2035 HCM Calculations

Analysis Type	Location	Peak Hour	V (veh/h)	% Trucks	Speed (mph)	f_{HV}	V _F (pc/h/ln)	D (pc/mi/ln)	LOS
	NB I-75 / WB I-96 Diverge	AM	5513	14	-	0.935	1242	13.5	В
Major Diverge		Midday	2135	28	-	0.877	512	5.6	Α
		PM	2845	17	-	0.922	650	7.1	Α
	WB I-96 from WB I-96 (2-1 lane) merge to Gateway on-ramp	AM	1802	20	55	0.909	2087	37.9	Е
1-Lane Segment		Midday	546	52	55	0.794	724	13.2	В
		PM	955	26	55	0.885	1136	20.7	С
1-Lane Segment	EB I-96 from Gateway off-ramp to SB I-75	AM	1001	29	55	0.873	1206	21.9	С
		Midday	774	41	55	0.830	982	17.9	В
		PM	1375	10	55	0.952	1520	27.6	D

HCM Equations:
$$f_{HV} = \frac{1}{1 + P_T \left(E_T - 1 \right)}$$

$$V_F = \frac{V}{PHF \ * N \ * f_{HV} \ * f_P}$$

$$D = 0.0109 * V_{\scriptscriptstyle F} \qquad \text{(Major Diverge)}$$

$$D = \frac{V_F}{S}$$
 (Freeway Segment)

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Average passenger-car speed, S

Number of lanes, N

Density, D

	Operational An	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/08		
Analysis Time Period:			
Freeway/Direction:	I-75 NB		
From/To:	Dearborn Exit/S	oringwells Exit	5
Jurisdiction:	MDOT		
Analysis Year:	2035 Hybrid		
Description: Detroit		al Crossing Pro	oject
	Flow Inputs and	d Adjustments	
Volume, V		5141	veh/h
Peak-hour factor, PHF		0.95	·
Peak 15-min volume, v1	5	1353	V
Trucks and buses		16	90
Recreational vehicles		0	00
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE, :	ET	1.5	
Recreational vehicle PCE, ER		1.2	
Heavy vehicle adjustme:	nt, fHV	0.926	
Driver population fact	or, fp	1.00	
Flow rate, vp		1461	pc/h/ln
	Speed Inputs a	nd Adjustments_	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment,		0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjustr	ment, fN	1.5	mi/h
Free-flow speed, FFS		70.0	mi/h
		Urban Free	eway
	LOS and Perform	mance Measures_	
Flow rate, vp		1461	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
_			

69.9

20.9

mi/h

pc/mi/ln

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	Operational Ana	lysis	
Analyst:	СН		
Agency or Company:	PARSONS		
	8/15/08		
Analysis Time Period:			
Freeway/Direction:	_ ==		
	Springwells Exit	/Spring. Ent.	
Jurisdiction:		. 1	
Analysis Year:			
Description: Detroit R		al Crossing Proje	ect
	Flow Inputs and	d Adjustments	
Volume, V		4739	veh/h
Peak-hour factor, PHF		0.95	. 4,
Peak 15-min volume, v15		1247	V
Trucks and buses		17	00
Recreational vehicles		0	olo
Terrain type:		Level	· ·
Grade		0.00	olo
Segment length		0.00	mi
Trucks and buses PCE, E	·т	1.5	
Recreational vehicle PC		1.2	
Heavy vehicle adjustmen		0.922	
Driver population factor		1.00	
Flow rate, vp	, - , - <u>-</u> , - , , , , , , - , , - , , - ,	1353	pc/h/ln
	Speed Inputs ar	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density adj	ustment, fID	2.5	mi/h
Number of lanes adjustm		1.5	mi/h
Free-flow speed, FFS	•	70.0	mi/h
_ ,		Urban Freewa	ау
	LOS and Perform	mance Measures	
Flow rato un		1353	pc/h/ln
Flow rate, vp		70.0	mi/h
Free-flow speed, FFS	sneed S	70.0	mi/h
Average passenger-car s Number of lanes, N	ppded, b	4	***** / **
Density, D		19.3	pc/mi/ln

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	•		
	Operational Ar	nalysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/08		
Analysis Time Period:	AM Peak		
Freeway/Direction:	I-75 NB	/D1 B	
From/To:	Springwells Ent	./Plaza Exit	
Jurisdiction:	MDOT		
Analysis Year:	2035 Hybrid	al Caracian Barria	
Description: Detroit R	iver internation	nal Crossing Project	
	Flow Inputs ar	nd Adjustments	
Volume, V		5072	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		1335	V
Trucks and buses		17	%
Recreational vehicles		0	8
Terrain type:		Level	•
Grade		0.00	90
Segment length		0.00	mi
Trucks and buses PCE, E	Т	1.5	
Recreational vehicle PC		1.2	
Heavy vehicle adjustmen		0.922	
Driver population facto		1.00	
Flow rate, vp	-/ -P	1159	pc/h/ln
	Speed Inputs a	and Adjustments	
	<u> </u>		
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		5	
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment,		0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density adj		2.5	mi/h
Number of lanes adjustm	ent, fN	0.0	mi/h
Free-flow speed, FFS		70.0	mi/h
		Urban Freeway	
	LOS and Perfor	rmance Measures	
Flow rate, vp		1159	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car s	naad s	70.0	mi/h
Number of lanes, N	peda, b	5	IUT / 11
Density, D		16.6	pc/mi/ln
		<u> </u>	PC/1111

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Density, D

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_____Operational Analysis_____ Analyst: Agency or Company: PARSONS Date Performed: 8/15/08 Analysis Time Period: AM Peak Freeway/Direction: I-75 NB From/To: Plaza Exit/Livernois Exit From/To: Plaza Exit/L Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V veh/h 4678 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1231 V 11 0 Trucks and buses Recreational vehicles Terrain type: Level Grade 0.00 응 mi Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.948 Driver population factor, fp 1.00 Flow rate, vp 1299 pc/h/ln _____Speed Inputs and Adjustments_____ ft Lane width 12.0 6.0 ft Right-shoulder lateral clearance 1.00 interchange/mi Interchange density Number of lanes, N Free-flow speed: Measured Measured 70.0 mi/h 0.0 mi/h 0.0 mi/h 2.5 mi/h 1.5 mi/h 70.0 mi/h FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ pc/h/ln Flow rate, vp 1299 Free-flow speed, FFS 70.0 mi/h mi/h 70.0 Average passenger-car speed, S Number of lanes, N 4

18.6

pc/mi/ln

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	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/08		
Analysis Time Period:	AM Peak		
Freeway/Direction:	I-75 NB		
From/To:	Livernois Exit/I	Oragoon Ent.	
Jurisdiction:	MDOT	-	
Analysis Year:	2035 Hybrid		
Description: Detroit I	River Internation	al Crossing Proj	ect
	Flow Inputs and	d Adjustments	
Volume, V		4536	veh/h
Peak-hour factor, PHF		0.95	V 311, 11
Peak 15-min volume, v1:	- 5	1194	V
Trucks and buses		12	%
Recreational vehicles		0	00
Terrain type:		Level	•
Grade		0.00	96
Segment length		0.00	mi
Trucks and buses PCE, 1	ΣT	1.5	
Recreational vehicle Po		1.2	
Heavy vehicle adjustmen		0.943	
Driver population factor		1.00	
Flow rate, vp	, 1	1265	pc/h/ln
	Speed Inputs a	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	3 .
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjusti		1.5	mi/h
Free-flow speed, FFS		70.0	mi/h
-		Urban Freew	<i>v</i> ay
	LOS and Perfor	mance Measures	
Flow rate, vp		1265	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car	speed. S	70.0	mi/h
	0,000,0		
Number of lanes, N		4	

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Density, D

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	Operational Ana	lysis	
Analyst:	СН		
Agency or Company:	•		
	8/15/08		
Analysis Time Period:			
	I-75 NB		
From/To:	Dragoon Ent./Pla	za Ent	
Jurisdiction:	MDOT	.Za Biic.	
Analysis Year: Description: Detroit D		1 Crossing Proj	iect
Description: Detroit	Kiver incernaciona	it crossing Froj	1600
	Flow Inputs and	l Adjustments	
Volume, V		4665	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	1228	v
Trucks and buses		11	90
Recreational vehicles		0	%
Terrain type:		Level	
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme		0.948	
		1.00	
Driver population fact	or, rp	1295	pc/h/ln
Flow rate, vp		1295	pc/11/111
	Speed Inputs ar	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjust		1.5	mi/h
Free-flow speed, FFS	mono, in	70.0	mi/h
riee riow speed, irs		Urban Free	
		orban riee	
	LOS and Perform	mance Measures	
Flow rate, vp		1295	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car	speed, S	70.0	mi/h
Number of lanes, N	- <u> ,</u>	4	,
Number of lanes, N		18.5	pc/mi/ln

pc/mi/ln

18.5

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	Operational Ana	lysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/08		
Analysis Time Period:			
Freeway/Direction:	I-75 NB		
	Plaza Ent./Clark	Ent.	
Jurisdiction:	MDOT		
Analysis Year:			
Description: Detroit R		l Crossing Projec	t
	Flow Inputs and	Adjustments	
Volume, V		5358	veh/h
Peak-hour factor, PHF		0.95	,
Peak 15-min volume, v15		1410	V
Trucks and buses		14	્
Recreational vehicles		0	୍
Terrain type:		Level	
Grade		0.00	90
Segment length		0.00	mi
Trucks and buses PCE, E	ST.	1.5	
Recreational vehicle PC		1.2	
Heavy vehicle adjustmen		0.935	
Driver population facto		1.00	
Flow rate, vp		1509	pc/h/ln
	Speed Inputs an	d Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus	stment, fLC	0.0	mi/h
Interchange density adj	ustment, fID	2.5	mi/h
Number of lanes adjustm	nent, fN	1.5	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freeway	,
	LOS and Perform	ance Measures	
Flow rate, vp		1509	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car s	speed, S	55.0	mi/h
Number of lanes, N	<u>.</u>	4	
Density, D		27.4	pc/mi/ln

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	Operational Ana	lysis	
Analyst:	СН		
Agency or Company:	PARSONS		
	8/15/08		
Analysis Time Period:			
Freeway/Direction:			
From/To:	Clark Ent./Lafay	rette Exit	
Jurisdiction:	MDOT	CCCC HATC	
Analysis Year:			
Description: Detroit R	-	al Crossina Project	:
bederiperent beerere :			
	Flow Inputs and	l Adjustments	
Volume, V		5532	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		1456	V
Trucks and buses		14	00
Recreational vehicles		0	%
Terrain type:		Level	
Grade		0.00	90
Segment length		0.00	mi
Trucks and buses PCE, E	T	1.5	
Recreational vehicle PC	E, ER	1.2	
Heavy vehicle adjustmen	it, fHV	0.935	
Driver population facto	or, fp	1.00	
Flow rate, vp		1246	pc/h/ln
	Speed Inputs ar	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		5	j
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density adj		2.5	mi/h
Number of lanes adjustm		0.0	mi/h
Free-flow speed, FFS		55.0	mi/h
•		Urban Freeway	
	LOS and Perform	nance Measures	
Flow rate, vp		1246	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car s	need S	55.0	mi/h
Number of lanes, N	ppeed, b	5	шт/ п
Density, D		22.7	pc/mi/ln
Denorch' D		44.1	PC/1111

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	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:			
	8/15/08		
Analysis Time Period:			
Freeway/Direction:			
	Lafayette Exit/	I-96 WB Exit	
Jurisdiction:			
Analysis Year:	2035 Hybrid		
Description: Detroit	River Internationa	al Crossing Projec	:t
	Flow Inputs and	d Adjustments	
Volume, V		5513	veh/h
Peak-hour factor, PHF		0.95	ve11/11
Peak 15-min volume, v1	5	1451	v
Trucks and buses	9	14	%
Recreational vehicles		0	୍ ଚ
Terrain type:		Level	6
Grade		0.00	ଚ୍ଚ
Segment length		0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme		0.935	
Driver population fact		1.00	
Flow rate, vp	1	1242	pc/h/ln
	Speed Inputs ar	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density	CICALANCC	1.00	interchange/mi
Number of lanes, N		5	Intelemange/mi
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjust	=	0.0	mi/h
Free-flow speed, FFS	,	55.0	mi/h
,		Urban Freeway	
	LOS and Perforr	nance Measures	
Flow rate, vp		1242	ng/h/ln
Free-flow speed, FFS		55.0	pc/h/ln mi/h
Average passenger-car	sneed S	55.0	mi/h mi/h
Number of lanes, N	preca, p	5	111.1./ 11
Density, D		22.6	pc/mi/ln
Dombie Cy, D		22.0	DC/1111

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	Operational An	nalysis	·
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	10/2/08		
Analysis Time Period:			
Freeway/Direction:	T-75 NB		
From/To:		-75 NB S.D. Exit	
Jurisdiction:	MDOT	, s nb s.b. hare	
	2035 Hybrid		
Description: Detroit R		al Crossing Projec	t
	Flow Inputs an	nd Adjustments	
Volume, V		3710	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		976	v
Trucks and buses		11	%
Recreational vehicles		0	%
Terrain type:		Level	
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, E		1.5	
Recreational vehicle PC		1.2	
Heavy vehicle adjustmen		0.948	
Driver population facto	r, fp	1.00	
Flow rate, vp		1030	pc/h/ln
	Speed Inputs a	and Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus	tment, fLC	0.0	mi/h
Interchange density adj		2.5	mi/h
Number of lanes adjustm	ent, fN	1.5	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freeway	
	LOS and Perfor	rmance Measures	
Flow rate, vp		1030	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car s	peed, S	55.0	mi/h
Number of lanes, N	<u>. </u>	4	·
Density, D		18.7	pc/mi/ln
- '			= '

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	Operational A	nalysis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Detroit R	I-75 NB I-75 NB S.D. E MDOT 2035 Hybrid		et
	Flow Inputs a	nd Adjustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:		3677 0.95 968 11 0	veh/h v %
Grade Segment length Trucks and buses PCE, E Recreational vehicle PC Heavy vehicle adjustmen	E, ER t, fHV	Level 0.00 0.00 1.5 1.2 0.948	% mi
Driver population factor Flow rate, vp	r, 1p	1.00 1361	pc/h/ln
	Speed Inputs	and Adjustments	
Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS	clearance	12.0 6.0 1.00 3 Measured 55.0	ft ft interchange/mi mi/h
Lane width adjustment, Lateral clearance adjust Interchange density adjustment Number of lanes adjustment Free-flow speed, FFS	tment, fLC ustment, fID	0.0 0.0 2.5 3.0 55.0 Urban Freeway	mi/h mi/h mi/h mi/h mi/h
	LOS and Perfo	rmance Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car sp Number of lanes, N Density, D	peed, S	1361 55.0 55.0 3 24.7	pc/h/ln mi/h mi/h pc/mi/ln

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Density, D

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E-mail: catherine.hart	ner@parsons.com		
	Operational An	alysis	
Analyst:	СН		
Agency or Company:			
	10/2/08		
Analysis Time Period:			
	I-75 NB		
_	Amb. Ent./C-D R	and Errit	
Jurisdiction:	MDOT	oad Exit	
Analysis Year:			
Description: Detroit R		al Crossing Projec	+
	Flow Inputs and	d Adjustments	
Volume, V		4414	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		1162	V
Trucks and buses		9	8
Recreational vehicles		0	ફ
Terrain type:		Level	
Grade		0.00	&
Segment length		0.00	mi
Trucks and buses PCE, E	T	1.5	
Recreational vehicle PC		1.2	
Heavy vehicle adjustmen		0.957	
Driver population facto		1.00	
Flow rate, vp	-, - <u>-</u>	1618	pc/h/ln
	Speed Inputs a	nd Adjustments	_
	are our impacts a.	is ray as emerces	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		3	
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus	tment, fLC	0.0	mi/h
Interchange density adj	ustment, fID	2.5	mi/h
Number of lanes adjustm	ent, fN	3.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freeway	
	LOS and Perform	mance Measures	
Flow rato un		1.61.0	
Flow rate, vp		1618	pc/h/ln
Free-flow speed, FFS	nood C	55.0	mi/h
Average passenger-car s	peeu, s	55.0	mi/h
Number of lanes, N		3	

29.4

pc/mi/ln

PTG

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_____Operational Analysis______

Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/08 Date Performed:
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Dearborn Exit/Springwells Exit

From/To: Dearborn Exi Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow	Inputs	and	Adjustments
------	--------	-----	-------------

** 1 **		0751	
Volume, V		2751	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		724	V
Trucks and buses		25	96
Recreational vehicles		0	00
Terrain type:		Level	
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.889	
Driver population factor,	fp	1.00	
Flow rate, vp		814	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
-	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp		814	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car speed,	S	70.0	mi/h
Number of lanes, N		4	
Density, D		11.6	pc/mi/ln

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_____Operational Analysis_____

Analyst:

Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Springwells Exit/Spring. Ent.

