TRACY HILLS SPECIFIC PLAN

DRAFT SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

VOLUME II

DECEMBER 2014

APPENDIX H-4

HIGHWAY RAMP MERGE/DIVERGE ANALYSIS (HCS), DATED FALL 2014

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	178
Ramp Volume, V_R	41
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	178	0.92	Level	18	0	0.917	1.00	211
Ramp	41	0.70	Level	11	0	0.948	1.00	62
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	***Estimation of v_{12}***

Merge Areas — Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   211   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas — Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	273	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	273	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   6.0   (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.299 (Exibit 13-11)

S_R =   61.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.6 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	178
Ramp Volume, V_R	58
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	178	0.92	Level	18	0	0.917	1.00	211
Ramp	58	0.69	Level	19	0	0.913	1.00	92
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   211 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	211	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	119	Exhibit 13-8	4800	No
V_R	92	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	211	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   4.3 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Speed Determination — Merge

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination — Diverge

D_s =   0.436 (Exhibit 13-12)

S_R =   57.8 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1689
Ramp Volume, V_R	325
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1689	0.92	Level	18	0	0.917	1.00	2001
Ramp	325	0.72	Level	13	0	0.939	1.00	481
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	*Estimation of v_{12}*

Merge Areas — Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000 using Equation (Exhibit 13-6)

V_{12} =   2001 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas — Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	2482	Exhibit 13-8	No

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2482	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   22.1 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.324 (Exibit 13-11)

S_R =   60.9 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.9 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			
☐ Yes	☐ On		
☑ No	☐ Off		
L_{up} =	ft		
V_u =	veh/h		

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	1	
Acceleration Lane Length, L_A		
Deceleration Lane Length L_D	200	
Freeway Volume, V_F	1886	
Ramp Volume, V_R	197	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	35.0	

Downstream Adj Ramp			
☐ Yes	☐ On		
☑ No	☐ Off		
L_{down} =	ft		
V_D =	veh/h		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1886	0.92	Level	18	0	0.917	1.00	2235
Ramp	197	0.77	Level	14	0	0.935	1.00	274
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Merge Areas — Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =	(Equation 13-6 or 13-7)
P_{FM} =	using Equation (Exhibit 13-6)
V_{12} =	pc/h
V_3 or V_{av34}	pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h?	☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2	☐ Yes ☐ No
If Yes, V_{12a} =	pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas — Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =	(Equation 13-12 or 13-13)
P_{FD} =	1.000 using Equation (Exhibit 13-7)
V_{12} =	2235 pc/h
V_3 or V_{av34}	0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h?	☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2	☐ Yes ☑ No
If Yes, V_{12a} =	pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F	2235	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1961	Exhibit 13-8	4800	No
V_R	274	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	2235	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =	(pc/mi/ln)
LOS =	(Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =	21.7 (pc/mi/ln)
LOS =	C (Exhibit 13-2)

Speed Determination (Merge)

M_S =	(Exibit 13-11)
S_R =	mph (Exhibit 13-11)
S_0 =	mph (Exhibit 13-11)
S =	mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =	0.453 (Exhibit 13-12)
S_R =	57.3 mph (Exhibit 13-12)
S_0 =	N/A mph (Exhibit 13-12)
S =	57.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information   Site Information

Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1433
Ramp Volume, V_R	333
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1433	0.92	Level	18	0	0.917	1.00	1698
Ramp	333	0.86	Level	6	0	0.971	1.00	399
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1698   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity	LOS F?
V_{FO}	2097	Exhibit 13-8	No

Diverge:

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}	2097	Exhibit 13-8 4600:All	No

Diverge:

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   20.1 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

Merge:

M_S =   0.325 (Exibit 13-11)

S_R =   60.9 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.9 mph (Exhibit 13-13)

Diverge:

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1433
Ramp Volume, V_R	263
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1433	0.92	Level	18	0	0.917	1.00	1698
Ramp	263	0.91	Level	8	0	0.962	1.00	301
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	**Estimation of v_{12}**

Merge:
$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation   (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:
$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   1698 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

	Actual	Capacity		LOS F?
V_F	1698	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1397	Exhibit 13-8	4800	No
V_R	301	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	1698	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   17.1 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Speed Determination

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination

D_s =   0.455 (Exhibit 13-12)

S_R =   57.3 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	967
Ramp Volume, V_R	86
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	967	0.92	Level	18	0	0.917	1.00	1146
Ramp	86	0.83	Level	5	0	0.976	1.00	106
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) | ### Estimation of v_{12} (Diverge)

Merge Areas — Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1146   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas — Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	1252	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1252	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   12.7 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination — Merge

M_S =   0.291 (Exibit 13-11)

S_R =   61.9 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.9 mph (Exhibit 13-13)

Speed Determination — Diverge

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			Downstream Adj Ramp	
☐ Yes	☐ On	Freeway Number of Lanes, N 2	☐ Yes	☐ On
☑ No	☐ Off	Ramp Number of Lanes, N 1	☑ No	☐ Off
		Acceleration Lane Length, L_A		
L_{up} = ft		Deceleration Lane Length L_D 200	L_{down} = ft	
		Freeway Volume, V_F 1019		
V_u = veh/h		Ramp Volume, V_R 52	V_D = veh/h	
		Freeway Free-Flow Speed, S_{FF} 70.0		
		Ramp Free-Flow Speed, S_{FR} 35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1019	0.92	Level	18	0	0.917	1.00	1207
Ramp	52	0.93	Level	4	0	0.980	1.00	57
UpStream								
DownStream								

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 1207 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks / Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		V_F	1207	Exhibit 13-8	4800	No
				$V_{FO} = V_F - V_R$	1150	Exhibit 13-8	4800	No
				V_R	57	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8		V_{12}	1207	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) / Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = (pc/mi/ln)	D_R = 12.8 (pc/mi/ln)
LOS = (Exhibit 13-2)	LOS = B (Exhibit 13-2)

Speed Determination / Speed Determination

M_S = (Exibit 13-11)	D_s = 0.433 (Exhibit 13-12)
S_R = mph (Exhibit 13-11)	S_R = 57.9 mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-11)	S_0 = N/A mph (Exhibit 13-12)
S = mph (Exhibit 13-13)	S = 57.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	1	
Acceleration Lane Length, L_A	250	
Deceleration Lane Length L_D		
Freeway Volume, V_F	178	
Ramp Volume, V_R	221	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	55.0	

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	178	0.92	Level	18	0	0.917	1.00	211
Ramp	221	0.70	Level	11	0	0.948	1.00	333
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   211   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	544	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	544	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   8.0 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.300 (Exibit 13-11)

S_R =   61.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.6 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = _____ ft

V_u = _____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	420
Ramp Volume, V_R	242
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = _____ ft

V_D = _____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	420	0.92	Level	18	0	0.917	1.00	498
Ramp	242	0.69	Level	19	0	0.913	1.00	384
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge) | Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = _____ (Equation 13-6 or 13-7)

P_{FM} = _____ using Equation (Exhibit 13-6)

V_{12} = _____ pc/h

V_3 or V_{av34} _____ pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = _____ (Equation 13-12 or 13-13)

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 498 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Diverge:

	Actual	Capacity		LOS F?
V_F	498	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	114	Exhibit 13-8	4800	No
V_R	384	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area | Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Diverge:

	Actual	Max Desirable	Violation?
V_{12}	498	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = _____ (pc/mi/ln)

LOS = _____ (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 6.7 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

Merge:

M_S = _____ (Exibit 13-11)

S_R = _____ mph (Exhibit 13-11)

S_0 = _____ mph (Exhibit 13-11)

S = _____ mph (Exhibit 13-13)

Diverge:

D_S = 0.463 (Exhibit 13-12)

S_R = 57.0 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 57.0 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = _____ ft

V_u = _____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1689
Ramp Volume, V_R	1171
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = _____ ft

V_D = _____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1689	0.92	Level	18	0	0.917	1.00	2001
Ramp	1171	0.72	Level	13	0	0.939	1.00	1732
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = _____ (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2001 pc/h

V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = _____ (Equation 13-12 or 13-13)

P_{FD} = _____ using Equation (Exhibit 13-7)

V_{12} = _____ pc/h

V_3 or V_{av34} = _____ pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	3733	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3733	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 31.3 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = _____ (pc/mi/ln)

LOS = _____ (Exhibit 13-2)

Speed Determination (Merge)

M_S = 0.440 (Exibit 13-11)

S_R = 57.7 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 57.7 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = _____ (Exhibit 13-12)

S_R = _____ mph (Exhibit 13-12)

S_0 = _____ mph (Exhibit 13-12)

S = _____ mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			
☐ Yes	☐ On		
☑ No	☐ Off		
L_{up} =	ft		
V_u =	veh/h		

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1960
Ramp Volume, V_R	271
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp	
☐ Yes	☐ On
☑ No	☐ Off
L_{down} =	ft
V_D =	veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1960	0.92	Level	18	0	0.917	1.00	2322
Ramp	271	0.77	Level	14	0	0.935	1.00	377
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge) | ### Estimation of v_{12} (Diverge)

Merge Areas — Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} =	(Equation 13-6 or 13-7)
P_{FM} =	using Equation (Exhibit 13-6)
V_{12} =	pc/h
V_3 or V_{av34}	pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h?	☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2	☐ Yes ☐ No
If Yes, V_{12a} =	pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas — Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =	(Equation 13-12 or 13-13)
P_{FD} =	1.000 using Equation (Exhibit 13-7)
V_{12} =	2322 pc/h
V_3 or V_{av34}	0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h?	☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2	☐ Yes ☑ No
If Yes, V_{12a} =	pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F	2322	Exhibit 13-8 4800	No
$V_{FO} = V_F - V_R$	1945	Exhibit 13-8 4800	No
V_R	377	Exhibit 13-10 2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	2322	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F) — Merge

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =	(pc/mi/ln)
LOS =	(Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =	22.4 (pc/mi/ln)
LOS =	C (Exhibit 13-2)

Speed Determination — Merge

M_S =	(Exibit 13-11)
S_R =	mph (Exhibit 13-11)
S_0 =	mph (Exhibit 13-11)
S =	mph (Exhibit 13-13)

Speed Determination — Diverge

D_S =	0.462 (Exhibit 13-12)
S_R =	57.1 mph (Exhibit 13-12)
S_0 =	N/A mph (Exhibit 13-12)
S =	57.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information
Site Information

Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Project

Project Description Tracy Hills Specific Plan

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1433
Ramp Volume, V_R	449
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1433	0.92	Level	18	0	0.917	1.00	1698
Ramp	449	0.86	Level	6	0	0.971	1.00	538
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) | ### Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1698 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2236	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2236	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 21.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination — Merge

M_S = 0.330 (Exibit 13-11)

S_R = 60.8 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

Speed Determination — Diverge

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2455
Ramp Volume, V_R	1022
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2455	0.92	Level	18	0	0.917	1.00	2909
Ramp	1022	0.91	Level	8	0	0.962	1.00	1168
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 2909 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks / Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8		V_F	2909	Exhibit 13-8 4800	No
				$V_{FO} = V_F - V_R$	1741	Exhibit 13-8 4800	No
				V_R	1168	Exhibit 13-10 2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8		V_{12}	2909	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F) / Level of Service Determination (if not F)

D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A	D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D
D_R = (pc/mi/ln)	D_R = 27.5 (pc/mi/ln)
LOS = (Exhibit 13-2)	LOS = C (Exhibit 13-2)

Speed Determination / Speed Determination

M_S = (Exibit 13-11)	D_s = 0.533 (Exhibit 13-12)
S_R = mph (Exhibit 13-11)	S_R = 55.1 mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-11)	S_0 = N/A mph (Exhibit 13-12)
S = mph (Exhibit 13-13)	S = 55.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	967
Ramp Volume, V_R	326
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	967	0.92	Level	18	0	0.917	1.00	1146
Ramp	326	0.83	Level	5	0	0.976	1.00	403
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1146   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	1549	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	1549	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   14.9 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.295 (Exibit 13-11)

S_R =   61.7 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.7 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			Downstream Adj Ramp	
☐ Yes ☐ On	Freeway Number of Lanes, N	2	☐ Yes ☐ On	
	Ramp Number of Lanes, N	1		
☑ No ☐ Off	Acceleration Lane Length, L_A		☑ No ☐ Off	
	Deceleration Lane Length L_D	200		
L_{up} = ft	Freeway Volume, V_F	1178	L_{down} = ft	
	Ramp Volume, V_R	211		
V_u = veh/h	Freeway Free-Flow Speed, S_{FF}	70.0	V_D = veh/h	
	Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1178	0.92	Level	18	0	0.917	1.00	1396
Ramp	211	0.93	Level	4	0	0.980	1.00	231
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} | Estimation of v_{12}

Estimation of v_{12} (Merge)	**Estimation of v_{12}** (Diverge)
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 1396 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks | Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8		V_F	1396	Exhibit 13-8 4800	No
				$V_{FO} = V_F - V_R$	1165	Exhibit 13-8 4800	No
				V_R	231	Exhibit 13-10 2000	No

Flow Entering Merge Influence Area | Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8		V_{12}	1396	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F) | Level of Service Determination (if not F)

Level of Service Determination (if not F) (Merge)	**Level of Service Determination (if not F)** (Diverge)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = (pc/mi/ln)	D_R = 14.5 (pc/mi/ln)
LOS = (Exhibit 13-2)	LOS = B (Exhibit 13-2)

Speed Determination | Speed Determination

Speed Determination (Merge)	**Speed Determination** (Diverge)
M_S = (Exibit 13-11)	D_s = 0.449 (Exhibit 13-12)
S_R = mph (Exhibit 13-11)	S_R = 57.4 mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-11)	S_0 = N/A mph (Exhibit 13-12)
S = mph (Exhibit 13-13)	S = 57.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information — Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing+Project Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1689
Ramp Volume, V_R	425
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1689	0.92	Level	18	0	0.917	1.00	2001
Ramp	425	0.72	Level	13	0	0.939	1.00	629
UpStream								
DownStream								

Merge Areas — Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 1.000 using Equation (Exhibit 13-6)
V_{12} = 2001 pc/h
V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	2630	Exhibit 13-8	No

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2630	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$
D_R = 23.2 (pc/mi/ln)
LOS = C (Exhibit 13-2)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = 0.331 (Exibit 13-11)
S_R = 60.7 mph (Exhibit 13-11)
S_0 = N/A mph (Exhibit 13-11)
S = 60.7 mph (Exhibit 13-13)

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing+Project Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	967
Ramp Volume, V_R	223
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	967	0.92	Level	18	0	0.917	1.00	1146
Ramp	223	0.83	Level	5	0	0.976	1.00	275
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 1146 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks | ### Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	1421	Exhibit 13-8	No

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area | ### Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	1421	Exhibit 13-8 4600:All	No

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) | ### Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   13.9 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination | ### Speed Determination

M_S =   0.293 (Exibit 13-11)

S_R =   61.8 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.8 mph (Exhibit 13-13)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	178
Ramp Volume, V_R	279
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	178	0.92	Level	18	0	0.917	1.00	211
Ramp	279	0.70	Level	11	0	0.948	1.00	420
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12}	*Estimation of v_{12}*
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 211 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks				*Capacity Checks*			
	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V_{FO}	631	Exhibit 13-8	No	V_F		Exhibit 13-8	
				$V_{FO} = V_F - V_R$		Exhibit 13-8	
				V_R		Exhibit 13-10	

Flow Entering Merge Influence Area				*Flow Entering Diverge Influence Area*			
	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}	631	Exhibit 13-8 4600:All	No	V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)	*Level of Service Determination (if not F)*
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = 8.6 (pc/mi/ln)	D_R = (pc/mi/ln)
LOS = A (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	*Speed Determination*
M_S = 0.301 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R = 61.6 mph (Exhibit 13-11)	S_R = mph (Exhibit 13-12)
S_0 = N/A mph (Exhibit 13-11)	S_0 = mph (Exhibit 13-12)
S = 61.6 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	540
Ramp Volume, V_R	362
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	540	0.92	Level	18	0	0.917	1.00	640
Ramp	362	0.69	Level	19	0	0.913	1.00	574
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   640 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	640	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	66	Exhibit 13-8	4800	No
V_R	574	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	640	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   8.0 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Speed Determination (Merge)

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   0.480 (Exhibit 13-12)

S_R =   56.6 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   56.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1689
Ramp Volume, V_R	1404
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1689	0.92	Level	18	0	0.917	1.00	2001
Ramp	1404	0.72	Level	13	0	0.939	1.00	2077
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2001 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity	LOS F?
V_{FO}	4078	Exhibit 13-8	No

Diverge:

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable		Violation?
V_{R12}	4078	Exhibit 13-8	4600:All	No

Diverge:

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 33.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

Merge:

M_S = 0.507 (Exibit 13-11)

S_R = 55.8 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 55.8 mph (Exhibit 13-13)

Diverge:

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ___ ft

V_u = ___ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2024
Ramp Volume, V_R	335
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ___ ft

V_D = ___ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2024	0.92	Level	18	0	0.917	1.00	2398
Ramp	335	0.77	Level	14	0	0.935	1.00	466
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = ___ (Equation 13-6 or 13-7)	L_{EQ} = ___ (Equation 13-12 or 13-13)
P_{FM} = ___ using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = ___ pc/h	V_{12} = 2398 pc/h
V_3 or V_{av34} = ___ pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = ___ pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = ___ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

	Actual	Capacity		LOS F?
V_F	2398	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1932	Exhibit 13-8	4800	No
V_R	466	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable	Violation?
V_{12}	2398	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = ___ (pc/mi/ln)

LOS = ___ (Exhibit 13-2)

Diverge:

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 23.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

Merge:

M_S = ___ (Exibit 13-11)

S_R = ___ mph (Exhibit 13-11)

S_0 = ___ mph (Exhibit 13-11)

S = ___ mph (Exhibit 13-13)

Diverge:

D_S = 0.470 (Exhibit 13-12)

S_R = 56.8 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 56.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1433
Ramp Volume, V_R	699
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1433	0.92	Level	18	0	0.917	1.00	1698
Ramp	699	0.86	Level	6	0	0.971	1.00	837
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1698   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2535	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2535	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   23.3 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.343 (Exibit 13-11)

S_R =   60.4 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.4 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} = ____ ft

V_u = ____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2525
Ramp Volume, V_R	1092
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} = ____ ft

V_D = ____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2525	0.92	Level	18	0	0.917	1.00	2992
Ramp	1092	0.91	Level	8	0	0.962	1.00	1248
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = ____ (Equation 13-6 or 13-7)

P_{FM} = ____ using Equation (Exhibit 13-6)

V_{12} = ____ pc/h

V_3 or V_{av34} = ____ pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = ____ (Equation 13-12 or 13-13)

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 2992 pc/h

V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Diverge:

	Actual	Capacity		LOS F?
V_F	2992	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1744	Exhibit 13-8	4800	No
V_R	1248	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Diverge:

	Actual	Max Desirable	Violation?
V_{12}	2992	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = ____ (pc/mi/ln)

LOS = ____ (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 28.2 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

Merge:

M_S = ____ (Exibit 13-11)

S_R = ____ mph (Exhibit 13-11)

S_0 = ____ mph (Exhibit 13-11)

S = ____ mph (Exhibit 13-13)

Diverge:

D_S = 0.540 (Exhibit 13-12)

S_R = 54.9 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 54.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N 2		☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N 1		☑ No ☐ Off
	Acceleration Lane Length, L_A 400		
	Deceleration Lane Length L_D		
L_{up} = ft	Freeway Volume, V_F 967		L_{down} = ft
	Ramp Volume, V_R 686		
V_u = veh/h	Freeway Free-Flow Speed, S_{FF} 70.0		V_D = veh/h
	Ramp Free-Flow Speed, S_{FR} 55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	967	0.92	Level	18	0	0.917	1.00	1146
Ramp	686	0.83	Level	5	0	0.976	1.00	847
UpStream								
DownStream								

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 1146 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	1993	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1993	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   18.1 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.306 (Exibit 13-11)

S_R =   61.4 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.4 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ____ ft

V_u = ____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1248
Ramp Volume, V_R	281
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ____ ft

V_D = ____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1248	0.92	Level	18	0	0.917	1.00	1479
Ramp	281	0.93	Level	4	0	0.980	1.00	308
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 1479 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8		V_F	1479	Exhibit 13-8 4800	No
				$V_{FO} = V_F - V_R$	1171	Exhibit 13-8 4800	No
				V_R	308	Exhibit 13-10 2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8		V_{12}	1479	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F)

Merge	Diverge
$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$	$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$
D_R = (pc/mi/ln)	D_R = 15.2 (pc/mi/ln)
LOS = (Exhibit 13-2)	LOS = B (Exhibit 13-2)