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow	Inputs	and	Adjustments	

****		0.477	1 /1
Volume, V		2477	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		652	v
Trucks and buses		25	90
Recreational vehicles		0	00
Terrain type:		Level	
Grade		0.00	9
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE, E	ER	1.2	
Heavy vehicle adjustment, f	HV	0.889	
Driver population factor, f	Īp	1.00	
Flow rate, vp		733	pc/h/ln

Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freewav	

LOS and Performance Measures_____

Flow rate, vp		733	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car speed,	S	70.0	mi/h
Number of lanes, N		4	
Density, D		10.5	pc/mi/ln

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(Operational	Analysis	3

Analyst: СН

Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: Midday Peak

Freeway/Direction: I-75 NB
From/To: Springwells Ent./Plaza Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_Flow Inputs	and	Adjustments
--------------	-----	-------------

Volume, V		2724	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		717	V
Trucks and buses		25	%
Recreational vehicles		0	90
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.889	
Driver population factor,		1.00	
Flow rate, vp	-	645	pc/h/ln

Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp		645	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car speed,	S	70.0	mi/h
Number of lanes, N		5	
Density, D		9.2	pc/mi/ln

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_____Operational Analysis_____

CH Analyst: Agency or Company: PARSONS
Date Performed: 8/15/08 Date Performed:
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Plaza Exit/Livernois Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow Inputs and Adjustm

Volume, V		2016	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		531	V
Trucks and buses		25	%
Recreational vehicles		0	%
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE, EF	IR .	1.2	
Heavy vehicle adjustment, fi	HV	0.889	
Driver population factor, fy	Īp	1.00	
Flow rate, vp		597	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp	597	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	4	
Density, D	8.5	pc/mi/ln

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Operational Analysis

Analyst: CH

Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Livernois Exit/Dragoon Ent.
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Flow Inputs and Adjustments_____

Volume, V		1965 0.95	veh/h
Peak-hour factor, PHF Peak 15-min volume, v15		517	V
Trucks and buses		25	v %
Recreational vehicles		0	90
Terrain type:		Level	
Grade		0.00	90
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,		0.889	
Driver population factor,	fp	1.00	
Flow rate, vp		582	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
- -	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp	582	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	4	
Density, D	8.3	pc/mi/ln

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Operational Analysis	
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CH Analyst:

Agency or Company:

Date Performed: 8/15/08 Analysis Time Period: Midday Peak Freeway/Direction: I-75 NB
From/To: Dragoon Ent./Plaza Ent.

MDOT

Jurisdiction: Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

		_Flow	Inputs	and	Adjustments		
77 - 7	7.7				2040	1- /1-	

Volume, V	2048	veh/h	
Peak-hour factor, PHF	0.95		
Peak 15-min volume, v15	539	v	
Trucks and buses	25	%	
Recreational vehicles	0	%	
Terrain type:	Level		
Grade	0.00	%	
Segment length	0.00	mi	
Trucks and buses PCE, ET	1.5		
Recreational vehicle PCE, ER	1.2		
Heavy vehicle adjustment, fHV	0.889		
Driver population factor, fp	1.00		
Flow rate, vp	606	pc/h/ln	

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp	606	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	4	
Density, D	8.7	pc/mi/ln

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Operational Analysis

Analyst: CH

Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Plaza Ent./Clark Ent.

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

	Fl	WO	Inputs	and	Adjust	ments_
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Volume, V	2202	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	579	V
Trucks and buses	25	%
Recreational vehicles	0	00
Terrain type:	Level	
Grade	0.00	96
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	652	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	55.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp		652	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car speed,	S	55.0	mi/h
Number of lanes, N		4	
Density, D		11.9	pc/mi/ln

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Operational Analysis	
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Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/08

Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Clark Ent./Lafayette Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

	Flow	Inputs	and	Adjustments_	
--	------	--------	-----	--------------	--

Volume, V	2379 0.95	veh/h
Peak-hour factor, PHF		
Peak 15-min volume, v15	626	V
Trucks and buses	25	00
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	00
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	563	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	55.0	mi/h
•	Urban Freeway	•

LOS and Performance Measures_____

Flow rate, vp	563	pc/h/ln
Free-flow speed, FFS	55.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N	5	
Density, D	10.2	pc/mi/ln

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_____Operational Analysis_____

Analyst: CH

Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: Midday Peak

Freeway/Direction: I-75 NB
From/To: Lafayette Exit/I-96 WB Exit

From/To: Latayette Ex
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

TIOW INDUCTS and Majastinents	Flow	Inputs	and	Adjustments
-------------------------------	------	--------	-----	-------------

Volume, V	2	2135	veh/h
Peak-hour factor, PHF	(0.95	
Peak 15-min volume, v15	Ţ	562	V
Trucks and buses		25	9
Recreational vehicles	(0	%
Terrain type:]	Level	
Grade	(0.00	%
Segment length	(0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE, ER	₹	1.2	
Heavy vehicle adjustment, fH		0.889	
Driver population factor, fp		1.00	
Flow rate, vp		506	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width Right-shoulder lateral clearance	12.0 6.0	ft ft
Interchange density	1.00	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	55.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp Free-flow speed, FFS		506 55.0	pc/h/ln mi/h
Average passenger-car speed, S	S	55.0	mi/h
Number of lanes, N		5	
Density, D		9.2	pc/mi/ln

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Number of lanes, N

Density, D

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0pe	erational Ana	alysis	
Analyst: CH			
Agency or Company: PARS	ONS		
Date Performed: 10/2	/08		
Analysis Time Period: Midd	lay Peak		
reeway/Direction: I-75			
From/To: I-96	WB Exit/I-7	'5 NB S.D. Exit	
Turisdiction: MDOT			
Analysis Year: 2035	Hybrid		
Description: Detroit River		ıl Crossing Pro	pject
F1c	w Inputs and	l Adjustments	
/olume, V		1589	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		418	V
rucks and buses		20	8
Recreational vehicles		0	8
'errain type:		Level	
Grade		0.00	8
Segment length		0.00	mi
rucks and buses PCE, ET		1.5	
ecreational vehicle PCE, ER		1.2	
leavy vehicle adjustment, fH	V	0.909	
river population factor, fp		1.00	
low rate, vp		460	pc/h/ln
Spe	ed Inputs an	d Adjustments_	
ane width		12.0	ft
ight-shoulder lateral clear	ance	6.0	ft
nterchange density		1.00	interchange/mi
umber of lanes, N		4	•
ree-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
ane width adjustment, fLW		0.0	mi/h
ateral clearance adjustment		0.0	mi/h
nterchange density adjustme		2.5	mi/h
umber of lanes adjustment,	fN	1.5	mi/h
ree-flow speed, FFS		55.0	mi/h
		Urban Free	way
LOS	and Perform	ance Measures_	
low rate, vp		460	pc/h/ln
ree-flow speed, FFS		55.0	mi/h
verage passenger-car speed,	S	55.0	mi/h
Tumber of lanes N		4	· ·-

8.4

pc/mi/ln

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Number of lanes, N

Density, D

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Operation	al Analysis	
Analyst: CH		
Agency or Company: PARSONS		
Date Performed: 10/2/08		
Analysis Time Period: Midday Pea	k	
Freeway/Direction: I-75 NB		
From/To: I-75 NB S.	D. Exit/Amb. Ent.	
Jurisdiction: MDOT		
Analysis Year: 2035 Hybri	d	
Description: Detroit River Intern		ject
Flow Inpu	ts and Adjustments	
Volume, V	1567	veh/h
Peak-hour factor, PHF	0.95	V C11/ 11
Peak 15-min volume, v15	412	V
Trucks and buses	20	8
Recreational vehicles	0	90
Terrain type:	Level	.0
Grade	0.00	90
Segment length	0.00	mi
Frucks and buses PCE, ET	1.5	шт
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Oriver population factor, fp	1.00	
Flow rate, vp	605	pc/h/ln
Speed Inp	uts and Adjustments_	_
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fI		mi/h
Number of lanes adjustment, fN	3.0	mi/h
ree-flow speed, FFS	55.0	mi/h
	Urban Freev	vay
LOS and P	erformance Measures	
low rate, vp	605	pc/h/ln
Free-flow speed, FFS	55.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes N		,

3

11.0

pc/mi/ln

26777 Central Park Blvd Southfield, MI 48076.

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

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	Operational An	alysis		
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Detroit R	10/2/08 Midday Peak I-75 NB Amb. Ent./C-D R MDOT 2035 Hybrid		ect	
	Flow Inputs an	d Adjustments		
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses		1766 0.95 465 18	veh/h v	
Recreational vehicles Terrain type: Grade Segment length Trucks and buses PCE, E	·T	0 Level 0.00 0.00 1.5	% % mi	
Recreational vehicle PC Heavy vehicle adjustment Driver population factor Flow rate, vp	E, ER t, fHV	1.2 0.917 1.00 675	pc/h/ln	
Speed Inputs and Adjustments				
Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS	clearance	12.0 6.0 1.00 3 Measured 55.0	<pre>ft ft interchange/mi mi/h</pre>	
Lane width adjustment, Lateral clearance adjust Interchange density adj Number of lanes adjustment Free-flow speed, FFS	tment, fLC ustment, fID	0.0 0.0 2.5 3.0 55.0 Urban Freewa	mi/h mi/h mi/h mi/h mi/h	
	LOS and Perfor	mance Measures		
Flow rate, vp		675	pc/h/ln	

55.0

55.0

12.3

3

mi/h

pc/mi/ln

mi/h

Density, D

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Operational Analysis					
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year:	I-75 NB Dearborn Exit/Sp MDOT 2035 Hybrid	-			
Description: Detroit R	<pre>iver Internationa Flow Inputs and</pre>	-			
	rrow inputs and	Adjustments			
Volume, V Peak-hour factor, PHF		3392 0.95	veh/h		
Peak 15-min volume, v15		893	V		
Trucks and buses		25	%		
Recreational vehicles		0	90		
Terrain type:		Level			
Grade		0.00	90		
Segment length		0.00	mi		
Trucks and buses PCE, E		1.5			
Recreational vehicle PC	•	1.2			
Heavy vehicle adjustmen	t, fHV	0.889			
Driver population facto	r, fp	1.00			
Flow rate, vp		1004	pc/h/ln		
Speed Inputs and Adjustments					
Lane width		12.0	ft		
Right-shoulder lateral	clearance	6.0	ft		
Interchange density	0100101100	1.00	interchange/mi		
Number of lanes, N		4			
Free-flow speed:		Measured			
FFS or BFFS		70.0	mi/h		
Lane width adjustment,	fLW	0.0	mi/h		
Lateral clearance adjus		0.0	mi/h		
Interchange density adj		2.5	mi/h		
Number of lanes adjustm		1.5	mi/h		
Free-flow speed, FFS	•	70.0	mi/h		
<u>,</u>		Urban Freeway			
	LOS and Perform	nance Measures			
T1		1004	ng/h/1n		
Flow rate, vp		1004	pc/h/ln		
Free-flow speed, FFS	o boom	70.0	mi/h		
Average passenger-car s	speed, s	70.0	mi/h		
Number of lanes, N		4			

14.3 pc/mi/ln

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Flow rate, vp

Density, D

Number of lanes, N

Free-flow speed, FFS

Average passenger-car speed, S

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_____Operational Analysis_____ Analyst: CH Analyst: Agency or Company: PARSONS Date Performed: 8/15/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 NB From/To: Springwells Exit/Spring. Ent. Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V 3116 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 820 V Trucks and buses 25 0 ે Recreational vehicles Terrain type: Level Grade 0.00 용 Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.889 Driver population factor, fp 1.00 Flow rate, vp 923 pc/h/ln ______Speed Inputs and Adjustments_____ Lane width 12.0 ft £+ Right-shoulder lateral clearance 6.0 ft 1.00 interchange/mi ft Interchange density Number of lanes, N Free-flow speed: Measured mi/h mi/h FFS or BFFS 70.0 Lane width adjustment, fLW 0.0 mi/h mi/h Lateral clearance adjustment, fLC 0.0 2.5 Interchange density adjustment, fID 1.5 Number of lanes adjustment, fN 1.5 mi/h 70.0 mi/h Free-flow speed, FFS Urban Freeway _____LOS and Performance Measures_____

pc/h/ln mi/h mi/h

pc/mi/ln

923

4

13.2

70.0 70.0

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	Operational Analysis
Analyst:	СН
Agency or Company:	PARSONS
Date Performed:	8/15/08

Analysis Time Period: PM Peak Freeway/Direction: I-75 NB

From/To: Springwells Ent./Plaza Exit

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

3243	
	veh/h
0.95	
853	v
25	ଚ
0	%
Level	
0.00	ଚ
0.00	mi
1.5	
1.2	
0.889	
1.00	
768	pc/h/ln
djustments	
12.0	ft
6.0	ft
1.00	interchange/mi
5	_
Measured	
70.0	mi/h
0.0	mi/h
0.0	mi/h
2.5	mi/h
0.0	mi/h
70.0	mi/h
Urban Freeway	
7	0.0

Flow rate, vp 768 pc/h/ln Free-flow speed, FFS 70.0 mi/h Average passenger-car speed, S 70.0 mi/h Number of lanes, N 5

Density, D 11.0pc/mi/ln

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Operational Analysis

Analyst: СН Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: PM Peak

Freeway/Direction: I-75 NB
From/To: Plaza Exit/Livernois Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow Inputs and Adjustment	Flow	Inputs	and	Adjustments
----------------------------	------	--------	-----	-------------

Volume, V		2274	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		598	V
Trucks and buses		17	00
Recreational vehicles		0	90
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.922	
Driver population factor,	fp	1.00	
Flow rate, vp		649	pc/h/ln

______Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp	649	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	4	
Density, D	9.3	pc/mi/ln

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_____Operational Analysis_____

Analyst: CHAgency or Company: PARSONS
Date Performed: 8/15/08
Analysis Time Period: PM Peak
Freeway/Direction: I-75 NB
From/To: Livernois Exit/Dragoon Ent.

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow	Inputs	and	Adjustments

Volume, V	2213	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	582	V
Trucks and buses	17	00
Recreational vehicles	0	90
Terrain type:	Level	
Grade	0.00	90
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.922	
Driver population factor, fp	1.00	
Flow rate, vp	632	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures______

Flow rate, vp	632	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	4	,
Density, D	9.0	pc/mi/ln

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_____Operational Analysis_____

Analyst: CH

Agency or Company:

Date Performed: 8/15/08 Analysis Time Period: PM Peak

Freeway/Direction: I-75 NB
From/To: Dragoon Ent./Plaza Ent.

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Volume, V		2615	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		688	v
Trucks and buses		16	%
Recreational vehicles		0	%
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.926	
Driver population factor,	fp	1.00	
Flow rate, vp		743	pc/h/ln

Speed Inputs and Adjustments______

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
-	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp	743	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	4	
Density, D	10.6	pc/mi/ln

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Average passenger-car speed, S

Number of lanes, N

Density, D

Operational Analysis_____ Analyst: Agency or Company: PARSONS Date Performed: 8/15/08 Date Performed: 0,10, Analysis Time Period: PM Peak Freeway/Direction: I-75 NB From/To: Plaza Ent./Clark Ent. From/To: Plaza Ent./C Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments____ Volume, V veh/h 2737 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 720 v 19 Trucks and buses Recreational vehicles Level Terrain type: 0.00 Grade 용 Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.913 Driver population factor, fp 1.00 Flow rate, vp 789 pc/h/ln _____Speed Inputs and Adjustments_____ ft Lane width 12.0 ft Right-shoulder lateral clearance 6.0 1.00 interchange/mi Interchange density Number of lanes, N 4 Free-flow speed: Measured FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h 1.5 1.5 mi/h 55.0 mi/h Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway LOS and Performance Measures____ 789 pc/h/ln Flow rate, vp Free-flow speed, FFS 55.0 mi/h

mi/h

pc/mi/ln

55.0

14.3

4

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_____Operational Analysis_____ Analyst: CH Agency or Company: PARSONS Date Performed: 8/15/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 NB From/To: Clark Ent./Lafayette Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Flow Inputs ar	nd Adjustments	
Volume, V	3049	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	802	V
Trucks and buses	19	%
Recreational vehicles	0	90
Terrain type:	Level	
Grade	0.00	90
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	703	pc/h/ln
Speed Inputs a	and Adjustments_	
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	5	,
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	55.0	mi/h
-	Urban Free	way
LOS and Perfor	mance Measures_	

Flow rate, vp	703	pc/h/ln
Free-flow speed, FFS	55.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N Density, D	5 12.8	pc/mi/ln

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_____Operational Analysis_____

Analyst:	CH
Agency or Company:	PARSONS
Date Performed:	8/15/08
Analysis Time Period:	PM Peak
Bar /Discretiis	T 75 MD

Freeway/Direction: I-75 NB
From/To: Lafayette Exit/I-96 WB Exit From/To: Lafayette Ex
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

TIOW TIPUCS and Adjustments	Flow	Inputs	and	Adjustments
-----------------------------	------	--------	-----	-------------

Volume, V		2845	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		749	v
Trucks and buses		17	90
Recreational vehicles		0	90
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.922	
Driver population factor,	fp	1.00	
Flow rate, vp		650	pc/h/ln

______Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	5	-
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	55.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp		650	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car speed,	S	55.0	mi/h
Number of lanes, N		5	
Density, D		11.8	pc/mi/ln

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Operatio	onal Analysis			
Analyst: CH				
Agency or Company: PARSONS				
Date Performed: 10/2/08				
Analysis Time Period: PM Peak				
Freeway/Direction: I-75 NB				
Jurisdiction: MDOT				
Analysis Year: 2035 Hybrid				
Description: Detroit River Inter		E.		
Flow Inp	outs and Adjustments			
Volume, V	1890	veh/h		
Peak-hour factor, PHF	0.95			
Peak 15-min volume, v15	497	V		
Trucks and buses	12	9		
Recreational vehicles	0	8		
Terrain type:	Level			
Grade	0.00	8		
Segment length	0.00	mi		
Trucks and buses PCE, ET	1.5			
Recreational vehicle PCE, ER	1.2			
Heavy vehicle adjustment, fHV	0.943			
Driver population factor, fp	1.00			
Flow rate, vp	527	pc/h/ln		
Speed In	puts and Adjustments			
Lane width	12.0	ft		
Right-shoulder lateral clearance	6.0	ft		
Interchange density	1.00	interchange/mi		
Number of lanes, N	4	incerchange/mi		
Free-flow speed:	Measured			
FFS or BFFS	55.0	mi/h		
Lane width adjustment, fLW	0.0	mi/h		
Lateral clearance adjustment, fLC		mi/h		
Interchange density adjustment, f		mi/h		
Number of lanes adjustment, fN	1.5			
Free-flow speed, FFS	55.0	mi/h		
riee-liow speed, Frb	Urban Freeway	mi/h		
LOS and	Performance Measures			
		41. 42		
Flow rate, vp	527	pc/h/ln		
Free-flow speed, FFS	55.0	mi/h		
Average passenger-car speed, S	55.0	mi/h		
Number of lanes, N	4			
Density, D	9.6	pc/mi/ln		

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Number of lanes, N

Density, D

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	Operational	Analysis		
Analyst:	СН			
Agency or Company:	PARSONS			
	10/2/08			
Date Performed: Analysis Time Period:	PM Peak			
Freeway/Direction:	I-75 NB			
		Exit/Amb. Ent.		
Jurisdiction:	MDOT			
Analysis Year:	2035 Hybrid			
Description: Detroit R		ional Crossing Projec	et	
	Flow Inputs	and Adjustments		
Volume, V		1858	veh/h	
Peak-hour factor, PHF		0.95		
Peak 15-min volume, v15		489	V	
Trucks and buses		12	8	
Recreational vehicles		0	%	
Terrain type:		Level		
Grade		0.00	8	
Segment length		0.00	mi	
Trucks and buses PCE, E	Γ	1.5		
Recreational vehicle PC	E, ER	1.2		
Heavy vehicle adjustmen	t, fHV	0.943		
Driver population factor	r, fp	1.00		
Flow rate, vp		691	pc/h/ln	
	Speed Input:	s and Adjustments		
Lane width		12.0	ft	
Right-shoulder lateral	clearance	6.0	ft	
Interchange density		1.00	interchange/mi	
Number of lanes, N		3		
Free-flow speed:		Measured		
FFS or BFFS		55.0	mi/h	
Lane width adjustment,		0.0	mi/h	
Lateral clearance adjus		0.0	mi/h	
Interchange density adj		2.5	mi/h	
Number of lanes adjustm	ent, fN	3.0	mi/h	
Free-flow speed, FFS		55.0	mi/h	
		Urban Freeway	!	
	LOS and Per	formance Measures		
Flow rate, vp		691	pc/h/ln	
Free-flow speed, FFS		55.0	mi/h	
Average passenger-car s	peed, S	55.0	mi/h	
Number of lanes N		3		

3

12.6

pc/mi/ln

Density, D

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	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
	10/2/08		
Analysis Time Period: PM Peak			
Freeway/Direction: I-75 NB			
From/To: Amb. Ent./C-D Road Exit			
Jurisdiction: MDOT			
Analysis Year: 2035 Hybrid			
Description: Detroit	River Internationa	al Crossing Proj	ect
	Flow Inputs and	d Adjustments	
Volume, V		2071	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	545	V
Trucks and buses		11	8
Recreational vehicles		0	8
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE,		1.5	
Recreational vehicle PCE, ER		1.2	
Heavy vehicle adjustment, fHV		0.948	
Driver population factor, fp		1.00	
Flow rate, vp		767	pc/h/ln
	Speed Inputs ar	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral clearance		6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		3	
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment, fLW		0.0	mi/h
Lateral clearance adjustment, fLC		0.0	mi/h
Interchange density adjustment, fID		2.5	mi/h
Number of lanes adjustment, fN		3.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freew	ay
	LOS and Perform	mance Measures	
Flow rate, vp		767	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car	speed, S	55.0	mi/h
Number of lanes, N		3	
Donaity D		12 0	ng/mi/ln

13.9

pc/mi/ln

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	Operational Analy	sis	
Analyst:	СН		
Agency or Company:	PARSONS		
	10/2/08		
Analysis Time Period:			
Freeway/Direction:	T-75 SB		
	C-D Road Ent. / Am	b. Exit	
	MDOT		
Analysis Year:			
Description: Detroit R		Crossing Project	
	Flow Inputs and A	djustments	
17-1		0.2.64	1 (1
Volume, V Peak-hour factor, PHF		2361	veh/h
Peak 15-min volume, v15		0.95	
Trucks and buses		621 9	V o.
Recreational vehicles		0	8 8
Terrain type:		Level	8
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, E	т	1.5	шт
Recreational vehicle PC		1.2	
Heavy vehicle adjustmen	· ·	0.957	
Driver population factor, fp		1.00	
Flow rate, vp		866	pc/h/ln
	Speed Inputs and	Adjustments	
Lane width		12.0	£L
Right-shoulder lateral	clearance	6.0	ft ft
Interchange density	Clearance	1.00	_ ·
Number of lanes, N		3	interchange/mi
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density adj		2.5	mi/h
Number of lanes adjustm		3.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freeway	
	LOS and Performan	ce Measures	
Flow rate, vp		866	nc/h/ln
Free-flow speed, FFS		55.0	pc/h/ln mi/h
Average passenger-car s	need. S	55.0	mi/h
Number of lanes, N		3	1117 / 11
Density, D		15.7	pc/mi/ln

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	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed: Analysis Time Period:	10/2/08		
Freeway/Direction:	AM Peak		
	Amb. Exit / EB	T 06 Ext	
Jurisdiction:	MDOT	1-96 Enc.	
Analysis Year:			
Description: Detroit R		al Crossing Project	E
		d Adjustments	
Volume, V		2295	veh/h
Peak-hour factor, PHF Peak 15-min volume, v15		0.95	
Trucks and buses		604 8	V o.
Recreational vehicles		0	& &
Terrain type:		Level	•
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, E	${f T}$	1.5	III
Recreational vehicle PC		1.2	
Heavy vehicle adjustmen		0.962	
Driver population factor, fp		1.00	
Flow rate, vp		837	pc/h/ln
	Speed Inputs an	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		3	3 ·
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,		0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density adj		2.5	mi/h
Number of lanes adjustm	ent, IN	3.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freeway	
	LOS and Perform	mance Measures	
Flow rate, vp		837	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car s	peed, S	55.0	mi/h
Number of lanes, N		3	
Density, D		15.2	pc/mi/ln

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	Operational Ana	alysis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Detroit R	I-75 SB EB I-96 Ent. / A MDOT 2035 Hybrid		et
	Flow Inputs and	d Adjustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15		3296 0.95 867	veh/h v
Trucks and buses Recreational vehicles		14 0	% %
Terrain type: Grade Segment length		Level 0.00 0.00	% mi
Trucks and buses PCE, E Recreational vehicle PC Heavy vehicle adjustment Driver population factor	E, ER t, fhV	1.5 1.2 0.935 1.00	
Flow rate, vp	a 1 = .	928	pc/h/ln
	Speed Inputs ar	nd Adjustments	
Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed:	clearance	12.0 6.0 1.00 4 Measured	ft ft interchange/mi
FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density adj	tment, fLC ustment, fID	55.0 0.0 0.0 2.5	mi/h mi/h mi/h mi/h
Number of lanes adjustm Free-flow speed, FFS	ent, fN	1.5 55.0 Urban Freeway	mi/h mi/h
	LOS and Perform	mance Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car s Number of lanes, N Density, D	peed, S	928 55.0 55.0 4 16.9	pc/h/ln mi/h mi/h pc/mi/ln
			

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Number of lanes, N

Density, D

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	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
	8/15/08		
Analysis Time Period:	AM Peak		
Freeway/Direction:	I-75 SB		
From/To:	Ambassador Ent.,	Grand Ent.	
Jurisdiction:	MDOT		
Analysis Year:	2035 Hybrid		
Description: Detroit	River Internation	al Crossing Pro	oject
	Flow Inputs and	d Adjustments	
Volume, V		3386	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	.5	891	v
Trucks and buses		14	%
Recreational vehicles		0	%
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle F	CE, ER	1.2	
Heavy vehicle adjustment, fHV		0.935	
Driver population factor, fp		1.00	
Flow rate, vp		763	pc/h/ln
	Speed Inputs an	nd Adjustments_	
Lane width		12.0	ft
Right-shoulder lateral	. clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		5	-
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adju	stment, fLC	0.0	mi/h
Interchange density ad	ljustment, fID	2.5	mi/h
Number of lanes adjust	ment, fN	0.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Free	eway
	LOS and Perform	mance Measures_	
Flow rate, vp		763	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car	speed, S	55.0	mi/h
ar the effective at the second		_	•

13.9

PTG

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	Operational Anal	ysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/08		
Analysis Time Period:			
	I-75 SB		
From/To:	Grand Ent./Clark	Exit	
Jurisdiction:	MDOT		
Analysis Year:			
Description: Detroit R	iver International	Crossing Project	
	Flow Inputs and .	Adjustments	
Volume, V		3414	veh/h
Peak-hour factor, PHF		0.95	·
Peak 15-min volume, v15		898	v
Trucks and buses		14	ଚ
Recreational vehicles		0	%
Terrain type:		Level	
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE, E		1.5	
Recreational vehicle PC	•	1.2	
Heavy vehicle adjustmen		0.935	
Driver population factor, fp		1.00	/1 / 1
Flow rate, vp		769	pc/h/ln
	Speed Inputs and	Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		5	
Free-flow speed:		Measured	
FFS or BFFS	67.77	55.0	mi/h
Lane width adjustment,		0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density adj		2.5	mi/h
Number of lanes adjustm	lent, in	0.0 55.0	mi/h
Free-flow speed, FFS		Urban Freeway	mi/h
		Orban Freeway	
	LOS and Performa:	nce Measures	
Flow rate, vp		769	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car s	peed, S	55.0	mi/h
Number of lanes, N		5	
Density, D		14.0	pc/mi/ln

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Density, D

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	Operational Ana	alysis	
Analyst:	СН		
	PARSONS		
	8/15/08		
Analysis Time Period:	AM Peak		
Freeway/Direction: From/To:	Clark Exit/Plaza	. Ezi+	
	MDOT	i EXIL	
Analysis Year:		. 1 . C	
Description: Detroit	River internationa	al Crossing Proj	ect
	Flow Inputs and	d Adjustments	
Volume, V		2833	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	746	V
Trucks and buses		17	90
Recreational vehicles		0	96
Terrain type:		Level	
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustment, fHV		0.922	
_		1.00	
Driver population factor, fp		647	pc/h/ln
Flow rate, vp		047	pc/11/111
	Speed Inputs an	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		5	
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjust:	_	0.0	mi/h
Free-flow speed, FFS	·	55.0	mi/h
,		Urban Freew	•
	LOS and Perform	mance Measures	
Flow rate, vp		647	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car	sneed S	55.0	mi/h
	speed, s	5	шт/ п
Number of lanes, N		11 0	/ / / 3

11.8

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Density, D

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	Operational And	alysis	
Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year:	I-75 SB Plaza Exit/Junc [®] MDOT 2035 Hybrid		
Description: Detroit	River Internation	al Crossing Proj	ject
	Flow Inputs and	d Adjustments	
Volume, V Peak-hour factor, PHF		2617 0.95	veh/h
Peak 15-min volume, v1	5	689	v
Trucks and buses Recreational vehicles		15 0	90
Terrain type:		Level	6
Grade		0.00	ojo
Segment length		0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme	nt, fHV	0.930	
Driver population fact	or, fp	1.00	
Flow rate, vp		740	pc/h/ln
	Speed Inputs a	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	
Free-flow speed:		Measured	
FFS or BFFS	67.77	70.0	mi/h
Lane width adjustment,		0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad Number of lanes adjust:	<u>-</u>	2.5 1.5	mi/h
Free-flow speed, FFS	menc, in	70.0	mi/h mi/h
riee ilow speed, ilo		Urban Freev	
	LOS and Perform	mance Measures	
Flow rate, vp		 740	nc/h/ln
Free-flow speed, FFS		70.0	pc/h/ln mi/h
Average passenger-car	speed, S	70.0	mi/h
Number of lanes, N	F 1	4	/ **
Density D		10 6	nc/mi/ln

10.6

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Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

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Operational Analysis_____ Analyst: $_{\rm CH}$ Analyst: Agency or Company: PARSONS Date Performed: 8/15/08 Analysis Time Period: AM Peak Freeway/Direction: I-75 SB From/To: Junction Ent./Dragoon Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V veh/h 2661 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 700 V 14 Trucks and buses 9 Recreational vehicles 0 Level Terrain type: Grade 0.00 용 mi Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.935 Driver population factor, fp 1.00 Flow rate, vp 599 pc/h/ln _____Speed Inputs and Adjustments_____ ft Lane width 12.0 6.0 Right-shoulder lateral clearance ft 6.0 ft 1.00 interchange/mi Interchange density Number of lanes, N Free-flow speed: Measured mi/h mi/h 70.0 FFS or BFFS mi/h mi/h mi/h Lane width adjustment, fLW 0.0 Lateral clearance adjustment, fLC 0.0 2.5 mi/h 0.0 mi/h 70.0 mi/h Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ Flow rate, vp 599 pc/h/ln