Speed Determination

Merge	Diverge
M_S = (Exibit 13-11)	D_s = 0.456 (Exhibit 13-12)
S_R = mph (Exhibit 13-11)	S_R = 57.2 mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-11)	S_0 = N/A mph (Exhibit 13-12)
S = mph (Exhibit 13-13)	S = 57.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
- [ ] Yes [ ] On
- [x] No [ ] Off

L_{up} =　　ft

V_u =　　veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	2	
Acceleration Lane Length, L_A		
Deceleration Lane Length L_D	200	
Freeway Volume, V_F	540	
Ramp Volume, V_R	362	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	35.0	

Downstream Adj Ramp
- [ ] Yes [ ] On
- [x] No [ ] Off

L_{down} =　　ft

V_D =　　veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	540	0.92	Level	18	0	0.917	1.00	640
Ramp	362	0.69	Level	19	0	0.913	1.00	574
UpStream								
DownStream								

Merge Areas — Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} =　(Equation 13-6 or 13-7)
P_{FM} =　using Equation (Exhibit 13-6)
V_{12} =　pc/h
V_3 or V_{av34} =　pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? [ ] Yes [ ] No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 [ ] Yes [ ] No
If Yes, V_{12a} =　pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas — Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =　(Equation 13-12 or 13-13)
P_{FD} =　1.000 using Equation (Exhibit 13-7)
V_{12} =　640 pc/h
V_3 or V_{av34} =　0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? [ ] Yes [x] No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 [ ] Yes [x] No
If Yes, V_{12a} =　pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	640	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	66	Exhibit 13-8	4800	No
V_R	574	Exhibit 13-10	4000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	640	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) — Merge

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$
D_R =　(pc/mi/ln)
LOS =　(Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R =　1.7 (pc/mi/ln)
LOS =　A (Exhibit 13-2)

Speed Determination — Merge

M_S =　(Exibit 13-11)
S_R =　mph (Exhibit 13-11)
S_0 =　mph (Exhibit 13-11)
S =　mph (Exhibit 13-13)

Speed Determination — Diverge

D_S =　0.480 (Exhibit 13-12)
S_R =　56.6 mph (Exhibit 13-12)
S_0 =　N/A mph (Exhibit 13-12)
S =　56.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			Downstream Adj Ramp	
☐ Yes ☐ On	Freeway Number of Lanes, N	2	☐ Yes ☐ On	
☑ No ☐ Off	Ramp Number of Lanes, N	2	☑ No ☐ Off	
	Acceleration Lane Length, L_A			
L_{up} = ft	Deceleration Lane Length L_D	200	L_{down} = ft	
	Freeway Volume, V_F	1092		
V_u = veh/h	Ramp Volume, V_R	2525	V_D = veh/h	
	Freeway Free-Flow Speed, S_{FF}	70.0		
	Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1092	0.92	Level	18	0	0.917	1.00	1294
Ramp	2525	0.91	Level	8	0	0.962	1.00	2886
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 1294 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8		V_F	1294	Exhibit 13-8 4800	No
				$V_{FO} = V_F - V_R$	-1592	Exhibit 13-8 4800	No
				V_R	2886	Exhibit 13-10 4000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8		V_{12}	1294	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F)

Merge	Diverge
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = (pc/mi/ln)	D_R = 7.3 (pc/mi/ln)
LOS = (Exhibit 13-2)	LOS = A (Exhibit 13-2)

Speed Determination

Merge	Diverge
M_S = (Exibit 13-11)	D_s = 0.688 (Exhibit 13-12)
S_R = mph (Exhibit 13-11)	S_R = 50.7 mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-11)	S_0 = N/A mph (Exhibit 13-12)
S = mph (Exhibit 13-13)	S = 50.7 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1689
Ramp Volume, V_R	648
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1689	0.92	Level	18	0	0.917	1.00	2001
Ramp	648	0.72	Level	13	0	0.939	1.00	958
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
### *Estimation of v_{12}*	### *Estimation of v_{12}*

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 2001 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	2959	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2959	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   25.6 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.352 (Exibit 13-11)

S_R =   60.1 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.1 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	967
Ramp Volume, V_R	543
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	967	0.92	Level	18	0	0.917	1.00	1146
Ramp	543	0.83	Level	5	0	0.976	1.00	671
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) | ### Estimation of v_{12} (Diverge)

Merge Areas

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000 using Equation (Exhibit 13-6)

V_{12} =   1146 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	1817	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1817	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   16.8 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.301 (Exibit 13-11)

S_R =   61.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.6 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			
☐ Yes ☐ On	Freeway Number of Lanes, N	2	Downstream Adj Ramp
	Ramp Number of Lanes, N	1	
☑ No ☐ Off	Acceleration Lane Length, L_A	250	☐ Yes ☐ On
	Deceleration Lane Length L_D		☑ No ☐ Off
L_{up} = ft	Freeway Volume, V_F	38	
	Ramp Volume, V_R	109	L_{down} = ft
V_u = veh/h	Freeway Free-Flow Speed, S_{FF}	70.0	V_D = veh/h
	Ramp Free-Flow Speed, S_{FR}	55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	38	0.92	Level	18	0	0.917	1.00	45
Ramp	109	0.70	Level	11	0	0.948	1.00	164
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	*Estimation of v_{12}*

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 45 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks | ### *Capacity Checks*

	Actual	Capacity	LOS F?
V_{FO}	209	Exhibit 13-8	No

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area | ### *Flow Entering Diverge Influence Area*

	Actual	Max Desirable	Violation?
V_{R12}	209	Exhibit 13-8 4600:All	No

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) | ### *Level of Service Determination (if not F)*

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = 5.5 (pc/mi/ln)	D_R = (pc/mi/ln)
LOS = A (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination | ### *Speed Determination*

M_S =	0.298 (Exibit 13-11)	D_s =	(Exhibit 13-12)
S_R =	61.6 mph (Exhibit 13-11)	S_R =	mph (Exhibit 13-12)
S_0 =	N/A mph (Exhibit 13-11)	S_0 =	mph (Exhibit 13-12)
S =	61.6 mph (Exhibit 13-13)	S =	mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	1	
Acceleration Lane Length, L_A	250	
Deceleration Lane Length L_D		
Freeway Volume, V_F	174	
Ramp Volume, V_R	41	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	55.0	

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	174	0.92	Level	18	0	0.917	1.00	206
Ramp	41	0.70	Level	11	0	0.948	1.00	62
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   206 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	268	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	268	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   6.0 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.299 (Exibit 13-11)

S_R =   61.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.6 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	215
Ramp Volume, V_R	177
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	215	0.92	Level	18	0	0.917	1.00	255
Ramp	177	0.69	Level	19	0	0.913	1.00	281
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)   ### Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   255 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

	Actual	Capacity		LOS F?
V_F	255	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	-26	Exhibit 13-8	4800	No
V_R	281	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	255	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   4.6 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Speed Determination

Merge:

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Diverge:

D_S =   0.453 (Exhibit 13-12)

S_R =   57.3 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	236
Ramp Volume, V_R	62
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	236	0.92	Level	18	0	0.917	1.00	280
Ramp	62	0.69	Level	19	0	0.913	1.00	98
UpStream								
DownStream								

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation   (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   280 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks

	Actual	Capacity		LOS F?
V_F	280	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	182	Exhibit 13-8	4800	No
V_R	98	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	280	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   4.9 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Speed Determination

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination

D_s =   0.437 (Exhibit 13-12)

S_R =   57.8 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Kimley-Horn & Associates
Agency or Company	
Date Performed	8/14/2014
Analysis Time Period	AM Peak

Freeway/Dir of Travel	I-580 WB
Junction	I-580/Corral Hollow Road
Jurisdiction	
Analysis Year	Cumulative

Project Description: Tracy Hills Specific Plan

Inputs

Upstream Adj Ramp

☐ Yes ☐ On
☑ No ☐ Off

L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1073
Ramp Volume, V_R	622
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On
☑ No ☐ Off

L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1073	0.92	Level	18	0	0.917	1.00	1271
Ramp	622	0.72	Level	13	0	0.939	1.00	920
UpStream								
DownStream								

Merge Areas / Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 1.000 using Equation (Exhibit 13-6)
V_{12} = 1271 pc/h
V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	2191	Exhibit 13-8	No

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2191	Exhibit 13-8 4600:All	No

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 19.6 (pc/mi/ln)
LOS = B (Exhibit 13-2)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = 0.312 (Exibit 13-11)
S_R = 61.3 mph (Exhibit 13-11)
S_0 = N/A mph (Exhibit 13-11)
S = 61.3 mph (Exhibit 13-13)

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1583
Ramp Volume, V_R	112
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1583	0.92	Level	18	0	0.917	1.00	1876
Ramp	112	0.72	Level	13	0	0.939	1.00	166
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1876   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2042	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2042	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   18.8 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.307 (Exibit 13-11)

S_R =   61.4 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.4 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp				Downstream Adj Ramp	
☐ Yes	☐ On	Freeway Number of Lanes, N	2	☐ Yes	☐ On
		Ramp Number of Lanes, N	1		
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
		Deceleration Lane Length L_D	200		
L_{up} =	ft	Freeway Volume, V_F	1545	L_{down} =	ft
		Ramp Volume, V_R	472		
V_u =	veh/h	Freeway Free-Flow Speed, S_{FF}	70.0	V_D =	veh/h
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1545	0.92	Level	18	0	0.917	1.00	1830
Ramp	472	0.77	Level	14	0	0.935	1.00	656
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} / *Estimation of v_{12}*

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 1830 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	1830	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1174	Exhibit 13-8	4800	No
V_R	656	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	1830	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 18.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination (Merge)

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = 0.487 (Exhibit 13-12)

S_R = 56.4 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 56.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1567
Ramp Volume, V_R	695
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1567	0.92	Level	18	0	0.917	1.00	1857
Ramp	695	0.86	Level	6	0	0.971	1.00	832
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000 using Equation (Exhibit 13-6)

V_{12} =   1857   pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2689	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2689	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 \, v_R + 0.0078 \, V_{12} - 0.00627 \, L_A$$

D_R =   24.5 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 \, V_{12} - 0.009 \, L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.351 (Exibit 13-11)

S_R =   60.2 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.2 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1806
Ramp Volume, V_R	252
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1806	0.92	Level	18	0	0.917	1.00	2140
Ramp	252	0.86	Level	6	0	0.971	1.00	302
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2140 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity	LOS F?
V_{FO}	2442	Exhibit 13-8	No

Diverge:

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}	2442	Exhibit 13-8 4600:All	No

Diverge:

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 22.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

Merge:

M_S = 0.338 (Exibit 13-11)

S_R = 60.5 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 60.5 mph (Exhibit 13-13)

Diverge:

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On
☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2058
Ramp Volume, V_R	491
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On
☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2058	0.92	Level	18	0	0.917	1.00	2438
Ramp	491	0.91	Level	2	0	0.990	1.00	545
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)
P_{FM} =   using Equation (Exhibit 13-6)
V_{12} =   pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)
P_{FD} =   1.000 using Equation (Exhibit 13-7)
V_{12} =   2438 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	2438	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1893	Exhibit 13-8	4800	No
V_R	545	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	2438	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)
LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   23.4 (pc/mi/ln)
LOS =   C (Exhibit 13-2)

Speed Determination — Merge

M_S =   (Exibit 13-11)
S_R =   mph (Exhibit 13-11)
S_0 =   mph (Exhibit 13-11)
S =   mph (Exhibit 13-13)

Speed Determination — Diverge

D_S =   0.477 (Exhibit 13-12)
S_R =   56.6 mph (Exhibit 13-12)
S_0 =   N/A mph (Exhibit 13-12)
S =   56.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			
☐ Yes	☐ On		
☑ No	☐ Off		

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2118
Ramp Volume, V_R	312
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp			
☐ Yes	☐ On		
☑ No	☐ Off		

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2118	0.92	Level	18	0	0.917	1.00	2509
Ramp	312	0.91	Level	2	0	0.990	1.00	346
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   2509 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Diverge:

	Actual	Capacity		LOS F?
V_F	2509	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	2163	Exhibit 13-8	4800	No
V_R	346	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Diverge:

	Actual	Max Desirable		Violation?
V_{12}	2509	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 24.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

Merge:

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Diverge:

D_S = 0.459 (Exhibit 13-12)

S_R = 57.1 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 57.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	2	Downstream Adj Ramp	
☐ Yes ☐ On		Ramp Number of Lanes, N	1	☐ Yes ☐ On	
		Acceleration Lane Length, L_A	400		
☑ No ☐ Off		Deceleration Lane Length L_D		☑ No ☐ Off	
		Freeway Volume, V_F	1139		
L_{up} = ft		Ramp Volume, V_R	271	L_{down} = ft	
V_u = veh/h		Freeway Free-Flow Speed, S_{FF}	70.0	V_D = veh/h	
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1139	0.92	Level	18	0	0.917	1.00	1349
Ramp	271	0.83	Level	7	0	0.966	1.00	338
UpStream								
DownStream								

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 1349 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks				Capacity Checks			
	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V_{FO}	1687	Exhibit 13-8	No	V_F		Exhibit 13-8	
				$V_{FO} = V_F - V_R$		Exhibit 13-8	
				V_R		Exhibit 13-10	

Flow Entering Merge Influence Area				Flow Entering Diverge Influence Area			
	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}	1687	Exhibit 13-8 4600:All	No	V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = 16.0 (pc/mi/ln)	D_R = (pc/mi/ln)
LOS = B (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.298 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R = 61.7 mph (Exhibit 13-11)	S_R = mph (Exhibit 13-12)
S_0 = N/A mph (Exhibit 13-11)	S_0 = mph (Exhibit 13-12)
S = 61.7 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1318
Ramp Volume, V_R	246
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1318	0.92	Level	18	0	0.917	1.00	1562
Ramp	246	0.83	Level	7	0	0.966	1.00	307
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1562   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	1869	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	1869	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   17.4 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.302 (Exibit 13-11)

S_R =   61.5 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.5 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ____ ft

V_u = ____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1245
Ramp Volume, V_R	106
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ____ ft

V_D = ____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1245	0.92	Level	18	0	0.917	1.00	1475
Ramp	106	0.93	Level	4	0	0.980	1.00	116
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = ____ (Equation 13-6 or 13-7)
P_{FM} = ____ using Equation (Exhibit 13-6)
V_{12} = ____ pc/h
V_3 or V_{av34} = ____ pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = ____ (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 1475 pc/h
V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	1475	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1359	Exhibit 13-8	4800	No
V_R	116	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	1475	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = ____ (pc/mi/ln)
LOS = ____ (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 15.1 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination (Merge)

M_S = ____ (Exibit 13-11)
S_R = ____ mph (Exhibit 13-11)
S_0 = ____ mph (Exhibit 13-11)
S = ____ mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = 0.438 (Exhibit 13-12)
S_R = 57.7 mph (Exhibit 13-12)
S_0 = N/A mph (Exhibit 13-12)
S = 57.7 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	2	Downstream Adj Ramp	
☐ Yes ☐ On		Ramp Number of Lanes, N	1	☐ Yes ☐ On	
		Acceleration Lane Length, L_A			
☑ No ☐ Off		Deceleration Lane Length L_D	200	☑ No ☐ Off	
		Freeway Volume, V_F	1410		
L_{up} = ft		Ramp Volume, V_R	92	L_{down} = ft	
		Freeway Free-Flow Speed, S_{FF}	70.0		
V_u = veh/h		Ramp Free-Flow Speed, S_{FR}	35.0	V_D = veh/h	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1410	0.92	Level	18	0	0.917	1.00	1671
Ramp	92	0.93	Level	4	0	0.980	1.00	101
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 1671 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Diverge

	Actual	Capacity		LOS F?
V_F	1671	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1570	Exhibit 13-8	4800	No
V_R	101	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	1671	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Diverge

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 16.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

Merge

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge

D_S = 0.437 (Exhibit 13-12)

S_R = 57.8 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 57.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	67
Ramp Volume, V_R	129
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	67	0.92	Level	18	0	0.917	1.00	79
Ramp	129	0.70	Level	11	0	0.948	1.00	194
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000 using Equation (Exhibit 13-6)

V_{12} =   79 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	273	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	273	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   5.9 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.299 (Exibit 13-11)

S_R =   61.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.6 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	204
Ramp Volume, V_R	70
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	204	0.92	Level	18	0	0.917	1.00	242
Ramp	70	0.70	Level	11	0	0.948	1.00	106
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	**Estimation of v_{12}**

Merge Areas	Diverge Areas
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 242 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge (left):

	Actual	Capacity	LOS F?
V_{FO}	348	Exhibit 13-8	No

Diverge (right) — Capacity Checks:

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	348	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

Merge:

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   6.6 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Diverge:

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

Merge:

M_S =   0.299 (Exibit 13-11)

S_R =   61.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.6 mph (Exhibit 13-13)

Diverge:

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp		
☐ Yes	☐ On	
☑ No	☐ Off	
L_{up} =		ft
V_u =		veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	1	
Acceleration Lane Length, L_A		
Deceleration Lane Length L_D	200	
Freeway Volume, V_F	274	
Ramp Volume, V_R	207	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	35.0	

Downstream Adj Ramp		
☐ Yes	☐ On	
☑ No	☐ Off	
L_{down} =		ft
V_D =		veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	274	0.92	Level	18	0	0.917	1.00	325
Ramp	207	0.69	Level	19	0	0.913	1.00	329
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 325 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

	Actual	Capacity		LOS F?
V_F	325	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	-4	Exhibit 13-8	4800	No
V_R	329	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable		Violation?
V_{12}	325	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge	Diverge
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = (pc/mi/ln)	D_R = 5.2 (pc/mi/ln)
LOS = (Exhibit 13-2)	LOS = A (Exhibit 13-2)

Speed Determination

Merge	Diverge
M_S = (Exibit 13-11)	D_s = 0.458 (Exhibit 13-12)
S_R = mph (Exhibit 13-11)	S_R = 57.2 mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-11)	S_0 = N/A mph (Exhibit 13-12)
S = mph (Exhibit 13-13)	S = 57.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	355
Ramp Volume, V_R	151
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	355	0.92	Level	18	0	0.917	1.00	421
Ramp	151	0.69	Level	19	0	0.913	1.00	240
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 421 pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Diverge

	Actual	Capacity		LOS F?
V_F	421	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	181	Exhibit 13-8	4800	No
V_R	240	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Diverge

	Actual	Max Desirable	Violation?
V_{12}	421	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Diverge

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   6.1 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Speed Determination

Merge

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Diverge

D_s =   0.450 (Exhibit 13-12)

S_R =   57.4 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ____ ft

V_u = ____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1242
Ramp Volume, V_R	702
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ____ ft

V_D = ____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1242	0.92	Level	18	0	0.917	1.00	1472
Ramp	702	0.72	Level	13	0	0.939	1.00	1038
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = ____ (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1472 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = ____ (Equation 13-12 or 13-13)

P_{FD} = ____ using Equation (Exhibit 13-7)

V_{12} = ____ pc/h

V_3 or V_{av34} ____ pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2510	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2510	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 22.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = ____ (pc/mi/ln)

LOS = ____ (Exhibit 13-2)

Speed Determination — Merge

M_S = 0.325 (Exibit 13-11)

S_R = 60.9 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 60.9 mph (Exhibit 13-13)

Speed Determination — Diverge

D_s = ____ (Exhibit 13-12)

S_R = ____ mph (Exhibit 13-12)

S_0 = ____ mph (Exhibit 13-12)

S = ____ mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1663
Ramp Volume, V_R	391
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1663	0.92	Level	18	0	0.917	1.00	1970
Ramp	391	0.72	Level	13	0	0.939	1.00	578
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 1970 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	2548	Exhibit 13-8	No

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2548	Exhibit 13-8 4600:All	No

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

Merge	Diverge
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = 22.6 (pc/mi/ln)	D_R = (pc/mi/ln)
LOS = C (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination

Merge	Diverge
M_S = 0.327 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R = 60.8 mph (Exhibit 13-11)	S_R = mph (Exhibit 13-12)
S_0 = N/A mph (Exhibit 13-11)	S_0 = mph (Exhibit 13-12)
S = 60.8 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp				Downstream Adj Ramp	
☐ Yes	☐ On	Freeway Number of Lanes, N	2	☐ Yes	☐ On
		Ramp Number of Lanes, N	1		
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
		Deceleration Lane Length L_D	200		
L_{up} =	ft	Freeway Volume, V_F	1794	L_{down} =	ft
		Ramp Volume, V_R	552		
V_u =	veh/h	Freeway Free-Flow Speed, S_{FF}	70.0	V_D =	veh/h
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1794	0.92	Level	18	0	0.917	1.00	2126
Ramp	552	0.77	Level	14	0	0.935	1.00	767
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = pc/h	V_{12} = 2126 pc/h
V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