70.0 mi/h 70.0 mi/h

pc/mi/ln

70.0

5 8.6

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Average passenger-car speed, S

Number of lanes, N

Density, D

_____Operational Analysis_____ Analyst: Agency or Company: PARSONS Date Performed: 8/15/08 Date Performed: 0,15,00 Analysis Time Period: AM Peak Freeway/Direction: I-75 SB From/To: Dragoon Exit/Plaza Ent. From/To: Dragoon Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments____ Volume, V 2342 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 616 16 Trucks and buses Recreational vehicles Terrain type: Level Grade 0.00 응 Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.926 Driver population factor, fp 1.00 Flow rate, vp 666 pc/h/ln _____Speed Inputs and Adjustments____ Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft interchange/mi 1.00 Interchange density Number of lanes, N Free-flow speed: Measured FFS or BFFS 70.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 1.5 mi/h mi/h 70.0 Free-flow speed, FFS Urban Freeway _____LOS and Performance Measures_____ Flow rate, vp 666 pc/h/ln Free-flow speed, FFS 70.0

mi/h

pc/mi/ln

mi/h

70.0

4 9.5

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Density, D

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	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/08		
Analysis Time Period:			
Freeway/Direction:	I-75 SB		
From/To:	Plaza Ent./Spri	nawells Exit	
Jurisdiction:	MDOT	19WOLLD DALC	
Analysis Year:	2035 Hybrid		
Description: Detroit		al Crossing Proj	ect
	Flow Inputs and	d Adjustments	
			
Volume, V		3110	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	818	V
Trucks and buses		24	%
Recreational vehicles		0	90
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE, 1	ET	1.5	
Recreational vehicle Po	CE, ER	1.2	
Heavy vehicle adjustme:	nt, fHV	0.893	
Driver population fact	or, fp	1.00	
Flow rate, vp		611	pc/h/ln
	Speed Inputs ar	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density	Cicalance	1.00	interchange/mi
Number of lanes, N		6	incerchange/mi
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment,	f T.W	0.0	mi/h
Lateral clearance adjustments,		0.0	mi/h
Interchange density ad	•	2.5	mi/h
Number of lanes adjust		0.0	mi/h
Free-flow speed, FFS	meric, in	70.0	
riee flow speed, fib		Urban Freew	mi/h av
	LOS and Perform		1
Flow rate, vp		611	pc/h/ln
Free-flow speed, FFS		70.0.	mi/h
Average passenger-car	speed, S	70.0	mi/h
Number of lanes, N		6	
D 1 1 D		ο π	

8.7

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Number of lanes, N

Density, D

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	Operational Ana	alysis	· · · · · · · · · · · · · · · · · · ·
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/08		
Analysis Time Period:	AM Peak		
Freeway/Direction:	I-75 SB		
-	Springwells Exit	/Spring. Ent.	
Jurisdiction:	MDOT	······································	
Analysis Year:			
Description: Detroit		al Crossing Pro	oject
	Flow Inputs and	d Adjustments	
Volume, V		3030	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	797	V
Trucks and buses		24	%
Recreational vehicles		0	00
Terrain type:		Level	,
Grade		0.00	୦
Segment length		0.00	mi
Trucks and buses PCE,	ድጥ	1.5	III I
Recreational vehicle PCE, ER		1.2	
Heavy vehicle adjustment, fHV Driver population factor, fp		0.893	
		1.00	
Flow rate, vp	01, IP	893	pc/h/ln
	Speed Inputs an	nd Adjustments	-
		100	
Lane width	1	12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	
Free-flow speed:		Measured	
FFS or BFFS	CTT	70.0	mi/h
Lane width adjustment,		0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad	_	2.5	mi/h
Number of lanes adjust	ment, iN	1.5	mi/h
Free-flow speed, FFS		70.0	mi/h
		Urban Fre€	eway
	LOS and Perform	mance Measures_	
Flow rate, vp		893	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car	speed, S	70.0	mi/h
Number of lance N		1	,

12.8

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Density, D

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	Operational Ana	lysis	
Analyst:	СН		
Agency or Company:			
	8/15/08		
Analysis Time Period:			
Freeway/Direction:			
From/To:	Springwells Ent.	/Dearhorn Ent	
Jurisdiction:	MDOT	/ Dearborn Enc.	
Analysis Year:			
Description: Detroit I		al Crossing Proj	ject
	Flow Inputs and	d Adjustments	
Volume, V		3153	veh/h
Peak-hour factor, PHF		0.95	,
Peak 15-min volume, v15		830	V
Trucks and buses	.	24	90
Recreational vehicles		0	90
Terrain type:		Level	•
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE, I	ਟਾਸ	1.5	1112
Recreational vehicle Po		1.2	
Heavy vehicle adjustmen		0.893	
Driver population factor		1.00	
Flow rate, vp), ip	929	pc/h/ln
riow rate, vp			pc/ 11/ ±11
	Speed Inputs ar	nd Adjustments_	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density ad	justment, fID	2.5	mi/h
Number of lanes adjustr	_	1.5	mi/h
Free-flow speed, FFS		70.0	mi/h
- · ·		Urban Free	way
	LOS and Perform	nance Measures_	
Flow rate, vp		929	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car	speed, S	70.0	mi/h
Number of lanes, N	<u>.</u> ,	4	·
D		12 2	ng/mi/ln

13.3

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Average passenger-car speed, S

Number of lanes, N

Density, D

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0p	erational Anal	lysis	
Analyst: CH			
_	SONS		
Date Performed: 10/	2/08		
Analysis Time Period: Mid			
Freeway/Direction: I-7			
_	Road Ent. / A	Amb. Exit	
Jurisdiction: MDO			
	5 Hybrid		
Description: Detroit River	_	l Crossing Project	5
Fl	ow Inputs and	Adjustments	
Volume, V		2519	veh/h
Peak-hour factor, PHF		0.95	V C11/ 11
Peak 15-min volume, v15		663	V
Trucks and buses		21	⋄ ⋄
Recreational vehicles		0	do
Terrain type:		Level	ŭ
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	1112
Recreational vehicle PCE, E	P.	1.2	
Heavy vehicle adjustment, f		0.905	
Driver population factor, f		1.00	
Flow rate, vp		977	pc/h/ln
Sp	eed Inputs and	d Adjustments	
I and width		12.0	ft
Lane width Right-shoulder lateral clea	rando	6.0	ft
Interchange density	irance	1.00	
Number of lanes, N		3	interchange/mi
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment, fLW		0.0	mi/h
Lateral clearance adjustmen	t fro	0.0	mi/h
Interchange density adjustment		2.5	mi/h
Number of lanes adjustment,		3.0	mi/h
Free-flow speed, FFS	TIV	55.0	mi/h
riee flow speed, rib		Urban Freeway	1111/11
LC	S and Performa	ance Measures	
Flow rate, vp		977	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
TICG TIOM PROCH LLD		33.0	TILT / 11

55.0

17.8

mi/h

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Average passenger-car speed, S

Number of lanes, N

Density, D

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	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
	10/2/08		
Analysis Time Period:	Midday Peak		
Freeway/Direction:	I-75 SB		
From/To:	Amb. Exit / EB	I-96 Ent.	
Jurisdiction:	MDOT		
Analysis Year:	2035 Hybrid		
Description: Detroit	River Internation	al Crossing Pro	pject
	Flow Inputs and	d Adjustments	
Volume, V		2224	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	585	V
Trucks and buses		23	8
Recreational vehicles		0	%
Terrain type:		Level	
Grade		0.00	ફ
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme		0.897	
Driver population fact	or, fp	1.00	
Flow rate, vp		870	pc/h/ln
	Speed Inputs a	nd Adjustments_	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		3	
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,		0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad	-	2.5	mi/h
Number of lanes adjust	ment, fN	3.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Free	eway
	LOS and Perform	mance Measures_	
Flow rate, vp		870	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
7		EE 0	4 /7-

55.0

15.8

3

mi/h

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Density, D

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	Operational Ana	alysis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To:	CH PARSONS 10/2/08 Midday Peak I-75 SB EB I-96 Ent. / A	lmh Fnt	
Jurisdiction: Analysis Year: Description: Detroit	MDOT 2035 Hybrid		iest
Description: Detroit	Flow Inputs and		
	riow inputs and	Adjustments	
Volume, V		2998	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	789	V
Trucks and buses		25	8
Recreational vehicles		0	8
Terrain type:		Level	
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE,		1.5	
Recreational vehicle F		1.2	
Heavy vehicle adjustme		0.889	
Driver population fact	or, fp	1.00	
Flow rate, vp		888	pc/h/ln
	Speed Inputs a	nd Adjustments_	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	_
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjust	_	1.5	mi/h
Free-flow speed, FFS		55.0	mi/h
-		Urban Free	eway
	LOS and Perfor	mance Measures_	
Flow rate, vp		888	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car	aneed S	55.0	mi/h
Number of lanes, N	pheer' n	4	111.1 / 11
Number of lanes, N		± 16 1	nc/mi/ln

16.1

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26777 Central Park Blvd Southfield, MI 48076

Number of lanes, N

Density, D

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	Operational Ana	alysis	
Analyst:	CH		
Agency or Company:	PARSONS		
	8/15/08		
Analysis Time Period:	——————————————————————————————————————		
4 .	I-75 SB		
From/To:	Ambassador Ent.,	Grand Ent.	
Jurisdiction:	MDOT		
_	2035 Hybrid		
Description: Detroit R	iver Internation	al Crossing Proj	ject
	Flow Inputs and	d Adjustments	
Nolumo N		3048	veh/h
Volume, V		0.95	ven/n
Peak-hour factor, PHF			
Peak 15-min volume, v15		802	V
Trucks and buses		25	8
Recreational vehicles		0	8
Terrain type:		Level	2
Grade		0.00	8
Segment length	_	0.00	mi
Trucks and buses PCE, E		1.5	
Recreational vehicle PC	-	1.2	
Heavy vehicle adjustmen		0.889	
Driver population facto	r, fp	1.00	
Flow rate, vp		722	pc/h/ln
	Speed Inputs as	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density	CICALAIICC	1.00	interchange/mi
Number of lanes, N		5	inceremange/mi
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	ft.W	0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density adj		2.5	mi/h
Number of lanes adjustm		0.0	mi/h
Free-flow speed, FFS	ent, in	55.0	mi/h
riee-riow speed, rrs		Urban Freev	
		Olban Fleev	vay
	LOS and Perform	mance Measures	
Flow rate, vp		722	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car s	need S	55.0	mi/h
Average passenger car s	podu, b	55.0	шт / п

5

13.1

PTG

26777 Central Park Blvd Southfield, MI 48076

Phone: 248-936-1147 Fax: 248-936-1176

E-mail: catherine.hartner@parsons.com

Operational Analysis_____

Analyst:

Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Grand Ent./Clark Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow 1	Inputs	and	Adj	ustments
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Volume, V	3089	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	813	V
Trucks and buses	25	%
Recreational vehicles	0	90
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	732	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	55.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp	732	pc/h/ln
Free-flow speed, FFS	55.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N	5	
Density, D	13.3	pc/mi/ln

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_____Operational Analysis_____

Analyst: CH

Agency or Company: PARSONS
Date Performed: 8/15/08 Date Performed:

Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Clark Exit/Plaza Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow	Inputs	and	Adjustments

Volume, V	2798	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	736	v
Trucks and buses	25	00
Recreational vehicles	0	00
Terrain type:	Level	
Grade	0.00	9
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	663	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	55.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp	663	pc/h/ln
Free-flow speed, FFS	55.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N	5	
Density, D	12.1	pc/mi/ln

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Operational Analysis_____

Analyst: СН Agency or Company: PARSONS
Date Performed: 8/15/08

Date Performed:
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Plaza Exit/Junction Ent.

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Flow Inputs and Adjustments_____

Volume, V		2403	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		632	v
Trucks and buses		25	00
Recreational vehicles		0	00
Terrain type:		Level	
Grade		0.00	90
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.889	
Driver population factor,	fp	1.00	
Flow rate, vp		711	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures____

Flow rate, vp		711	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car speed,	S	70.0	mi/h
Number of lanes, N		4	
Density, D		10.2	pc/mi/ln

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Phone: 248-936-1147 E-mail: catherine.hart	ner@parsons.co	Fax: 248-936 om	5-11/6
	Operational	Analysis	
Analyst:	СН		
Agency or Company:	PARSONS		
	8/15/08		
Analysis Time Period:	Midday Peak		
Freeway/Direction:			
From/To:	Junction Ent	./Dragoon Exit	
Jurisdiction:	MDOT		
Analysis Year:	2035 Hybrid		
Description: Detroit I	River Internat	ional Crossing Projec	ct
	Flow Inputs	and Adjustments	
Volume, V		2575	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15	5	678	V
Trucks and buses		25	%
Recreational vehicles		0	96
Terrain type:		Level	
Grade		0.00	ଚ
Segment length		0.00	mi
Trucks and buses PCE, I	ΞT	1.5	
Recreational vehicle Po	CE, ER	1.2	
Heavy vehicle adjustmen	nt, fHV	0.889	
Driver population factor	or, fp	1.00	
Flow rate, vp		610	pc/h/ln
	Speed Input	s and Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		5	3 ,
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus		0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjusti		0.0	mi/h
Free-flow speed, FFS		70.0	mi/h
-		Urban Freewa	У

LOS and Performance Measures_____

Flow rate, vp	610	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	5	
Density, D	8.7	pc/mi/ln

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Operational An	alysis

Analyst: CH

Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Dragoon Exit/Plaza Ent.

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow	Inputs	and	Ad-	justments

Volume, V		2432	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		640	V
Trucks and buses		25	00
Recreational vehicles		0	90
Terrain type:		Level	
Grade		0.00	90
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.889	
Driver population factor,		1.00	
Flow rate, vp	-	720	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp		720	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car speed,	S	70.0	mi/h
Number of lanes, N		4	
Density, D		10.3	pc/mi/ln

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Operational Analysis______

Analyst:

Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: Midday Peak

Freeway/Direction: I-75 SB
From/To: Plaza Ent./Springwells Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

	Flow	Inputs	and	Adjustments
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Volume, V	2924	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	769	V
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	90
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	577	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
-	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp Free-flow speed, FFS	577 70.0	pc/h/ln mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	8.2	pc/mi/ln

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Density, D

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Operational	Analysis	
Analyst: CH		
Agency or Company: PARSONS		
Date Performed: 8/15/08		
Analysis Time Period: Midday Peak		
Freeway/Direction: I-75 SB	n 11/0 1 n.1	
	Exit/Spring. Ent.	
Jurisdiction: MDOT		
Analysis Year: 2035 Hybrid	1 0 D	٠ ـ ـ ـ ـ
Description: Detroit River Internat	ional Crossing Pro	ject
Flow Inputs	and Adjustments	
Volume, V	2888	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	760	V
Trucks and buses	25	96
Recreational vehicles	0	96
Terrain type:	Level	
Grade	0.00	96
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	855	pc/h/ln
Speed Input	s and Adjustments_	
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	-
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
- · ·	Urban Free	eway
LOS and Per	formance Measures_	
	855	pc/h/ln
Flow rate, vp		mi/h
Free-flow speed, FFS	70.0 70.0	mi/h mi/h
Average passenger-car speed, S	70.0 4	11117/11
Number of lanes, N	12.2	pc/mi/ln

pc/mi/ln

12.2

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_____Operational Analysis______

Analyst: CH

Agency or Company: PARSONS
Date Performed: 8/15/08 Date Performed:

Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Springwells Ent./Dearborn Ent.