	Actual	Capacity		LOS F?
V_F	2126	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1359	Exhibit 13-8	4800	No
V_R	767	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable		Violation?
V_{12}	2126	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge	Diverge
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = (pc/mi/ln)	D_R = 20.7 (pc/mi/ln)
LOS = (Exhibit 13-2)	LOS = C (Exhibit 13-2)

Speed Determination

Merge	Diverge
M_S = (Exibit 13-11)	D_s = 0.497 (Exhibit 13-12)
S_R = mph (Exhibit 13-11)	S_R = 56.1 mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-11)	S_0 = N/A mph (Exhibit 13-12)
S = mph (Exhibit 13-13)	S = 56.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1944
Ramp Volume, V_R	281
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1944	0.92	Level	18	0	0.917	1.00	2303
Ramp	281	0.77	Level	14	0	0.935	1.00	390
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000   using Equation (Exhibit 13-7)

V_{12} =   2303   pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	2303	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1913	Exhibit 13-8	4800	No
V_R	390	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	2303	Exhibit 13-8	4400:All No

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   22.3 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Speed Determination (Merge)

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   0.463 (Exhibit 13-12)

S_R =   57.0 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.0 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information | Site Information

Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1666
Ramp Volume, V_R	875
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1666	0.92	Level	18	0	0.917	1.00	1974
Ramp	875	0.86	Level	6	0	0.971	1.00	1048
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1974 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	3022	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3022	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 27.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination (Merge)

M_S = 0.374 (Exibit 13-11)

S_R = 59.5 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 59.5 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1946
Ramp Volume, V_R	351
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1946	0.92	Level	18	0	0.917	1.00	2306
Ramp	351	0.86	Level	6	0	0.971	1.00	420
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12}

Merge Areas

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   2306   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge Areas

	Actual	Capacity	LOS F?
V_{FO}	2726	Exhibit 13-8	No

Capacity Checks — Diverge Areas

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2726	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

Merge Areas

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   25.0 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Diverge Areas

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

Merge Areas

M_S =   0.353 (Exibit 13-11)

S_R =   60.1 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.1 mph (Exhibit 13-13)

Diverge Areas

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2297
Ramp Volume, V_R	631
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2297	0.92	Level	18	0	0.917	1.00	2721
Ramp	631	0.91	Level	2	0	0.990	1.00	700
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation   (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   2721 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	2721	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	2021	Exhibit 13-8	4800	No
V_R	700	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	2721	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   25.9 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Speed Determination (Merge)

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   0.491 (Exhibit 13-12)

S_R =   56.3 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   56.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	1	
Acceleration Lane Length, L_A		
Deceleration Lane Length L_D	200	
Freeway Volume, V_F	2527	
Ramp Volume, V_R	581	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	35.0	

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2527	0.92	Level	18	0	0.917	1.00	2994
Ramp	581	0.91	Level	2	0	0.990	1.00	645
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   2994 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Diverge:

	Actual	Capacity		LOS F?
V_F	2994	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	2349	Exhibit 13-8	4800	No
V_R	645	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Diverge:

	Actual	Max Desirable	Violation?
V_{12}	2994	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   28.2 (pc/mi/ln)

LOS =   D (Exhibit 13-2)

Speed Determination

Merge:

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Diverge:

D_s =   0.486 (Exhibit 13-12)

S_R =   56.4 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   56.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			Downstream Adj Ramp	
	Freeway Number of Lanes, N	2		
☐ Yes ☐ On	Ramp Number of Lanes, N	1	☐ Yes ☐ On	
	Acceleration Lane Length, L_A	400		
☑ No ☐ Off	Deceleration Lane Length L_D		☑ No ☐ Off	
	Freeway Volume, V_F	1198		
L_{up} = ft	Ramp Volume, V_R	411	L_{down} = ft	
	Freeway Free-Flow Speed, S_{FF}	70.0		
V_u = veh/h	Ramp Free-Flow Speed, S_{FR}	55.0	V_D = veh/h	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1198	0.92	Level	18	0	0.917	1.00	1419
Ramp	411	0.83	Level	7	0	0.966	1.00	513
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	**Estimation of v_{12}**
$$V_{12} = V_F (P_{FM})$$	$$V_{12} = V_R + (V_F - V_R)P_{FD}$$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 1419 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐Yes ☑No	Is V_3 or V_{av34} > 2,700 pc/h? ☐Yes ☐No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐Yes ☑No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐Yes ☐No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	1932	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1932	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   17.8 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.304 (Exibit 13-11)

S_R =   61.5 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.5 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1458
Ramp Volume, V_R	595
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1458	0.92	Level	18	0	0.917	1.00	1727
Ramp	595	0.83	Level	7	0	0.966	1.00	742
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1727   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2469	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2469	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   21.9 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination — Merge

M_S =   0.323 (Exibit 13-11)

S_R =   61.0 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.0 mph (Exhibit 13-13)

Speed Determination — Diverge

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1404
Ramp Volume, V_R	206
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1404	0.92	Level	18	0	0.917	1.00	1663
Ramp	206	0.93	Level	4	0	0.980	1.00	226
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$V_{12} = V_F (P_{FM})$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation   (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   1663 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

Diverge:

	Actual	Capacity	LOS F?
V_F	1663	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1437	Exhibit 13-8	4800	No
V_R	226	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Diverge:

	Actual	Max Desirable	Violation?
V_{12}	1663	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Diverge:

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   16.8 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Speed Determination

Merge:

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Diverge:

D_S =   0.448 (Exhibit 13-12)

S_R =   57.4 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information | Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Project
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
- [ ] Yes [ ] On
- [x] No [ ] Off

L_{up} =   ft
V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1609
Ramp Volume, V_R	151
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
- [ ] Yes [ ] On
- [x] No [ ] Off

L_{down} =   ft
V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1609	0.92	Level	18	0	0.917	1.00	1906
Ramp	151	0.93	Level	4	0	0.980	1.00	166
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$V_{12} = V_F (P_{FM})$
L_{EQ} =   (Equation 13-6 or 13-7)
P_{FM} =   using Equation (Exhibit 13-6)
V_{12} =   pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? [ ] Yes [ ] No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 [ ] Yes [ ] No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} =   (Equation 13-12 or 13-13)
P_{FD} =   1.000 using Equation (Exhibit 13-7)
V_{12} =   1906 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? [ ] Yes [x] No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 [ ] Yes [x] No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

	Actual	Capacity	LOS F?
V_F	1906	Exhibit 13-8 4800	No
$V_{FO} = V_F - V_R$	1740	Exhibit 13-8 4800	No
V_R	166	Exhibit 13-10 2000	No

Flow Entering Merge Influence Area | Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable	Violation?
V_{12}	1906	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$
D_R =   (pc/mi/ln)
LOS =   (Exhibit 13-2)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R =   18.8 (pc/mi/ln)
LOS =   B (Exhibit 13-2)

Speed Determination

M_S =   (Exibit 13-11)
S_R =   mph (Exhibit 13-11)
S_0 =   mph (Exhibit 13-11)
S =   mph (Exhibit 13-13)

D_s =   0.443 (Exhibit 13-12)
S_R =   57.6 mph (Exhibit 13-12)
S_0 =   N/A mph (Exhibit 13-12)
S =   57.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative+Project Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	355
Ramp Volume, V_R	151
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	355	0.92	Level	18	0	0.917	1.00	421
Ramp	151	0.69	Level	19	0	0.913	1.00	240
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation   (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   421 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

	Actual	Capacity		LOS F?
V_F	421	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	181	Exhibit 13-8	4800	No
V_R	240	Exhibit 13-10	4000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable	Violation?
V_{12}	421	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   -0.2 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Speed Determination

Merge:

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Diverge:

D_s =   0.450 (Exhibit 13-12)

S_R =   57.4 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information | Site Information

Analyst	Kimley-Horn & Associates
Agency or Company	
Date Performed	8/14/2014
Analysis Time Period	PM Peak
Project Description	Tracy Hills Specific Plan

Freeway/Dir of Travel	I-580 EB
Junction	I-580 and Lammers Road
Jurisdiction	
Analysis Year	Cumulative+Project Mitigated

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2527
Ramp Volume, V_R	581
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2527	0.92	Level	18	0	0.917	1.00	2994
Ramp	581	0.91	Level	2	0	0.990	1.00	645
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$V_{12} = V_F (P_{FM})$

L_{EQ} =   (Equation 13-6 or 13-7)
P_{FM} =   using Equation (Exhibit 13-6)
V_{12} =   pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =   (Equation 13-12 or 13-13)
P_{FD} =   1.000 using Equation (Exhibit 13-7)
V_{12} =   2994 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks | Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

	Actual	Capacity	LOS F?
V_F	2994	Exhibit 13-8 4800	No
$V_{FO} = V_F - V_R$	2349	Exhibit 13-8 4800	No
V_R	645	Exhibit 13-10 4000	No

Flow Entering Merge Influence Area | Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable	Violation?
V_{12}	2994	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F) | Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)
LOS =   (Exhibit 13-2)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   21.9 (pc/mi/ln)
LOS =   C (Exhibit 13-2)

Speed Determination | Speed Determination

M_S =   (Exibit 13-11)
S_R =   mph (Exhibit 13-11)
S_0 =   mph (Exhibit 13-11)
S =   mph (Exhibit 13-13)

D_s =   0.486 (Exhibit 13-12)
S_R =   56.4 mph (Exhibit 13-12)
S_0 =   N/A mph (Exhibit 13-12)
S =   56.4 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	87
Ramp Volume, V_R	169
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	87	0.92	Level	18	0	0.917	1.00	103
Ramp	169	0.70	Level	11	0	0.948	1.00	255
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   103   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	358	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	358	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   6.6 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.299 (Exibit 13-11)

S_R =   61.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.6 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	304
Ramp Volume, V_R	90
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	304	0.92	Level	18	0	0.917	1.00	360
Ramp	90	0.70	Level	11	0	0.948	1.00	136
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   360   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	496	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	496	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   7.7 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.300 (Exibit 13-11)

S_R =   61.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.6 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	394
Ramp Volume, V_R	307
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	394	0.92	Level	18	0	0.917	1.00	467
Ramp	307	0.69	Level	19	0	0.913	1.00	487
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$V_{12} = V_F (P_{FM})$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   467 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	467	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	-20	Exhibit 13-8	4800	No
V_R	487	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	467	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) — Merge

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   6.5 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Speed Determination (Merge)

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination (Diverge)

D_S =   0.472 (Exhibit 13-12)

S_R =   56.8 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   56.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} =   ft
V_u =   veh/h

Freeway Number of Lanes, N   2
Ramp Number of Lanes, N   1
Acceleration Lane Length, L_A
Deceleration Lane Length L_D 200
Freeway Volume, V_F 475
Ramp Volume, V_R 171
Freeway Free-Flow Speed, S_{FF} 70.0
Ramp Free-Flow Speed, S_{FR} 35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} =   ft
V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	475	0.92	Level	18	0	0.917	1.00	563
Ramp	171	0.69	Level	19	0	0.913	1.00	271
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)
P_{FM} =   using Equation (Exhibit 13-6)
V_{12} =   pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)
P_{FD} =   1.000   using Equation (Exhibit 13-7)
V_{12} =   563 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	563	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	292	Exhibit 13-8	4800	No
V_R	271	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	563	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)
LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   7.3 (pc/mi/ln)
LOS =   A (Exhibit 13-2)

Speed Determination (Merge)

M_S =   (Exibit 13-11)
S_R =   mph (Exhibit 13-11)
S_0 =   mph (Exhibit 13-11)
S =   mph (Exhibit 13-13)

Speed Determination (Diverge)

D_S =   0.452 (Exhibit 13-12)
S_R =   57.3 mph (Exhibit 13-12)
S_0 =   N/A mph (Exhibit 13-12)
S =   57.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N	2	☐ Yes ☐ On
	Ramp Number of Lanes, N	1	
☑ No ☐ Off	Acceleration Lane Length, L_A	400	☑ No ☐ Off
	Deceleration Lane Length L_D		
L_{up} = ft	Freeway Volume, V_F	1262	L_{down} = ft
	Ramp Volume, V_R	802	
V_u = veh/h	Freeway Free-Flow Speed, S_{FF}	70.0	V_D = veh/h
	Ramp Free-Flow Speed, S_{FR}	55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1262	0.92	Level	18	0	0.917	1.00	1495
Ramp	802	0.72	Level	13	0	0.939	1.00	1186
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) | ### Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1495   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2681	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2681	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) — Merge

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   23.3 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F) — Diverge

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.334 (Exibit 13-11)

S_R =   60.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.6 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	1	
Acceleration Lane Length, L_A	400	
Deceleration Lane Length L_D		
Freeway Volume, V_F	1763	
Ramp Volume, V_R	421	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	55.0	

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1763	0.92	Level	18	0	0.917	1.00	2089
Ramp	421	0.72	Level	13	0	0.939	1.00	623
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12}

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 2089 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity	LOS F?
V_{FO}	2712	Exhibit 13-8	No

Diverge:

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2712	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

Merge:

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   23.8 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Diverge:

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

Merge:

M_S =   0.336 (Exibit 13-11)

S_R =   60.6 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.6 mph (Exhibit 13-13)

Diverge:

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ____ ft

V_u = ____ veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	1	
Acceleration Lane Length, L_A		
Deceleration Lane Length L_D	200	
Freeway Volume, V_F	1874	
Ramp Volume, V_R	612	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	35.0	

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ____ ft

V_D = ____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1874	0.92	Level	18	0	0.917	1.00	2220
Ramp	612	0.77	Level	14	0	0.935	1.00	850
UpStream								
DownStream								

Merge Areas / Diverge Areas

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = ____ (Equation 13-6 or 13-7)	L_{EQ} = ____ (Equation 13-12 or 13-13)
P_{FM} = ____ using Equation (Exhibit 13-6)	P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = ____ pc/h	V_{12} = 2220 pc/h
V_3 or V_{av34} ____ pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

	Actual	Capacity	LOS F?
V_F	2220	Exhibit 13-8 — 4800	No
$V_{FO} = V_F - V_R$	1370	Exhibit 13-8 — 4800	No
V_R	850	Exhibit 13-10 — 2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable	Violation?
V_{12}	2220	Exhibit 13-8 — 4400:All	No

Level of Service Determination (if not F)

Merge	Diverge
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = ____ (pc/mi/ln)	D_R = 21.5 (pc/mi/ln)
LOS = ____ (Exhibit 13-2)	LOS = C (Exhibit 13-2)

Speed Determination

Merge	Diverge
M_S = ____ (Exibit 13-11)	D_s = 0.505 (Exhibit 13-12)
S_R = ____ mph (Exhibit 13-11)	S_R = 55.9 mph (Exhibit 13-12)
S_0 = ____ mph (Exhibit 13-11)	S_0 = N/A mph (Exhibit 13-12)
S = ____ mph (Exhibit 13-13)	S = 55.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes　☐ On

☑ No　☐ Off

L_{up} = 　ft

V_u = 　veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2064
Ramp Volume, V_R	301
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes　☐ On

☑ No　☐ Off

L_{down} = 　ft

V_D = 　veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2064	0.92	Level	18	0	0.917	1.00	2445
Ramp	301	0.77	Level	14	0	0.935	1.00	418
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} =　(Equation 13-6 or 13-7)	L_{EQ} =　(Equation 13-12 or 13-13)
P_{FM} =　using Equation (Exhibit 13-6)	P_{FD} =　1.000　using Equation (Exhibit 13-7)
V_{12} =　pc/h	V_{12} =　2445　pc/h
V_3 or V_{av34}　pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34}　0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} =　pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} =　pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

	Actual	Capacity	LOS F?
V_F	2445	Exhibit 13-8　4800	No
$V_{FO} = V_F - V_R$	2027	Exhibit 13-8　4800	No
V_R	418	Exhibit 13-10　2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable	Violation?
V_{12}	2445	Exhibit 13-8　4400:All	No

Level of Service Determination (if not F)

Merge: $D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =　(pc/mi/ln)

LOS =　(Exhibit 13-2)

Diverge: $D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =　23.5 (pc/mi/ln)

LOS =　C (Exhibit 13-2)

Speed Determination

Merge:

M_S =　(Exibit 13-11)

S_R =　mph (Exhibit 13-11)

S_0 =　mph (Exhibit 13-11)

S =　mph (Exhibit 13-13)

Diverge:

D_S =　0.466 (Exhibit 13-12)

S_R =　57.0 mph (Exhibit 13-12)

S_0 =　N/A mph (Exhibit 13-12)

S =　57.0 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp				Downstream Adj Ramp	
☐ Yes ☐ On	Freeway Number of Lanes, N	2		☐ Yes ☐ On	
	Ramp Number of Lanes, N	1			
☑ No ☐ Off	Acceleration Lane Length, L_A	250		☑ No ☐ Off	
	Deceleration Lane Length L_D				
L_{up} = ft	Freeway Volume, V_F	1706		L_{down} = ft	
	Ramp Volume, V_R	985			
V_u = veh/h	Freeway Free-Flow Speed, S_{FF}	70.0		V_D = veh/h	
	Ramp Free-Flow Speed, S_{FR}	55.0			

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1706	0.92	Level	18	0	0.917	1.00	2021
Ramp	985	0.86	Level	6	0	0.971	1.00	1180
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	*Estimation of v_{12}*

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 2021 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	3201	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3201	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 28.3 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination (Merge)

M_S = 0.389 (Exibit 13-11)

S_R = 59.1 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 59.1 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1433
Ramp Volume, V_R	333
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1433	0.92	Level	18	0	0.917	1.00	1698
Ramp	333	0.86	Level	6	0	0.971	1.00	399
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1698   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2097	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2097	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   20.1 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination (Merge)

M_S =   0.325 (Exibit 13-11)

S_R =   60.9 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.9 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2547
Ramp Volume, V_R	841
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2547	0.92	Level	18	0	0.917	1.00	3018
Ramp	841	0.91	Level	2	0	0.990	1.00	933
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 3018 pc/h
V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	3018	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	2085	Exhibit 13-8	4800	No
V_R	933	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3018	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 28.4 (pc/mi/ln)
LOS = D (Exhibit 13-2)

Speed Determination (Merge)

M_S = (Exibit 13-11)
S_R = mph (Exhibit 13-11)
S_0 = mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = 0.512 (Exhibit 13-12)
S_R = 55.7 mph (Exhibit 13-12)
S_0 = N/A mph (Exhibit 13-12)
S = 55.7 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
- [ ] Yes [ ] On
- [x] No   [ ] Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2757
Ramp Volume, V_R	601
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
- [ ] Yes [ ] On
- [x] No   [ ] Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2757	0.92	Level	18	0	0.917	1.00	3266
Ramp	601	0.91	Level	2	0	0.990	1.00	667
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$V_{12} = V_F (P_{FM})$

L_{EQ} =   (Equation 13-6 or 13-7)
P_{FM} =   using Equation (Exhibit 13-6)
V_{12} =   pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? [ ] Yes [ ] No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 [ ] Yes [ ] No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =   (Equation 13-12 or 13-13)
P_{FD} =   1.000 using Equation (Exhibit 13-7)
V_{12} =   3266 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? [ ] Yes [x] No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 [ ] Yes [x] No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

	Actual	Capacity		LOS F?
V_F	3266	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	2599	Exhibit 13-8	4800	No
V_R	667	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area | Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable	Violation?
V_{12}	3266	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)
LOS =   (Exhibit 13-2)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   30.5 (pc/mi/ln)
LOS =   D (Exhibit 13-2)

Speed Determination

M_S =   (Exibit 13-11)
S_R =   mph (Exhibit 13-11)
S_0 =   mph (Exhibit 13-11)
S =   mph (Exhibit 13-13)

D_S =   0.488 (Exhibit 13-12)
S_R =   56.3 mph (Exhibit 13-12)
S_0 =   N/A mph (Exhibit 13-12)
S =   56.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	*Site Information*	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	1	
Acceleration Lane Length, L_A	400	
Deceleration Lane Length L_D		
Freeway Volume, V_F	1218	
Ramp Volume, V_R	691	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	55.0	

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1218	0.92	Level	18	0	0.917	1.00	1443
Ramp	691	0.83	Level	7	0	0.966	1.00	862
UpStream								
DownStream								

Merge Areas	**Diverge Areas**
Estimation of v_{12}	**Estimation of v_{12}**
$V_{12} = V_F(P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 1443 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	2305	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2305	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   20.5 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.316 (Exibit 13-11)

S_R =   61.1 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.1 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} = _____ ft

V_u = _____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1738
Ramp Volume, V_R	685
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} = _____ ft