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow Inputs	and	Adjustments	
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Volume, V		3169	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		834	V
Trucks and buses		25	9
Recreational vehicles		0	00
Terrain type:		Level	
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.889	
Driver population factor,	fp	1.00	
Flow rate, vp		938	pc/h/ln

Speed Inputs and Adjustments______

Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N	12.0 6.0 1.00	ft ft interchange/mi
Free-flow speed: FFS or BFFS	Measured 70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC Interchange density adjustment, fID	0.0 2.5	mi/h mi/h
Number of lanes adjustment, fN Free-flow speed, FFS	1.5 70.0	mi/h mi/h
1100 1100 1100 1100	Urban Freeway	

LOS and Performance Measures______

Flow rate, vp		938	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car speed,	S	70.0	mi/h
Number of lanes, N		4	
Density, D		13.4	pc/mi/ln

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Density, D

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Operational Analysis Analyst: CH Agency or Company: PARSONS Date Performed: 10/2/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 SB From/To: C-D Road Ent. / Amb. Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project Flow Inputs and Adjustments Volume, V Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1303 v Trucks and buses 8 % % Recreational vehicles 0 % Terrain type: Level Grade 0.00 % Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 Driver population factor, fp 1.00 Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/n Number of lanes, N Free-flow speed: Measured FFS or BFFS 5.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS Urban Freeway				
Agency or Company: PARSONS Date Performed: 10/2/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 SB From/To: C-D Road Ent. / Amb. Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project Flow Inputs and Adjustments Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 1303 v Trucks and buses 8 % Recreational vehicles 0 % Terrain type: Level Grade 0.00 % Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 Driver population factor, fp 1.00 Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/I Number of lanes, N Free-flow speed: Measured FFS or BFFS 5.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Lateral clearance adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h		erational Ana	lysis	
Date Performed: 10/2/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 SB From/To: C-D Road Ent. / Amb. Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project	.yst:			
Date Performed: 10/2/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 SB From/To: C-D Road Ent. / Amb. Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project Flow Inputs and Adjustments Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 1303 v Frucks and buses 8 8 8 Recreational vehicles 0 8 Ferrain type: Level Grade 0.00 % Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 Driver population factor, fp 1.00 Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/Interchange of Index Sepsed: Measured FFS or BFFS 5.0 mi/h Lateral clearance adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLW 0.0 mi/h Interchange density adjustment, fLD 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h Number of lanes adjustment, fN 3.0 mi/h Number of lanes adjustment, fN 3.0 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h		SONS		
Analysis Time Period: PM Peak Freeway/Direction: I-75 SB From/To: C-D Road Ent. / Amb. Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project Flow Inputs and Adjustments Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses 8 8 8 Recreational vehicles 0 8 Terrain type: Level Grade 0.00 8 Segment length 0.00 mi Trucks and buses PCE, ET Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 Driver population factor, fp 1.00 Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/I Number of lanes, N 3 Free-flow speed: Measured FFS or BFFS 5.0 mi/h Number of lanes adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h	-			
Freeway/Direction: I-75 SB From/To: C-D Road Ent. / Amb. Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project Flow Inputs and Adjustments Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 1303 v Trucks and buses 8 8 8 Recreational vehicles 0 8 Terrain type: Level Grade 0.00 8 Terrain type: Level Grade 1.5 Recreational vehicle PCE, ER 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 Driver population factor, fp 1.00 Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/n Number of lanes, N 3 Free-flow speed: Measured FFS or BFFS 5.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fID 3.0 mi/h Free-flow speed, FFS 5.0 mi/h Number of lanes adjustment, fID 3.0 mi/h Free-flow speed, FFS 5.0 mi/h Number of lanes adjustment, fID 3.0 mi/h Free-flow speed, FFS 5.0 mi/h Number of lanes adjustment, fID 3.0 mi/h Free-flow speed, FFS 5.0 mi/h				
From/To:	_			
Jurisdiction: MDOT Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project	-		Amb. Exit	
Analysis Year: 2035 Hybrid Description: Detroit River International Crossing Project Flow Inputs and Adjustments Volume, V Peak-hour factor, PHF Peak-hour foctor, PHF Peak-hour factor, PHF Peak-hour factor, PHF Peak-to-min volume, v15 1303 V Trucks and buses Recreational vehicles O Segment length Forade Segment length Segmen			THID: EXIC	
Flow Inputs and Adjustments				
Volume, V 4953 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1303 v Frucks and buses 8 % Recreational vehicles 0 % Ferrain type: Level 6 Grade 0.00 mi Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV Driver population factor, fp 1.00 pc/h/ln Flow rate, vp 1.807 pc/h/ln Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/r Number of lanes, N 3 Free-flow speed: Measured FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lane card clearance adjustment, fLC 0.0 mi/h Level 0.0 mi/h	-		al Crossing Pro	ject
Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1303 v Trucks and buses 8 % Recreational vehicles 0 % Terrain type: Level 0.00 mi Grade 0.00 mi Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 0.962 Driver population factor, fp 1.00 pc/h/ln Flow rate, vp 1807 pc/h/ln Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/r Number of lanes, N 3 Tree-flow speed: Measured FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fLD 2.5 mi/h Number of lanes adjustmen		ow Inputs and	l Adjustments	
Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1303 v Trucks and buses 8 % Recreational vehicles 0 % Terrain type: Level 0.00 mi Grade 0.00 mi mi Segment length 0.00 mi mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 pc/h/ln Driver population factor, fp 1.00 pc/h/ln pc/h/ln Speed Inputs and Adjustments pc/h/ln pc/h/ln Lane width 12.0 ft ft Right-shoulder lateral clearance 6.0 ft ft Interchange density 1.00 interchange/r mi/h Number of lanes, N 3 Tree-flow speed: Measured mi/h FFS or BFFS 55.0 mi/h mi/h Lane width adjustment, fLW 0.0 mi/h Lane width adjustment, fLW 0.0 mi/h </td <td>ıme, V</td> <td></td> <td>4953</td> <td>veh/h</td>	ıme, V		4953	veh/h
Peak 15-min volume, v15 1303 v Trucks and buses 8 % Recreational vehicles 0 % Terrain type: Level 0.00 % Grade 0.00 mi mi Segment length 0.00 mi mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 Driver population factor, fp 1.00 pc/h/ln Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/r Number of lanes, N 3 Tree-flow speed: Measured FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fLD 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0				•
Trucks and buses Recreational vehicles Recreational vehicles Grade Grade Segment length Trucks and buses PCE, ET Recreational vehicle PCE, ER Heavy vehicle adjustment, fHV Driver population factor, fp Flow rate, vp Speed Inputs and Adjustments Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fLC Interchange density adjustment, fLC Interchange density adjustment, fLD Interchange density adjustment, fLD Interchange density adjustment, fID Interchange densit	•			V
Recreational vehicles 0 % Terrain type: Level 0.00 % Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.962 Driver population factor, fp 1.00 Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width Right-shoulder lateral clearance for a speed interchange density Interchange density Speed Inputs and Adjustments Speed Input services Speed Input serv				
Terrain type:				-
Grade Segment length O.00 Segment length O.00 Mi Trucks and buses PCE, ET Recreational vehicle PCE, ER Heavy vehicle adjustment, fHV O.962 Driver population factor, fp Tlow rate, vp Tlow rate, vp Tlow rate, vp Tlow rate adjustment Speed Inputs and Adjustments Lane width Right-shoulder lateral clearance Free-flow speed: Free-flow speed: FFS or BFFS Measured FFS or BFFS Mi/h Mumber of lanes adjustment, fLC Mi/h Number of lanes adjustment, fN Mumber of lanes adjustm				3
Segment length Trucks and buses PCE, ET Recreational vehicle PCE, ER Heavy vehicle adjustment, fHV Driver population factor, fp Flow rate, vp Speed Inputs and Adjustments Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lane width adjustment, fLW Lane width adjustment, fLC Interchange density adjustment, fID Lane width adjustment, fN Interchange density adjustment, fN Interch				9.
Trucks and buses PCE, ET Recreational vehicle PCE, ER Heavy vehicle adjustment, fHV Driver population factor, fp Speed Inputs and Adjustments Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lane width adjustment, fLW Lane width adjustment, fLC Interchange density adjustment, fID Interchange density adjustment, fN Number of lanes adjustment, fN Speed Inputs and Adjustment 12.0 ft 6.0 ft 1.00 interchange/I Measured FFS or BFFS 55.0 mi/h 1.00 mi/h 1				
Recreational vehicle PCE, ER Heavy vehicle adjustment, fHV Driver population factor, fp 1.00 Flow rate, vp 1807 Speed Inputs and Adjustments Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Interchange density adjustment, fN Number of lanes adjustment, fN Speed Inputs and Adjustment 12.0 ft 6.0 ft 1.00 interchange/r Measured FFS or BFFS 55.0 mi/h Mi/h Interchange density adjustment, fID 2.5 mi/h Sumber of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h Speed Inputs and Adjustment 12.0 ft 12				шт
Heavy vehicle adjustment, fHV 0.962 Driver population factor, fp 1.00 Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/I Number of lanes, N 3 Free-flow speed: Measured FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h		מי		
Driver population factor, fp 1.00 Flow rate, vp 1807 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/I Number of lanes, N 3 Free-flow speed: Measured FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h				
Speed Inputs and Adjustments Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Interchange density adjustment, fN Interchange density ad				
Speed Inputs and Adjustments Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN Speed Inputs and Adjustments 12.0 ft 6.0 ft 1.00 interchange/r Measured FFS or BFFS 55.0 mi/h 0.0 mi/h 3.0 mi/h 55.0 mi/h 55.0 mi/h 55.0		.p		/1- /1
Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS Lane width adjustment, fSD Lateral clearance adjustment, fSD Latera	rate, vp		1807	pc/n/in
Right-shoulder lateral clearance 6.0 ft Interchange density 1.00 interchange/n Number of lanes, N 3 Free-flow speed: Measured FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h		eed Inputs an	nd Adjustments_	
Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS 1.00 interchange/r 3 Measured 55.0 mi/h 0.0 mi/h 2.5 mi/h 3.0 mi/h 55.0 mi/h	e width		12.0	ft
Number of lanes, N 3 Free-flow speed: Measured FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h	ıt-shoulder lateral c	rance	6.0	ft
Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS Measured 55.0 mi/h 0.0 mi/h 3.0 mi/h 55.0 mi/h	erchange density		1.00	interchange/mi
FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h	per of lanes, N		3	
Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h	e-flow speed:		Measured	
Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h			55.0	mi/h
Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h	width adjustment, f		0.0	mi/h
Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h	_	it, fLC		
Number of lanes adjustment, fN 3.0 mi/h Free-flow speed, FFS 55.0 mi/h	-			
Free-flow speed, FFS 55.0 mi/h				
	-			
	, rrow specu, rrs			
LOS and Performance Measures		S and Perform	nance Measures_	
Flow rate, vp 1807 pc/h/ln				-
Free-flow speed, FFS 55.0 mi/h				
Average passenger-car speed, S 55.0 mi/h		ι, 5		mı/h
Number of lanes, N 3	er of lanes, N		3	

32.9

pc/mi/ln

PTG

Density, D

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	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
	10/2/08		
Analysis Time Period:	PM Peak		
Freeway/Direction:	I-75 SB		
	Amb. Exit / EB	I-96 Ent.	
Jurisdiction:	MDOT		
Analysis Year:			
Description: Detroit R		al Crossing Proj	ject
	Flow Inputs and	d Adjustments	
Volume, V		4554	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		1198	V
Trucks and buses		9	%
Recreational vehicles		0	8
Terrain type:		Level	
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, E	Г	1.5	
Recreational vehicle PC	E, ER	1.2	
Heavy vehicle adjustment	t, fHV	0.957	
Driver population factor	r, fp	1.00	
Flow rate, vp		1670	pc/h/ln
	Speed Inputs a	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		3	
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment, :	fLW	0.0	mi/h
Lateral clearance adjust	tment, fLC	0.0	mi/h
Interchange density adju	ıstment, fID	2.5	mi/h
Number of lanes adjustme	ent, fN	3.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freev	way
	LOS and Perform	mance Measures_	
Flow rate, vp		1670	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car s	peed, S	55.0	mi/h
Number of lanes, N		3	
D D		20 4	/ ' / 7

30.4

pc/mi/ln

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Density, D

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E-mail: catherine.har	tnereparsons.com		
	Operational And	alysis	
Analyst:	СН		
Agency or Company:			
	10/2/08		
Analysis Time Period:			
Freeway/Direction:			
	EB I-96 Ent. / 7	Δmh Ent	
Jurisdiction:	MDOT	AMD. EHC.	
Analysis Year:			
Description: Detroit		al Crossing Pro	oject
	Flow Inputs and		
TT - 1 T7		F 0 0 0	3 /1
Volume, V		5929	veh/h
Peak-hour factor, PHF	_	0.95	
Peak 15-min volume, v1	5	1560	V
Trucks and buses		9	8
Recreational vehicles		0	8
Terrain type:		Level	
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE,		1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme	ent, fHV	0.957	
Driver population fact	or, fp	1.00	
Flow rate, vp		1630	pc/h/ln
	Speed Inputs a:	nd Adjustments_	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		4	Tilder dilarige, mi
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	ft.M	0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjust	_	1.5	mi/h
Free-flow speed, FFS	meric, iii	55.0	mi/h
rice from Speed, 115		Urban Free	
	LOS and Perform	mance Measures_	
Flow rate, vp		1630	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car	speed, S	55.0	mi/h
Number of lanes, N		4	
Dana di terra D		20 (/ ' / 7 .

29.6

pc/mi/ln

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Density, D

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Operational An	alysis	
Analyst: CH		
Agency or Company: PARSONS		
Date Performed: 8/15/08		
Analysis Time Period: PM Peak		
Freeway/Direction: I-75 SB		
From/To: Grand Ent./Clar	k Exit	
Jurisdiction: MDOT		
Analysis Year: 2035 Hybrid		
Description: Detroit River Internation	al Crossing Projec	ct
Flow Inputs an	d Adjustments	
Volume, V	6512	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1714	V
Trucks and buses	10	90
Recreational vehicles	0	90
Terrain type:	Level	
Grade	0.00	96
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1439	pc/h/ln
Speed Inputs as	nd Adjustments	
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	5	3 .
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	55.0	mi/h
	Urban Freeway	7
LOS and Perform	mance Measures	
Flow rate, vp	1439	pc/h/ln
Free-flow speed, FFS	55.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N	5	•
Density, D	26.2	ng/mi/ln

26.2

pc/mi/ln

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Density, D

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Operational A	Analysis			
Analyst: CH		,		
Agency or Company: PARSONS				
Date Performed: 8/15/08				
Analysis Time Period: PM Peak				
Freeway/Direction: I-75 SB				
From/To: Clark Exit/Pla	aza Exit			
Jurisdiction: MDOT				
Analysis Year: 2035 Hybrid				
Description: Detroit River Internation	onal Crossing Proje	ct		
Flow Inputs a	and Adjustments			
Volume, V	6238	veh/h		
Peak-hour factor, PHF	0.95			
Peak 15-min volume, v15	1642	V		
Trucks and buses	10	%		
Recreational vehicles	0	00		
Terrain type:	Level			
Grade	0.00	%		
Segment length	0.00	mi		
Trucks and buses PCE, ET	1.5			
Recreational vehicle PCE, ER	1.2			
Heavy vehicle adjustment, fHV	0.952			
Driver population factor, fp	1.00			
Flow rate, vp	1379	pc/h/ln		
Speed Inputs	and Adjustments			
Lane width	12.0	ft		
Right-shoulder lateral clearance	6.0	ft		
Interchange density	1.00	interchange/mi		
Number of lanes, N	5	-		
Free-flow speed:	Measured			
FFS or BFFS	55.0	mi/h		
Lane width adjustment, fLW	0.0	mi/h		
Lateral clearance adjustment, fLC	0.0	mi/h		
Interchange density adjustment, fID	2.5	mi/h		
Number of lanes adjustment, fN	0.0	mi/h		
Free-flow speed, FFS	55.0	mi/h		
Urban Freeway				
LOS and Perfo	rmance Measures			
Flow rate, vp	1379	pc/h/ln		
Free-flow speed, FFS	55.0	mi/h		
Average passenger-car speed, S	55.0	mi/h		
Number of lanes, N	5			