V_D = _____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1738	0.92	Level	18	0	0.917	1.00	2059
Ramp	685	0.83	Level	7	0	0.966	1.00	854
UpStream								
DownStream								

Merge Areas	Diverge Areas
Estimation of v_{12}	**Estimation of v_{12}**

$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = _____ (Equation 13-6 or 13-7)	L_{EQ} = _____ (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = _____ using Equation (Exhibit 13-7)
V_{12} = 2059 pc/h	V_{12} = _____ pc/h
V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} = _____ pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	2913	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2913	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 25.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = _____ (pc/mi/ln)

LOS = _____ (Exhibit 13-2)

Speed Determination

M_S = 0.349 (Exibit 13-11)

S_R = 60.2 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 60.2 mph (Exhibit 13-13)

Speed Determination

D_s = _____ (Exhibit 13-12)

S_R = _____ mph (Exhibit 13-12)

S_0 = _____ mph (Exhibit 13-12)

S = _____ mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information | Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
- ☐ Yes ☐ On
- ☑ No ☐ Off

$L_{up} =$ ____ ft

$V_u =$ ____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1484
Ramp Volume, V_R	266
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
- ☐ Yes ☐ On
- ☑ No ☐ Off

$L_{down} =$ ____ ft

$V_D =$ ____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1484	0.92	Level	18	0	0.917	1.00	1758
Ramp	266	0.93	Level	4	0	0.980	1.00	292
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

$L_{EQ} =$ ____ (Equation 13-6 or 13-7)
$P_{FM} =$ ____ using Equation (Exhibit 13-6)
$V_{12} =$ ____ pc/h
V_3 or V_{av34} ____ pc/h (Equation 13-14 or 13-17)
Is V_3 or $V_{av34} > 2,700$ pc/h? ☐ Yes ☐ No
Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ ☐ Yes ☐ No
If Yes, $V_{12a} =$ ____ pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

$L_{EQ} =$ ____ (Equation 13-12 or 13-13)
$P_{FD} =$ 1.000 using Equation (Exhibit 13-7)
$V_{12} =$ 1758 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or $V_{av34} > 2,700$ pc/h? ☐ Yes ☑ No
Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ ☐ Yes ☑ No
If Yes, $V_{12a} =$ ____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	1758	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1466	Exhibit 13-8	4800	No
V_R	292	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	1758	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

$D_R =$ ____ (pc/mi/ln)
LOS = ____ (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

$D_R =$ 17.6 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination (Merge)

$M_S =$ ____ (Exibit 13-11)
$S_R =$ ____ mph (Exhibit 13-11)
$S_0 =$ ____ mph (Exhibit 13-11)
$S =$ ____ mph (Exhibit 13-13)

Speed Determination (Diverge)

$D_s =$ 0.454 (Exhibit 13-12)
$S_R =$ 57.3 mph (Exhibit 13-12)
$S_0 =$ N/A mph (Exhibit 13-12)
$S =$ 57.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information | Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative Plus Buildout
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1909
Ramp Volume, V_R	171
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1909	0.92	Level	18	0	0.917	1.00	2262
Ramp	171	0.93	Level	4	0	0.980	1.00	188
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 2262 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * $V_{12}/2$ ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks | Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

	Actual	Capacity	LOS F?
V_F	2262	Exhibit 13-8 — 4800	No
$V_{FO} = V_F - V_R$	2074	Exhibit 13-8 — 4800	No
V_R	188	Exhibit 13-10 — 2000	No

Flow Entering Merge Influence Area | Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

	Actual	Max Desirable	Violation?
V_{12}	2262	Exhibit 13-8 — 4400:All	No

Level of Service Determination (if not F) | Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = 21.9 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination | Speed Determination

M_S = (Exibit 13-11)
S_R = mph (Exhibit 13-11)
S_0 = mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

D_s = 0.445 (Exhibit 13-12)
S_R = 57.5 mph (Exhibit 13-12)
S_0 = N/A mph (Exhibit 13-12)
S = 57.5 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N: 2
Ramp Number of Lanes, N: 2
Acceleration Lane Length, L_A: 250
Deceleration Lane Length L_D:
Freeway Volume, V_F: 87
Ramp Volume, V_R: 169
Freeway Free-Flow Speed, S_{FF}: 70.0
Ramp Free-Flow Speed, S_{FR}: 55.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	87	0.92	Level	18	0	0.917	1.00	103
Ramp	169	0.70	Level	11	0	0.948	1.00	255
UpStream								
DownStream								

Merge Areas / Diverge Areas

Estimation of v_{12} (Merge)
$$V_{12} = V_F(P_{FM})$$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 1.000 using Equation (Exhibit 13-6)
V_{12} = 103 pc/h
V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)
$$V_{12} = V_R + (V_F - V_R)P_{FD}$$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	358	Exhibit 13-8	No

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area / Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	358	Exhibit 13-8 / 4600:All	No

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$
D_R = 1.9 (pc/mi/ln)
LOS = A (Exhibit 13-2)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = 0.217 (Exibit 13-11)
S_R = 63.9 mph (Exhibit 13-11)
S_0 = N/A mph (Exhibit 13-11)
S = 63.9 mph (Exhibit 13-13)

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ____ ft

V_u = ____ veh/h

Freeway Number of Lanes, N		2
Ramp Number of Lanes, N		2
Acceleration Lane Length, L_A		250
Deceleration Lane Length L_D		
Freeway Volume, V_F		1706
Ramp Volume, V_R		985
Freeway Free-Flow Speed, S_{FF}		70.0
Ramp Free-Flow Speed, S_{FR}		55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ____ ft

V_D = ____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1706	0.92	Level	18	0	0.917	1.00	2021
Ramp	985	0.86	Level	6	0	0.971	1.00	1180
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = ____ (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2021 pc/h

V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = ____ (Equation 13-12 or 13-13)

P_{FD} = ____ using Equation (Exhibit 13-7)

V_{12} = ____ pc/h

V_3 or V_{av34} = ____ pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	3201	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3201	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 23.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = ____ (pc/mi/ln)

LOS = ____ (Exhibit 13-2)

Speed Determination (Merge)

M_S = 0.307 (Exibit 13-11)

S_R = 61.4 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 61.4 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = ____ (Exhibit 13-12)

S_R = ____ mph (Exhibit 13-12)

S_0 = ____ mph (Exhibit 13-12)

S = ____ mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp			
☐ Yes	☐ On		
☑ No	☐ Off		
L_{up} =	ft		
V_u =	veh/h		

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	2	
Acceleration Lane Length, L_A		
Deceleration Lane Length L_D	200	
Freeway Volume, V_F	394	
Ramp Volume, V_R	307	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	35.0	

Downstream Adj Ramp	
☐ Yes	☐ On
☑ No	☐ Off
L_{down} =	ft
V_D =	veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	394	0.92	Level	18	0	0.917	1.00	467
Ramp	307	0.69	Level	19	0	0.913	1.00	487
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)
P_{FM} =   using Equation (Exhibit 13-6)
V_{12} =   pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)
P_{FD} =   1.000 using Equation (Exhibit 13-7)
V_{12} =   467 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

Diverge:

	Actual	Capacity		LOS F?
V_F	467	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	-20	Exhibit 13-8	4800	No
V_R	487	Exhibit 13-10	4000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Diverge:

	Actual	Max Desirable		Violation?
V_{12}	467	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   (pc/mi/ln)
LOS =   (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   0.2 (pc/mi/ln)
LOS =   A (Exhibit 13-2)

Speed Determination

Merge:

M_S =   (Exibit 13-11)
S_R =   mph (Exhibit 13-11)
S_0 =   mph (Exhibit 13-11)
S =   mph (Exhibit 13-13)

Diverge:

D_S =   0.472 (Exhibit 13-12)
S_R =   56.8 mph (Exhibit 13-12)
S_0 =   N/A mph (Exhibit 13-12)
S =   56.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Cumulative+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2547
Ramp Volume, V_R	841
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2547	0.92	Level	18	0	0.917	1.00	3018
Ramp	841	0.91	Level	2	0	0.990	1.00	933
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$V_{12} = V_F (P_{FM})$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation   (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   3018 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}		Exhibit 13-8	

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	3018	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	2085	Exhibit 13-8	4800	No
V_R	933	Exhibit 13-10	4000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3018	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   22.1 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Speed Determination (Merge)

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination (Diverge)

D_S =   0.512 (Exhibit 13-12)

S_R =   55.7 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   55.7 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Cumulative+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	475
Ramp Volume, V_R	171
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	475	0.92	Level	18	0	0.917	1.00	563
Ramp	171	0.69	Level	19	0	0.913	1.00	271
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge)

$V_{12} = V_F (P_{FM})$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation   (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   563 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	563	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	292	Exhibit 13-8	4800	No
V_R	271	Exhibit 13-10	4000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	563	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   1.0 (pc/mi/ln)

LOS =   A (Exhibit 13-2)

Speed Determination (Merge)

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination (Diverge)

D_S =   0.452 (Exhibit 13-12)

S_R =   57.3 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   57.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Lammers Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	
			Cumulative+Buildout Mitigated
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} = _____ ft

V_u = _____ veh/h

Freeway Number of Lanes, N	2	
Ramp Number of Lanes, N	2	
Acceleration Lane Length, L_A		
Deceleration Lane Length L_D	200	
Freeway Volume, V_F	2757	
Ramp Volume, V_R	601	
Freeway Free-Flow Speed, S_{FF}	70.0	
Ramp Free-Flow Speed, S_{FR}	35.0	

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} = _____ ft

V_D = _____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2757	0.92	Level	18	0	0.917	1.00	3266
Ramp	601	0.91	Level	2	0	0.990	1.00	667
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = _____ (Equation 13-6 or 13-7)
P_{FM} = _____ using Equation (Exhibit 13-6)
V_{12} = _____ pc/h
V_3 or V_{av34} _____ pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = _____ (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 3266 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F	3266	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	2599	Exhibit 13-8	4800	No
V_R	667	Exhibit 13-10	4000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	3266	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = _____ (pc/mi/ln)
LOS = _____ (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 24.2 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination (Merge)

M_S = _____ (Exibit 13-11)
S_R = _____ mph (Exhibit 13-11)
S_0 = _____ mph (Exhibit 13-11)
S = _____ mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = 0.488 (Exhibit 13-12)
S_R = 56.3 mph (Exhibit 13-12)
S_0 = N/A mph (Exhibit 13-12)
S = 56.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information | Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Phase IA
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = _____ ft

V_u = _____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	178
Ramp Volume, V_R	74
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = _____ ft

V_D = _____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	178	0.92	Level	18	0	0.917	1.00	211
Ramp	74	0.70	Level	11	0	0.948	1.00	112
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = _____ (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 211 pc/h

V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = _____ (Equation 13-12 or 13-13)

P_{FD} = _____ using Equation (Exhibit 13-7)

V_{12} = _____ pc/h

V_3 or V_{av34} = _____ pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks | Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	323	Exhibit 13-8	No

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area | Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	323	Exhibit 13-8 4600:All	No

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) | Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 6.4 (pc/mi/ln)

LOS = A (Exhibit 13-2)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = _____ (pc/mi/ln)

LOS = _____ (Exhibit 13-2)

Speed Determination | Speed Determination

M_S = 0.299 (Exibit 13-11)

S_R = 61.6 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 61.6 mph (Exhibit 13-13)

D_s = _____ (Exhibit 13-12)

S_R = _____ mph (Exhibit 13-12)

S_0 = _____ mph (Exhibit 13-12)

S = _____ mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information | Site Information

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Phase I
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp
- [ ] Yes [ ] On
- [x] No [ ] Off

L_{up} = ____ ft

V_u = ____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	339
Ramp Volume, V_R	161
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
- [ ] Yes [ ] On
- [x] No [ ] Off

L_{down} = ____ ft

V_D = ____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	339	0.92	Level	18	0	0.917	1.00	402
Ramp	161	0.69	Level	19	0	0.913	1.00	256
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge)

$$V_{12} = V_F(P_{FM})$$

L_{EQ} = ____ (Equation 13-6 or 13-7)
P_{FM} = ____ using Equation (Exhibit 13-6)
V_{12} = ____ pc/h
V_3 or V_{av34} = ____ pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? [ ] Yes [ ] No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 [ ] Yes [ ] No
If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = ____ (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 402 pc/h
V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? [ ] Yes [x] No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 [ ] Yes [x] No
If Yes, V_{12a} = ____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	402	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	146	Exhibit 13-8	4800	No
V_R	256	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	402	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = ____ (pc/mi/ln)
LOS = ____ (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 5.9 (pc/mi/ln)
LOS = A (Exhibit 13-2)

Speed Determination (Merge)

M_S = ____ (Exibit 13-11)
S_R = ____ mph (Exhibit 13-11)
S_0 = ____ mph (Exhibit 13-11)
S = ____ mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = 0.451 (Exhibit 13-12)
S_R = 57.4 mph (Exhibit 13-12)
S_0 = N/A mph (Exhibit 13-12)
S = 57.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Phase IA
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1689
Ramp Volume, V_R	650
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1689	0.92	Level	18	0	0.917	1.00	2001
Ramp	650	0.72	Level	13	0	0.939	1.00	961
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge	Diverge
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-6 or 13-7)	L_{EQ} = (Equation 13-12 or 13-13)
P_{FM} = 1.000 using Equation (Exhibit 13-6)	P_{FD} = using Equation (Exhibit 13-7)
V_{12} = 2001 pc/h	V_{12} = pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)	V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No	Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No	Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	2962	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2962	Exhibit 13-8 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   25.6 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.352 (Exibit 13-11)

S_R =   60.1 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   60.1 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	AM Peak	Analysis Year	Existing Plus Phase IA
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp				Downstream Adj Ramp	
☐ Yes	☐ On	Freeway Number of Lanes, N	2	☐ Yes	☐ On
		Ramp Number of Lanes, N	1		
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
		Deceleration Lane Length L_D	200		
L_{up} = ft		Freeway Volume, V_F	1921	L_{down} = ft	
		Ramp Volume, V_R	232		
V_u = veh/h		Freeway Free-Flow Speed, S_{FF}	70.0	V_D = veh/h	
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1921	0.92	Level	18	0	0.917	1.00	2276
Ramp	232	0.77	Level	14	0	0.935	1.00	322
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) | ### Estimation of v_{12} (Diverge)

Merge Areas

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 2276 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity		LOS F?
				V_F	2276	Exhibit 13-8	4800	No
V_{FO}		Exhibit 13-8		$V_{FO} = V_F - V_R$	1954	Exhibit 13-8	4800	No
				V_R	322	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area | ### Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8		V_{12}	2276	Exhibit 13-8 4400:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 22.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

D_s = 0.457 (Exhibit 13-12)

S_R = 57.2 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 57.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Phase IA
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} = _____ ft

V_u = _____ veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	250
Deceleration Lane Length L_D	
Freeway Volume, V_F	1433
Ramp Volume, V_R	397
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} = _____ ft

V_D = _____ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1433	0.92	Level	18	0	0.917	1.00	1698
Ramp	397	0.86	Level	6	0	0.971	1.00	475
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) | Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = _____ (Equation 13-6 or 13-7)

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1698 pc/h

V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = _____ (Equation 13-12 or 13-13)

P_{FD} = _____ using Equation (Exhibit 13-7)

V_{12} = _____ pc/h

V_3 or V_{av34} = _____ pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = _____ pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity	LOS F?
V_{FO}	2173	Exhibit 13-8	No

Capacity Checks (Diverge)

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	2173	Exhibit 13-8 / 4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F) (Merge)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 20.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = _____ (pc/mi/ln)

LOS = _____ (Exhibit 13-2)

Speed Determination (Merge)

M_S = 0.328 (Exibit 13-11)

S_R = 60.8 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

Speed Determination (Diverge)

D_s = _____ (Exhibit 13-12)

S_R = _____ mph (Exhibit 13-12)

S_0 = _____ mph (Exhibit 13-12)

S = _____ mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 EB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Phase IA
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	2074
Ramp Volume, V_R	641
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2074	0.92	Level	18	0	0.917	1.00	2457
Ramp	641	0.91	Level	8	0	0.962	1.00	733
UpStream								
DownStream								

Merge Areas	**Diverge Areas**

Estimation of v_{12} (Merge)

$V_{12} = V_F (P_{FM})$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   using Equation   (Exhibit 13-6)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   1.000 using Equation (Exhibit 13-7)

V_{12} =   2457 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge)

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Capacity Checks (Diverge)

	Actual	Capacity		LOS F?
V_F	2457	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1724	Exhibit 13-8	4800	No
V_R	733	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	2457	Exhibit 13-8	4400:All No

Level of Service Determination (if not F) (Merge)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R =   23.6 (pc/mi/ln)

LOS =   C (Exhibit 13-2)

Speed Determination (Merge)

M_S =   (Exibit 13-11)

S_R =   mph (Exhibit 13-11)

S_0 =   mph (Exhibit 13-11)

S =   mph (Exhibit 13-13)

Speed Determination (Diverge)

D_S =   0.494 (Exhibit 13-12)

S_R =   56.2 mph (Exhibit 13-12)

S_0 =   N/A mph (Exhibit 13-12)

S =   56.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580/Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Phase IA
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	967
Ramp Volume, V_R	663
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	967	0.92	Level	18	0	0.917	1.00	1146
Ramp	663	0.83	Level	5	0	0.976	1.00	819
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12}

Merge Areas

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)

P_{FM} =   1.000   using Equation (Exhibit 13-6)

V_{12} =   1146   pc/h

V_3 or V_{av34} 0   pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12}

Diverge Areas

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)

P_{FD} =   using Equation (Exhibit 13-7)

V_{12} =   pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity	LOS F?
V_{FO}	1965	Exhibit 13-8	No

Capacity Checks

	Actual	Capacity	LOS F?
V_F		Exhibit 13-8	
$V_{FO} = V_F - V_R$		Exhibit 13-8	
V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1965	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}		Exhibit 13-8	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R =   17.9 (pc/mi/ln)

LOS =   B (Exhibit 13-2)

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R =   (pc/mi/ln)

LOS =   (Exhibit 13-2)

Speed Determination

M_S =   0.305 (Exibit 13-11)

S_R =   61.5 mph (Exhibit 13-11)

S_0 =   N/A mph (Exhibit 13-11)

S =   61.5 mph (Exhibit 13-13)

Speed Determination

D_s =   (Exhibit 13-12)

S_R =   mph (Exhibit 13-12)

S_0 =   mph (Exhibit 13-12)

S =   mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kimley-Horn & Associates	Freeway/Dir of Travel	I-580 WB
Agency or Company		Junction	I-580 and Corral Hollow Road
Date Performed	8/14/2014	Jurisdiction	
Analysis Time Period	PM Peak	Analysis Year	Existing Plus Phase IA
Project Description	Tracy Hills Specific Plan		

Inputs

Upstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{up} =   ft

V_u =   veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	200
Freeway Volume, V_F	1199
Ramp Volume, V_R	232
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes   ☐ On

☑ No   ☐ Off

L_{down} =   ft

V_D =   veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1199	0.92	Level	18	0	0.917	1.00	1421
Ramp	232	0.93	Level	4	0	0.980	1.00	254
UpStream								
DownStream								

Merge Areas	Diverge Areas

Estimation of v_{12} (Merge) / Estimation of v_{12} (Diverge)

Merge:

$$V_{12} = V_F (P_{FM})$$

L_{EQ} =   (Equation 13-6 or 13-7)
P_{FM} =   using Equation (Exhibit 13-6)
V_{12} =   pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Diverge:

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} =   (Equation 13-12 or 13-13)
P_{FD} =   1.000 using Equation (Exhibit 13-7)
V_{12} =   1421 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} =   pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Merge:

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Diverge:

	Actual	Capacity		LOS F?
V_F	1421	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1167	Exhibit 13-8	4800	No
V_R	254	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area / Flow Entering Diverge Influence Area

Merge:

	Actual	Max Desirable	Violation?
V_{R12}		Exhibit 13-8	

Diverge:

	Actual	Max Desirable	Violation?
V_{12}	1421	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

Merge:

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$$

D_R =   (pc/mi/ln)
LOS =   (Exhibit 13-2)

Diverge:

$$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$$

D_R =   14.7 (pc/mi/ln)
LOS =   B (Exhibit 13-2)

Speed Determination

Merge:

M_S =   (Exibit 13-11)
S_R =   mph (Exhibit 13-11)
S_0 =   mph (Exhibit 13-11)
S =   mph (Exhibit 13-13)

Diverge:

D_S =   0.451 (Exhibit 13-12)
S_R =   57.4 mph (Exhibit 13-12)
S_0 =   N/A mph (Exhibit 13-12)
S =   57.4 mph (Exhibit 13-13)

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