25.1

pc/mi/ln

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Density, D

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Operational An	alysis	
Analyst: CH		
Agency or Company: PARSONS		
Date Performed: 8/15/08		
Analysis Time Period: PM Peak		
Freeway/Direction: I-75 SB		
From/To: Plaza Exit/Junc	tion Ent.	
Jurisdiction: MDOT		
Analysis Year: 2035 Hybrid		
Description: Detroit River Internation	al Crossing Proje	ct
Flow Inputs an	d Adjustments	
Volume, V	5301	veh/h
Peak-hour factor, PHF	0.95	V 011/ 11
Peak 15-min volume, v15	1395	V
Trucks and buses	9	000
Recreational vehicles	0	90
Terrain type:	Level	0
Grade	0.00	ojo
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1458	pc/h/ln
Speed Inputs as	nd Adjustments	
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	inceremange/mi
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
•	Urban Freewa	
LOS and Perform	mance Measures	
Flow rate, vp	1458	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	4	11177 11
Dangity D	20 0	4 1 4 2

20.9

pc/mi/ln

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O'	oerational Ana	lvsis	
°	902002011011 11110		
Analyst: CH			
Agency or Company: PA			
Date Performed: 8/			
Analysis Time Period: PM			
Freeway/Direction: I-			
	nction Ent./Dr	agoon Exit	
Jurisdiction: MD			
Analysis Year: 203	_		
Description: Detroit Rive	r Internationa	l Crossing Proje	ect
F	low Inputs and	Adjustments	
Volume, V		5586	veh/h
Peak-hour factor, PHF		0.95	,
Peak 15-min volume, v15		1470	V
Trucks and buses		9	00
Recreational vehicles		0	00
Terrain type:		Level	
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,	fHV	0.957	
Driver population factor,	fp	1.00	
Flow rate, vp	-	1229	pc/h/ln
S	peed Inputs an	d Adjustments	
Lane width		12.0	ft
Right-shoulder lateral clear	arance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		5	
Free-flow speed:		Measured	
FFS or BFFS		70.0	mi/h
Lane width adjustment, fLW		0.0	mi/h
Lateral clearance adjustme:	nt, fLC	0.0	mi/h
Interchange density adjusts		2.5	mi/h
Number of lanes adjustment		0.0	mi/h
Free-flow speed, FFS		70.0	mi/h

LOS and Performance Measures______

Flow rate, vp	1229	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	5	
Density, D	17.6	pc/mi/ln

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_____Operational Analysis_____

Analyst: CH
Agency or Company: PARSONS
Date Performed: 8/15/08 Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Dragoon Exit/Plaza Ent.
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_Flow Inputs	and	Adjustments
--------------	-----	-------------

Volume, V	5437	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1431	V
Trucks and buses	9	%
Recreational vehicles	0	90
Terrain type:	Level	
Grade	0.00	90
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1495	pc/h/ln

______Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
		_ -
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	1495	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.8	mi/h
Number of lanes, N	4	
Density, D	21.4	pc/mi/ln

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_____Operational Analysis_____

Analyst: CH
Agency or Company: PARSONS
Date Performed: 8/15/08
Analysis Time Posical Date Performed:
Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Plaza Ent./Springwells Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow	Inputs	and	Adjustments
------	--------	-----	-------------

Volume, V	5927	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1560	V
Trucks and buses	13	90
Recreational vehicles	0	96
Terrain type:	Level	
Grade	0.00	90
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1107	pc/h/ln
	*	

______Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	6	-
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp		1107	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car speed,	S	70.0	mi/h
Number of lanes, N		6	
Density, D		15.8	pc/mi/ln

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	Operational	Analysis	·	
-				
Analyst:	CH			
Agency or Company:	PARSONS			

Agency or Company: Date Performed: 8/15/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 SB

From/To: Springwells Exit/Spring. Ent.

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

Flow Inpu	its and Adjustments	
Volume, V	5890	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1550	V
Trucks and buses	12	%
Recreational vehicles	0	90
Terrain type:	Level	
Grade	0.00	9
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1643	pc/h/ln
Speed Inp	outs and Adjustments	
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
-		
Interchange density	1.00	interchange/mi
Interchange density Number of lanes, N	$\frac{1}{4}$.00	interchange/mi
Interchange density Number of lanes, N Free-flow speed:	4 Measured	-
Interchange density Number of lanes, N Free-flow speed: FFS or BFFS	4	interchange/mi mi/h
Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW	4 Measured	-
Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC	4 Measured 70.0 0.0 0.0	mi/h
Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fI	4 Measured 70.0 0.0 0.0 2.5	mi/h mi/h
Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fI Number of lanes adjustment, fN	4 Measured 70.0 0.0 0.0 2.5 1.5	mi/h mi/h mi/h mi/h mi/h
Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC	4 Measured 70.0 0.0 0.0 2.5	mi/h mi/h mi/h mi/h

Flow rate, vp	1643	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.2	mi/h
Number of lanes, N	4	
Density, D	23.7	pc/mi/ln

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Operational	Anal	lysis	3.
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Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/08 Date Performed:

Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Springwells Ent./Dearborn Ent.

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow Inputs and Adjust:	ments
-------------------------	-------

Volume, V	6247	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1644	v
Trucks and buses	12	ું ર
Recreational vehicles	0	90
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1743	pc/h/ln

______Speed Inputs and Adjustments______

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures_____

Flow rate, vp		1743	pc/h/ln
Free-flow speed, FFS		70.0	mi/h
Average passenger-car speed, S	5	68.4	mi/h
Number of lanes, N		4	
Density, D		25.5	pc/mi/ln

PTG

Density, D

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	Operational	Analysis	
Analust.	СН		
Analyst: Agency or Company:	PARSONS		
Date Performed:	10/2/08		
Analysis Time Period:			
Freeway/Direction:	I-96 WB	1 I ama Maraga	
From/To: Jurisdiction:	MDOT	1 Lane Merge	
	2035 Hybrid		
Analysis Year: Description: Detroit D		ional Crossing Project	-
		and Adjustments	
77-1 77	_		
Volume, V Peak-hour factor, PHF		1802 0.95	veh/h
Peak 15-min volume, v1	=	474	**
Trucks and buses)	20	V %
Recreational vehicles		0	ზ გ
Terrain type:		Level	0
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, I	tau.	1.5	шт
Recreational vehicle Po		1.2	
Heavy vehicle adjustmen		0.909	
Driver population factor		1.00	
Flow rate, vp	or, 1p	1043	pc/h/ln
	Speed Input	s and Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		2	3 ·
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus	stment, fLC	0.0	mi/h
Interchange density ad		2.5	mi/h
Number of lanes adjust	ment, fN	4.5	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freeway	
	LOS and Per	formance Measures	
Flow rate, vp		1043	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car	speed, S	55.0	mi/h
Number of lanes, N	_ ,	2	·
D D		10.0	no = /m - 1 / 1

19.0 pc/mi/ln

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	Operational Ana	alysis		
Analyst.	СН			
Analyst: Agency or Company:	PARSONS			
Analysis Time Period:				
From/To:	ection: I-96 WB Amb. Ent. / Michigan Exit			
Jurisdiction:	MDOT	ligan Exit		
Analysis Year:				
Description: Detroit R	_	ol Granding Draing	_	
Description: Detroit k	iver internations	ar crossing Project	•	
	Flow Inputs and	d Adjustments		
Volume, V		2152	veh/h	
Peak-hour factor, PHF		0.95		
Peak 15-min volume, v15		566	V	
Trucks and buses		17	ક	
Recreational vehicles		0	ફ	
Terrain type:		Level		
Grade		0.00	ફ	
Segment length		0.00	mi	
Trucks and buses PCE, E	T	1.5		
Recreational vehicle PC	E, ER	1.2		
Heavy vehicle adjustmen		0.922		
Driver population facto		1.00		
Flow rate, vp	_	1229	pc/h/ln	
	Speed Inputs ar	nd Adjustments		
Lane width		12.0	ft	
Right-shoulder lateral	clearance	6.0	ft	
Interchange density	Ciediance	1.00	interchange/mi	
Number of lanes, N		2	incerchange/mi	
Free-flow speed:		Measured		
FFS or BFFS		55.0	mi/h	
Lane width adjustment,	£ T .7a7	0.0	mi/h	
Lateral clearance adjus		0.0	mi/h	
Interchange density adj		2.5	mi/h	
Number of lanes adjustm		4.5	mi/h	
Free-flow speed, FFS	CIIC, LIV	55.0	mi/h	
rice from speed, fro		Urban Freeway	1017 11	
	LOS and Perform	mance Measures		
Flow rate, vp		1229	pc/h/ln	
Free-flow speed, FFS		55.0	mi/h	
Average passenger-car s	peed, S	55.0	mi/h	
Number of lanes, N		2		
Density, D		22.3	pc/mi/ln	

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Number of lanes, N

Density, D

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		Analysis	
_		<u> </u>	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	10/2/08		
Analysis Time Period:	Midday Peak		
Freeway/Direction:	I-96 WB		
From/To:	I-75 Split /	1 Lane Merge	
Jurisdiction:	MDOT		
Analysis Year:	2035 Hybrid		
Description: Detroit R	iver Internat	ional Crossing Project	
	Flow Inputs	and Adjustments	
Volume, V		546	veh/h
Peak-hour factor, PHF		0.95	V 311, 11
Peak 15-min volume, v15		144	V
Trucks and buses		25	v 90
Recreational vehicles		0	90
Terrain type:		Level	0
Grade		0.00	90
Segment length		0.00	mi
Trucks and buses PCE, E	л	1.5	III
Recreational vehicle PC		1.2	
Heavy vehicle adjustmen		0.889	
Driver population facto		1.00	
Flow rate, vp	Ι, ΙΡ	323	pc/h/ln
riow race, vp		223	pc/11/111
	Speed Input	s and Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		2	_
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adjus	tment, fLC	0.0	mi/h
Interchange density adj	ustment, fID	2.5	mi/h
Number of lanes adjustm	ent, fN	4.5	mi/h
Free-flow speed, FFS		55.0	mi/h
<u>-</u>		Urban Freeway	·
	LOS and Per	formance Measures	
Flow rate, vp		323	pc/h/ln
Free-flow speed, FFS		55.0	
Average passenger-car s	need C	55.0	mi/h mi/h
Average passenger car s	peed, b	33.0	III + / 11

2

5.9

pc/mi/ln

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Number of lanes, N

Density, D

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Operational And	alysis		
Analyst: CH			
Agency or Company: PARSONS			
Date Performed: 10/2/08			
Analysis Time Period: Midday Peak			
Freeway/Direction: I-96 WB			
	Amb. Ent. / Michigan Exit		
Turisdiction: MDOT			
analysis Year: 2035 Hybrid	_		
Description: Detroit River Internation	al Crossing Pro	oject	
Flow Inputs an	d Adjustments		
Jolume, V	847	veh/h	
Peak-hour factor, PHF	0.95		
Peak 15-min volume, v15	223	V	
Trucks and buses	25	ક	
Recreational vehicles	0	ુ	
Perrain type:	Level		
Grade	0.00	ક	
Segment length	0.00	mi	
Trucks and buses PCE, ET	1.5		
Recreational vehicle PCE, ER	1.2		
Heavy vehicle adjustment, fHV	0.889		
Oriver population factor, fp	1.00		
Flow rate, vp	502	pc/h/ln	
Speed Inputs a	nd Adjustments_		
Lane width	12.0	ft	
Right-shoulder lateral clearance	6.0	ft	
Interchange density	1.00	interchange/mi	
Number of lanes, N	2	inder diraing e/ min	
ree-flow speed:	Measured		
FFS or BFFS	55.0	mi/h	
Lane width adjustment, fLW	0.0	mi/h	
Lateral clearance adjustment, fLC	0.0	mi/h	
Interchange density adjustment, fID	2.5	mi/h	
Number of lanes adjustment, fN	4.5	mi/h	
Free-flow speed, FFS	55.0	mi/h	
100 IIon apoon, 112	Urban Free		
LOS and Perfor	mance Measures_		
Flow rate, vp	502	pc/h/ln	
Free-flow speed, FFS	55.0	mi/h	
Average passenger-car speed, S	55.0	mi/h	
average passenger car speed, s	JJ. U	III T / II	

9.1

pc/mi/ln

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E-mail: catherine.hartner@parsons.com				
Operational Ana	alysis			
Analyst: CH				
Agency or Company: PARSONS				
Date Performed: 10/2/08 Analysis Time Period: PM Peak				
From/To: I-75 Split / 1 I	-			
Jurisdiction: MDOT	10190			
Analysis Year: 2035 Hybrid				
Description: Detroit River Internation	al Crossing Proj	ject		
Flow Inputs and	d Adjustments			
Volume, V	955	veh/h		
Peak-hour factor, PHF	0.95	,		
Peak 15-min volume, v15	251	V		
Trucks and buses	25	8		
Recreational vehicles	0	90		
Terrain type:	Level	•		
Grade	0.00	8		
Segment length	0.00	mi		
Trucks and buses PCE, ET	1.5	****		
Recreational vehicle PCE, ER	1.2			
Heavy vehicle adjustment, fHV	0.889			
Driver population factor, fp	1.00			
Flow rate, vp	565	pc/h/ln		
Speed Inputs an	nd Adjustments			
Lane width	12.0	ft		
Right-shoulder lateral clearance	6.0	ft		
Interchange density	1.00	interchange/mi		
Number of lanes, N	2	3 ·		
Free-flow speed:	Measured			
FFS or BFFS	55.0	mi/h		
Lane width adjustment, fLW	0.0	mi/h		
Lateral clearance adjustment, fLC	0.0	mi/h		
Interchange density adjustment, fID	2.5	mi/h		
Number of lanes adjustment, fN	4.5	mi/h		
Free-flow speed, FFS	55.0	mi/h		
-	Urban Freew			
LOS and Perform	mance Measures			
Flow rate, vp	565	pc/h/ln		
Free-flow speed, FFS	55.0	mi/h		
Average passenger-car speed, S	55.0	mi/h		
Number of lanes, N	2	A.L. / &&		
Density, D	10.3	pc/mi/ln		
- '	-	<u>.</u>		

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_____Operational Analysis_____

Analyst: CHAgency or Company: PARSONS Date Performed: 10/2/08 Analysis Time Period: PM Peak Freeway/Direction: I-96 WB

From/To: Amb. Ent. / Michigan Exit

MDOT Jurisdiction:

Free-flow speed, FFS

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Flow Inputs and	Adjustments	
Volume, V	1177	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	310	v
Trucks and buses	22	8
Recreational vehicles	0	ଚ
Terrain type:	Level	
Grade	0.00	8
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.901	
Driver population factor, fp	1.00	
Flow rate, vp	688	pc/h/ln
Speed Inputs an	d Adjustments	
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h

LOS and Performance Measures

55.0

Urban Freeway

mi/h

71	600	/1- /1
Flow rate, vp	688	pc/h/ln
Free-flow speed, FFS	55.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N	2	
Density, D	12.5	pc/mi/ln

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	Operational Ana	lysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	10/2/08		
Analysis Time Period:			
-	I-96 EB		
Freeway/Direction:		Amb Evit	
From/To:	Michigan Ent. /	AllD. EXIC	
Jurisdiction:	MDOT		
Analysis Year:	2035 Hybrid	1 Constains Drasis	a h
Description: Detroit	River internationa	il Crossing Proje	CL
	Flow Inputs and	l Adjustments	
Volume, V		1628	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	428	V
Trucks and buses		25	%
Recreational vehicles		0	96
Terrain type:		Level	
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme		0.889	
Driver population fact		1.00	
Flow rate, vp	OI, IP	964	pc/h/ln
	Speed Inputs ar	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
_	Clearance	1.00	interchange/mi
Interchange density		2	THE CLEHANGE, MI
Number of lanes, N		Measured	
Free-flow speed:		55.0	mi/h
FFS or BFFS	£T [a]		mi/h
Lane width adjustment,		0.0	
Lateral clearance adju		0.0	mi/h mi/h
Interchange density ad		2.5	
Number of lanes adjust	ment, IN	4.5	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freewa	ч
	LOS and Perform	mance Measures	
Flow rate, vp		964	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car	speed. S	55.0	mi/h
Number of lanes, N		2	•
Density, D		17.5	pc/mi/ln
DCIIDICY / D		— · · · •	 '

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Operational Analysis			
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	10/2/08		
Analysis Time Period:	Midday Peak		
-	I-96 EB		
From/To:	Michigan Ent. / Amb. Exit		
Jurisdiction:	MDOT		
Analysis Year:	2035 Hybrid		
Description: Detroit River International Crossing Project			
Flow Inputs and Adjustments			

	· · · · · · · · · · · · · · · · · · ·	
	-	
Volume, V	1061	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	279	V
Trucks and buses	25	8
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	૪
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, EF	R 1.2	
Heavy vehicle adjustment, fl	HV 0.889	
Driver population factor, fg	p 1.00	
Flow rate, vp	628	pc/h/ln

Speed Inputs	and Adjustments	
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	55.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	55.0	mi/h
	Urban Freewa	У

Flow rate, vp	628	pc/h/ln
Free-flow speed, FFS	55.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N	2	,
Density, D	11.4	pc/mi/ln

_____LOS and Performance Measures_____

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0	perational And	alysis	
Analyst: CH	Ī		
-	RSONS	4	
	/2/08		
	Peak		
-	96 EB		
-	chigan Ent. /	Amb. Exit	
	OT		
	35 Hybrid		
Description: Detroit Rive		al Crossing Proj	ect
F	low Inputs and	d Adjustments	
Volume, V		2027	veh/h
Peak-hour factor, PHF		0.95	,
Peak 15-min volume, v15		533	V
Trucks and buses		8	8
Recreational vehicles		0	&
Terrain type:		Level	
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,		0.962	
Driver population factor,		1.00	
Flow rate, vp	-	1110	pc/h/ln
S	speed Inputs a	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral cle	arance	6.0	ft
Interchange density		1.00	interchange/mi
Number of lanes, N		2	
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment, fLW	I	0.0	mi/h
Lateral clearance adjustme		0.0	mi/h
Interchange density adjust		2.5	mi/h
Number of lanes adjustment		4.5	mi/h
Free-flow speed, FFS	•	55.0	mi/h
<u>.</u>		Urban Freew	
I	OS and Perform	mance Measures	
Flow rate, vp		1110	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
riee-llow speed, rrs Average passenger-car spee	2 5 ₄	55.0	mi/h mi/h
Number of lanes, N	ω, υ	2	IIIT / II
Density, D		20.2	pc/mi/ln
DOMBICY, D		40.4	ĎC\IIIT\ TII

HCS+: Ramps and Ramp Junctions Release 5.2

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_____Diverge Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp W of Dearborn
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5240	vph

_____Off Ramp Data_____

No

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	99	vph
Length of first accel/decel lane	120	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

vph

ft

Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5240	99	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	1379	26	V
Trucks and buses	16	11	%
Recreational vehicles	0	0	용
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment, fHV Driver population factor, fP 0.926 0.948 1.00 1.00 5957 110 Flow rate, vp pcph Estimation of V12 Diverge Areas_____ L = (Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 v = v + (v - v) P = 2659 pc/h12 R F R FD _____Capacity Checks_____ Actual Maximum LOS F? v = v5957 9600 No Fi F 2659 4400 No 12 v = v - v5847 9600 Νo FO F R 110 2000 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 26.0 pc/mi/lnDensity, Level of service for ramp-freeway junction areas of influence C _____Speed Estimation_____

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Diverge	

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp W of Springwells

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5141	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	402	vph
Length of first accel/decel lane	350	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp
Position of adjacent ramp
Type of adjacent ramp

Distance to adjacent ramp ft

Conversion	to	pc/h	Under	Base	Conditions
		-			

Junction Components	Freeway	Ramp	Adjacent
			Ramp
Volume, V (vph)	5141	402	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	1353	106	V
Trucks and buses	16	2	%
Recreational vehicles	0	0	8
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 m	i mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 5845 427 Flow rate, vp pcph Estimation of V12 Diverge Areas____ L = (Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 v = v + (v - v) P = 2789 pc/h12 R F R FD _____Capacity Checks_____ Actual Maximum LOS F? v = v5845 9600 No Fi F 2789 4400 No V 12 9600 v = v - v5418 No FO F R 427 2000 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 25.1 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence C _____Speed Estimation_____ Intermediate speed variable, D = 0.466S S = 56.9Space mean speed in ramp influence area, mph R

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.926

0.990

S = 74.7

S = 65.0 mph

0

mph

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Merge Analysis_____

CH Analyst:

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ramp E of Springwells
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4739	vph

_____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	333	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? Volume on adjacent Ramp

Position of adjacent Ramp

Type of adjacent Ramp Distance to adjacent Ramp

Conversion to pc/h Under Base Conditions

				
Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4739	333	. 1	/ph

No

vph

ft

Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1247	88		V
Trucks and buses	17	10		90
Recreational vehicles	0	0		96
Terrain type:	Level	Level		
Grade	9	8	%	%
Length	I	mi	mi	mi
Trucks and buses DCF FT	1 5	1 5		

Trucks and buses PCE, ET 1.5 1.2 1.2 Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 5412 368 Flow rate, vp pcph Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.650 Using Equation 4 v = v (P) = 3516 pc/h12 F FM _____Capacity Checks_____ Actual Maximum LOS F? 5780 9600 No FO3884 4600 No V R12 Level of Service Determination (if not F)______ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.2 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence C Speed Estimation_____ M = 0.406Intermediate speed variable, S S = 58.6 mph Space mean speed in ramp influence area, R Space mean speed in outer lanes, S = 68.4 mph

Space mean speed for all vehicles,

0

 $S = 61.5 \quad mph$

0.922

0.952

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Diverge	Analysis

Analyst: СН

Agency/Co.: PARSONS Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Plaza Exit Ramp E of Waterman Junction:

Junction:
Jurisdiction:

Distance to adjacent ramp

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data
---------	------

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5072	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	394	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	200	ft

_____Adjacent Ramp Data (if one exists)_____

No Does adjacent ramp exist?

vph Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjace Ramp	ent
Volume, V (vph)	5072	394		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1335	104		V
Trucks and buses	17	25		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00	%	%
Length	0.00 m	i 0.00	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV 0.922
Driver population factor, fP 1.00 1.00 5793 467 Flow rate, vp pcph Estimation of V12 Diverge Areas_____ L = (Equation 25-8 or 25-9) EO P = 0.260 Using Equation 0 v = v + (v - v) P = 1626 pc/h12 R F R FD ____Capacity Checks_____ Actual Maximum LOS F? v = v4925 9600 NoFi F 1626 4400 No V 12 9600 v = v - v4458 NoFO F R 467 4100 No R Level of Service Determination (if not F)______ D = 4.252 + 0.0086 v - 0.009 L = 16.4 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, D = 0.340S

Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.889

S = 60.5

s = 74.3

S = 69.1 mph

R

0

mph

mph

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_____Diverge Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp at Livernois
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis Diverge Number of lanes in freeway 4 70.0 mph 4678 wph Free-flow speed on freeway

vph Volume on freeway

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	142	vph
Length of first accel/decel lane	687	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

No

Does adjacent ramp exist?

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

ft Distance to adjacent ramp

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	4678		142		vph
Peak-hour factor, PHF	0.95		0.95		
Peak 15-min volume, v15	1231		37		V
Trucks and buses	11		5		%
Recreational vehicles	0		0		%
Terrain type:	Level		Level		
Grade	0.00	9	0.00	용	%
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

Heavy vehicle adjustmen Driver population facto Flow rate, vp		1.00	0.976 1.00 153	pcph
	Estimation o	f V12 Diverge	Areas	
L = EQ	(Eq	uation 25-8 or	25-9)	
	0.436 Usi	ng Equation 8		
v =	v + (v - v) R F R	P = 2351 p FD	c/h	
	Capaci	ty Checks		
v = v	Actual 5195	Maximum 9600	LOS F? No	
Fi F v 12	2351	4400	No	
v = v - v FO F R	5042	9600	No	
v R	153	2000	No	
Level	of Service Det	ermination (if	not F)	
Density,	D = 4.252 + 0.	0086 v - 0.00	9 L = 18.3	pc/mi/ln
Level of service for ra	mp-freeway jun			
Speed Estimation				
Intermediate speed vari	able,	D = 0 S	.442	
Space mean speed in ram	p influence ar		7.6 mph	
Space mean speed in out	er lanes,	S = 7	5.1 mph	

Space mean speed for all vehicles,

S = 66.1 mph

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______Merge Analysis_____

СН Analyst:

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB
Junction:

Junction: Entrance Ramp E of Dragoon
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway Data______

Type of analysis Merge Number of lanes in freeway mph Free-flow speed on freeway 70.0 Volume on freeway 4536 vph

____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	129	vph
Length of first accel/decel lane	600	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent Ramp vph Position of adjacent Ramp

Type of adjacent Ramp

Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ra	mp	Adjacent	
				Ramp	
Volume, V (vph)	4536	12	9		vph
Peak-hour factor, PHF	0.95	0.	95		
Peak 15-min volume, v15	1194	34			V
Trucks and buses	12	5			읭
Recreational vehicles	0	0			%
Terrain type:	Level	Le	vel		
Grade		%	%	%	
Length		mi	mi	m	i
Trucks and buses PCE, ET	1.5	1.	5		
Recreational vehicle PCE, ER	R 1.2	1.	2		

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 5061 139 pcph Flow rate, vp Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕO P = 0.392 Using Equation 4 FMv = v (P) = 1982 pc/h12 F FM _____Capacity Checks_____ Actual Maximum LOS F? 5200 9600 NoFO2121 4600 NoV R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.2 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ M = 0.312Intermediate speed variable, S Space mean speed in ramp influence area, $S = 61.3 \quad mph$ Space mean speed in outer lanes, $S = 66.3 \quad mph$

Space mean speed for all vehicles,

0

 $S = 64.1 \quad mph$

0.943

0.976

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______Merge Analysis_____

СН Analyst:

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB
Junction:

Junction: Plaza Ent. Ramp E of Junction
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4665	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	45.0	mph
Volume on ramp	693	vph
Length of first accel/decel lane	790	ft
Length of second accel/decel lane	1500	ft

____Adjacent Ramp Data (if one exists)____

Does adjacent ramp exist?

Volume on adjacent Ramp vph

Position of adjacent Ramp

Type of adjacent Ramp Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions
--

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4665	693	Ramp vph
Peak-hour factor, PHF	0.95	0.95	1
Peak 15-min volume, v15	1228	182	v
Trucks and buses	11	25	용
Recreational vehicles	0	0	용
Terrain type:	Level	Level	
Grade	00	양	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

No

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 821 Flow rate, vp 5181 pcph Estimation of V12 Merge Areas L = (Equation 25-2 or 25-3) ΕQ P = 0.209 Using Equation 0 v = v (P) = 1083 pc/h12 F FM _____Capacity Checks_____ Actual Maximum LOS F? 6002 9600 No FO1904 4600 No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 0.6 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence A _____Speed Estimation____ M = 0.070Intermediate speed variable, S Space mean speed in ramp influence area, S = 68.0 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.948

0.889

S = 64.4 mph

mph

S = 65.5

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Merge	Analysis
	<u> </u>

Analyst: CHAgency/Co.: PARSONS Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ramp E of Clark

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

D	Daka
reeway	Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5358	vph

____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	174	vph
Length of first accel/decel lane	590	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent Ramp vph

Position of adjacent Ramp

Type of adjacent Ramp Distance to adjacent Ramp ft

Conversi	on to	o pc/	h	Under	Base	Conditions	
		-					

Junction Components	Freeway	Ramp	Adjace	nt
			Ramp	
Volume, V (vph)	5358	174		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1410	46		V
Trucks and buses	14	23		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	olo		%	%
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV Driver population factor, fP 0.935 1.00 1.00 Flow rate, vp 6035 204 pcph ____Estimation of V12 Merge Areas____ L = (Equation 25-2 or 25-3) EQ P = 0.380 Using Equation 4 v = v (P) = 2295 pc/h12 F FM _____Capacity Checks_____ Actual Maximum LOS F? 6239 9000 No FΟ 2499 4600 No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.2 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence C _____Speed Estimation____ Intermediate speed variable, M = 0.327S Space mean speed in ramp influence area, S = 50.7 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

0

S = 50.1 mph

S = 50.3 mph

0.897

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_____Diverge Analysis______

CH Analyst:

PARSONS Agency/Co.: Agency/Co.:
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp Eof Grand(Lafayette)
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis Diverge Number of lanes in freeway 5 Free-flow speed on freeway 55.0 5532 mph Volume on freeway vph

____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	20	vph
Length of first accel/decel lane	235	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)_____

No

Does adjacent ramp exist?

Volume on adjacent ramp vph

Position of adjacent ramp

Type of adjacent ramp Distance to adjacent ramp ft

___Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp		Adjacent Ramp
Volume, V (vph)	5532	20		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1456	5		v
Trucks and buses	14	25		9
Recreational vehicles	0	0		9
Terrain type:	Level	Level		
Grade	0.00 %	0.00	%	96
Length	0.00 mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

S = 49.4

s = 54.1

S = 58.4 mph

R

0

mph

mph

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_____Diverge Analysis______

Analyst: CH

Agency/Co.: PARSONS Date performed: 10/2/08 Analysis time period: AM Peak Freeway/Dir of Travel: I-75 NB

Exit Ramp to NB I-75 S.D. Junction:

Jurisdiction:

 \mathtt{MDOT}

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data

Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 55.0 mph Volume on freeway 3710 vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	33	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

No

vph

ft

Does adjacent ramp exist?

Volume on adjacent ramp Position of adjacent ramp

Type of adjacent ramp Distance to adjacent ramp

_____Conversion to pc/h Under Base Conditions_____

Freeway Ramp Adjacent Junction Components

			Ramp
Volume, V (vph)	3710	33	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	976	9	V
Trucks and buses	11	9	8
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	8
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Driver population factor, fP
                                  1.00
                                            1.00
Flow rate, vp
                                  4120
                                            36
                                                                pcph
              _____Estimation of V12 Diverge Areas_____
               L =
                             (Equation 25-8 or 25-9)
                ΕO
                      0.655 Using Equation 5
               P =
                _{
m FD}
                v = v + (v - v) P = 2712 pc/h
                12 R F R FD
                      _____Capacity Checks_____
                       Actual
                                    Maximum
                                                 LOS F?
    v = v
                       4120
                                    6750
                                                  No
     Fi F
                                    4400
                       2712
                                                  No
     12
                                   6750
                       4084
                                                  Νo
    v = v - v
     FO F R
                       36
                                    2200
                                                  No
    V
     R
         _____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 18.6 pc/mi/ln
Density,
                                      12 D
Level of service for ramp-freeway junction areas of influence B
             ______Speed Estimation_____
                                       D = 0.171
Intermediate speed variable,
                                        S
Space mean speed in ramp influence area,
                                       S = 52.8
                                                   mph
                                        R
Space mean speed in outer lanes,
                                       S = 58.7
                                                   mph
                                        0
Space mean speed for all vehicles,
                                       S = 54.7
                                                   mph
```

0.948

0.957

Heavy vehicle adjustment, fHV

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	Merge Ar	nalysis		
Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction:	I-75 NB Entrance Ramp fro MDOT 2035 Hybrid		ject	
	Freeway	y Data		
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	Merge 3 55.0 3677	mph vph	
	On Rain	Data		
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	Right 1 35.0 737 870	mph vph ft ft	
	Adjacent Ramp Da	ata (if one ex	ists)	
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp	t?	No	vph	
Distance to adjacent Ra	mp		ft	

Junction Components	Freeway	Ramp		ljacent Imp
Volume, V (vph)	3677	737		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	968	194		V
Trucks and buses	11	0		8
Recreational vehicles	0	0		8
Terrain type:	Level	Level		
Grade	8		8	ક
Length	mi	-	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

_____Conversion to pc/h Under Base Conditions_____

```
Driver population factor, fP
                                   1.00
                                              1.00
Flow rate, vp
                                   4083
                                              776
                                                                 pcph
               _____Estimation of V12 Merge Areas_____
                L =
                              (Equation 25-2 or 25-3)
                 ΕQ
                       0.602 Using Equation 1
                P =
                 FM
                v = v (P) = 2457 pc/h
                 12 F FM
                       ____Capacity Checks_____
                                                  LOS F?
                        Actual
                                     Maximum
                        4859
                                     6750
                                                   No
    V
     FΟ
                                     4600
                                                   No
                        3233
     R12
          _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.9 pc/mi/ln
                                     12
                          R
Level of service for ramp-freeway junction areas of influence C
        _____Speed Estimation_____
Intermediate speed variable,
                                        M = 0.359
                                        S
Space mean speed in ramp influence area,
                                        S = 50.3
                                                    mph
                                         R
                                        S = 50.9
Space mean speed in outer lanes,
                                                    mph
                                         0
                                        S = 50.5
Space mean speed for all vehicles,
                                                    mph
```

0.948

1.000

Heavy vehicle adjustment, fHV

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_____Diverge Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB
Junction:

Junction: Exit Ramp W of Dearborn
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data______

Diverge Type of analysis Number of lanes in freeway 4 70.0 mph 2795 vph Free-flow speed on freeway Volume on freeway vph

____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	44	vph
Length of first accel/decel lane	120	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

No

Does adjacent ramp exist?

Volume on adjacent ramp vph Position of adjacent ramp

Type of adjacent ramp Distance to adjacent ramp ft

Junction Components	Freeway	Ramp	Adjacent
			Ramp
Volume, V (vph)	2795	44	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	736	12	v
Trucks and buses	25	7	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

D = 0.432

S = 57.9

S = 76.8

S = 67.1 mph

R

0

mph

mph

Intermediate speed variable,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Space mean speed in ramp influence area,

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______Diverge Analysis______

CH Analyst:

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB
Junction:

Junction: Exit Ramp W of Springwells
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Diverge Type of analysis Number of lanes in freeway 4 70.0 mph 2751 vph Free-flow speed on freeway Volume on freeway

_____Off Ramp Data______

No

ft

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	273	vph
Length of first accel/decel lane	350	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? Volume on adjacent ramp

vph Position of adjacent ramp

Type of adjacent ramp Distance to adjacent ramp

____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2751	273	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	724	72	V
Trucks and buses	25	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	_ mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

1.00 1.00 Driver population factor, fP 302 3258 pcph Flow rate, vp Estimation of V12 Diverge Areas L = (Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 FD v = v + (v - v) P = 1591 pc/h12 R F R FD ____Capacity Checks____ LOS F? Actual Maximum v = v3258 9600 No Fi F 1591 4400 No 12 2956 9600 v = v - vNo FO F R 302 2000 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 14.8 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence B Speed Estimation_____ Intermediate speed variable, D = 0.455S = 57.3Space mean speed in ramp influence area, mph R

0.889

0.952

S = 76.8

 $S = 65.8 \quad mph$

0

mph

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Space mean speed for all vehicles,

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Merge Analysis_____

CH Analyst:

PARSONS Agency/Co.: Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

Entrance Ramp E of Springwells Junction:

Junction: Entrance Ram
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2477	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	248	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent Ramp Position of adjacent Ramp

Type of adjacent Ramp

Distance to adjacent Ramp

Novph

ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	:
Volume, V (vph)	2477	248		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	652	65		V
Trucks and buses	25	18		ે
Recreational vehicles	0	0		olo
Terrain type:	Level	Level		
Grade	9		90	90
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV Driver population factor, fP 0.889 0.917 1.00 1.00 2933 285 pcph Flow rate, vp Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.660 Using Equation 4 FMv = v (P) = 1936 pc/h12 F FM ____Capacity Checks_____ LOS F? Actual Maximum 3218 9600 No FO2221 4600 No V R12 Level of Service Determination (if not F)______ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.3 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B ____Speed Estimation_____ Intermediate speed variable, M = 0.252S Space mean speed in ramp influence area, $S = 62.9 \quad mph$ R

Space mean speed in outer lanes,

Space mean speed for all vehicles,

S = 70.0 mph

S = 65.0 mph

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Diverge	Analysis
	<u> </u>

Analyst: СН

Agency/Co.: PARSONS Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

Plaza Exit Ramp E of Waterman Junction:

MDOT Jurisdiction:

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Exaction	Data
F'reeway	

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2724	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	708	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	200	ft

____Adjacent Ramp Data (if one exists)_____

No

vph

Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp

Type of adjacent ramp

ft Distance to adjacent ramp

Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2724	708	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	717	186	V
Trucks and buses	25	25	%
Recreational vehicles	0	0	8
Terrain type:	Level	Level	
Grade	0.00 %	0.00	90
Length	0.00 mi	0.00	mi mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 3226 838 Flow rate, vp pcph Estimation of V12 Diverge Areas L = (Equation 25-8 or 25-9) ΕO P = 0.260 Using Equation 0 v = v + (v - v) P = 1459 pc/h12 R F R FD _____Capacity Checks_____ Actual Maximum LOS F? 3226 9600 v = vNo Fi F 1459 4400 No 12 2388 9600 No v = v - vFO F R 838 4100 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 15.0 pc/mi/lnDensity, Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, D = 0.373S S = 59.5mph Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

0

 $S = 76.8 \quad mph$

S = 67.9 mph

0.889

0.889

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_____Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB Agency/Co.:

Junction: Exit Ramp at Livernois
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2016	vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	51	vph
Length of first accel/decel lane	687	ft
Length of second accel/decel lane		ft

____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

No vph

ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2016	51	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	531	13	V
Trucks and buses	25	18	90
Recreational vehicles	0	0	90
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Driver population factor, fP 1.00 1.00 Flow rate, vp 2387 59 pcph Estimation of V12 Diverge Areas_____ L =(Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 v = v + (v - v) P = 1074 pc/h12 R F R FD ____Capacity Checks____ Actual Maximum LOS F? v = v2387 9600 NoFi F 1074 V 4400 No 12 2328 9600 v = v - vNo FO F R 59 2000 V No R _____Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 7.3 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence A _____Speed Estimation_____ Intermediate speed variable, D = 0.433Space mean speed in ramp influence area, S = 57.9mph

R

0

S = 76.8

S = 66.9

mph

mph

0.889

0.917

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Space mean speed for all vehicles,

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Merge	Analysis
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Analyst: CH

Agency/Co.: Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ramp E of Dragoon

Jurisdiction: Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

reeway	Data
 _	

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	1965	vph

On	Ramp	Data
----	------	------

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	82	vph
Length of first accel/decel lane	600	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent Ramp

Position of adjacent Ramp Type of adjacent Ramp

Distance to adjacent Ramp

vph

ft

______Conversion to pc/h Under Base Conditions_____

No

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1965	82	vph
Peak-hour factor, PHF	0.95	0.95	L
Peak 15-min volume, v15	517	22	V
Trucks and buses	25	12	90
Recreational vehicles	0	0	96
Terrain type:	Level	Level	
Grade	00	90	9
Length	mi	m	ni mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Driver population factor, fP
                                 1.00
                                          1.00
Flow rate, vp
                                 2327
                                           91
                                                              pcph
                 Estimation of V12 Merge Areas____
               L =
                            (Equation 25-2 or 25-3)
               ΕQ
               P = 0.398 Using Equation 4
               FM
               v = v (P) = 925 pc/h
                12 F FM
                _____Capacity Checks_____
                      Actual
                                  Maximum
                                               LOS F?
                      2418
                                  9600
    v
                                                No
     FO
                      1016
                               4600
                                                No
    R12
          _____Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 9.6 pc/mi/ln
                            12
                        R
Level of service for ramp-freeway junction areas of influence A
       _____Speed Estimation
Intermediate speed variable,
                                     M = 0.290
                                      S
Space mean speed in ramp influence area,
                                     S = 61.9 \quad mph
                                      R
Space mean speed in outer lanes,
                                      S = 69.3 \quad mph
Space mean speed for all vehicles,
                                     s = 66.0
                                                mph
```

0.889

0.943

Heavy vehicle adjustment, fHV

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Merge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

Junction: Plaza Ent. F Jurisdiction: MDOT Analysis Year: 2035 Hybrid Junction: Plaza Ent. Ramp E of Junction

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2048	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	45.0	mph
Volume on ramp	154	vph
Length of first accel/decel lane	790	ft
Length of second accel/decel lane	1500	ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent Ramp

Position of adjacent Ramp Type of adjacent Ramp

Distance to adjacent Ramp

_____Conversion to pc/h Under Base Conditions_____

No

vph

ft

Junction Components		Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)		2048		154			vph
Peak-hour factor, PHF		0.95		0.95			
Peak 15-min volume, v15		539		41			v
Trucks and buses		25		25			્રે
Recreational vehicles		0		0			90
Terrain type:		Level		Level			
Grade			왕		%	%	
Length			mi		mi	m	ii
Trucks and buses PCE, ET		1.5		1.5			
Recreational vehicle PCE,	ER	1.2		1.2			

```
Heavy vehicle adjustment, fHV
                               0.889
                                        0.889
Driver population factor, fP
                               1.00
                                         1.00
Flow rate, vp
                               2425
                                        182
                                                         pcph
                 Estimation of V12 Merge Areas
                           (Equation 25-2 or 25-3)
              L =
               ΕQ
              P = 0.209 Using Equation 0
               FM
              v = v (P) = 507 pc/h
               12 F FM
                  Capacity Checks
                                 Maximum
                      Actual
                                              LOS F?
                      2607
                                 9600
    V
                                              No
    FO
                      689
                                4600
                                              No
    R12
        _____Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = -8.5 pc/mi/ln
                           12
                       R
Level of service for ramp-freeway junction areas of influence A
 _____Speed Estimation_
Intermediate speed variable,
                                    M = 0.052
                                     S
Space mean speed in ramp influence area,
                                    S = 68.6
                                              mph
                                    R
Space mean speed in outer lanes,
                                    S = 68.3
                                               mph
Space mean speed for all vehicles,
                                   S = 68.4
```

mph

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______Merge Analysis_____

CH Analyst:

Agency/Co.: Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ramp E of Clark
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freewav	Data
---------	------

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2202	vph

____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	177	vph
Length of first accel/decel lane	590	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent Ramp

Position of adjacent Ramp Type of adjacent Ramp

Distance to adjacent Ramp

vph

£t.

_____Conversion to pc/h Under Base Conditions_____

No

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2202	177	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	579	47	V
Trucks and buses	25	25	90
Recreational vehicles	0	0	96
Terrain type:	Level	Level	
Grade	90	%	96
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Heavy vehicle adjustment, fHV Driver population factor, fP
                               0.889
                                         0.889
                                1.00
                                          1.00
Flow rate, vp
                                2608
                                          210
                                                            pcph
               ___Estimation of V12 Merge Areas_____
               L =
                           (Equation 25-2 or 25-3)
               ΕQ
               P = 0.380 Using Equation 4
               FM
               v = v (P) = 990 pc/h
               12 F FM
               _____Capacity Checks_____
                      Actual
                                 Maximum
                                              LOS F?
                      2818
                                  9000
    v
                                               No
     FΟ
                      1200
                              4600
                                               No
    R12
          Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.0 pc/mi/ln
                            12
Level of service for ramp-freeway junction areas of influence B
  _____Speed Estimation
Intermediate speed variable,
                                    M = 0.293
                                     S
Space mean speed in ramp influence area,
                                    S = 51.2 \quad mph
                                     R
Space mean speed in outer lanes,
                                    S = 53.9
                                                mph
Space mean speed for all vehicles,
                                    S = 52.7
                                               mph
```

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Analyst: CH

Agency/Co.: PARSONS Date performed: 8/15/08
Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp Eof Grand(Lafayette)

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2379	vph

Off	Ramp	Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	244	vph
Length of first accel/decel lane	235	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent ramp vph Position of adjacent ramp

Type of adjacent ramp Distance to adjacent ramp ft

Conversion	to	pc/h	Under	Base	Conditions
------------	----	------	-------	------	------------

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	2379		244		vph
Peak-hour factor, PHF	0.95		0.95		1
Peak 15-min volume, v15	626		64		v
Trucks and buses	25		25		00
Recreational vehicles	0		0		90
Terrain type:	Level		Level		
Grade	0.00	%	0.00	%	%
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

```
Driver population factor, fP
                              1.00
                                        1.00
Flow rate, vp
                              2817
                                        289
                                                         pcph
                Estimation of V12 Diverge Areas_____
              L =
                          (Equation 25-8 or 25-9)
              ΕQ
              P = 0.436 Using Equation 8
              FD
              v = v + (v - v) P = 1391 pc/h
               12 R F R FD
                Capacity Checks
                     Actual
                                Maximum
                                            LOS F?
   v = v
                     2817
                                9000
                                             No
    Fi F
    V
                     1391
                               4400
                                             No
    12
    v = v - v
                     2528 9000
                                             No
    FO F R
                     289
   v
                                2000
                                             No
    R
      Level of Service Determination (if not F)
                  D = 4.252 + 0.0086 v - 0.009 L = 14.1 pc/mi/ln
Density,
                                  12 D
Level of service for ramp-freeway junction areas of influence B
       _____Speed Estimation_____
Intermediate speed variable,
                                   D = 0.454
                                  S = 49.1
Space mean speed in ramp influence area,
                                            mph
Space mean speed in outer lanes,
                                  s = 60.3
                                             mph
```

0

S = 54.2

mph

0.889

0.889

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

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Diverge	Analysis

СН Analyst:

Agency/Co.: PARSONS Date performed: 10/2/08 Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 NB

Exit Ramp to NB I-75 S.D. Junction:

Jurisdiction:

MDOT

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data
Tuno of analysis	Diverge

Type of analysis Number of lanes in freeway 3 55.0 mph Free-flow speed on freeway Volume on freeway 1589 vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	22	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

Conversion to pc/h	Under Base	Conditions
--------------------	------------	------------

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	1589		22		vph
Peak-hour factor, PHF	0.95		0.95		
Peak 15-min volume, v15	418		6		v
Trucks and buses	20		18		8
Recreational vehicles	0		0		%
Terrain type:	Level		Level		
Grade	0.00	용	0.00	&	8
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

```
1840
                                             25
Flow rate, vp
                                                                 pcph
             _____Estimation of V12 Diverge Areas____
                L =
                              (Equation 25-8 or 25-9)
                ΕQ
                       0.713 Using Equation 5
                P =
                FD
                v = v + (v - v) P = 1319 pc/h
                12 R F R FD
                     _____Capacity Checks_____
                                                  LOS F?
                        Actual
                                    Maximum
                                    6750
                        1840
                                                   No
    v = v
     Fi
                        1319
                                    4400
                                                  No
     12
                        1815
                                    6750
    v = v - v
                                                   No
        F R
     FO
                        25
                                    2200
                                                   No
    V
     R
        _____Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 6.6 pc/mi/ln
Density,
                                      12 D
                     R
Level of service for ramp-freeway junction areas of influence A
          _____Speed Estimation____
Intermediate speed variable,
                                        D = 0.170
                                        S
Space mean speed in ramp influence area,
                                        S = 52.8
                                                   mph
                                        R
Space mean speed in outer lanes,
                                        S = 60.3
                                                    mph
                                        0
Space mean speed for all vehicles,
                                        S = 54.7
                                                    mph
```

0.909

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

 PTG

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	Merge	Analysis		
Analyst: Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction: Analysis Year: Description: Detroit R	I-75 NB Entrance Ramp : MDOT 2035 Hybrid		oject	
	Free	way Data		,
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway		Merge 3 55.0 1567	mph vph	
	On R	amp Data		
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	Right 1 35.0 199 870	mph vph ft ft	
	Adjacent Ramp	Data (if one ex	xists)	
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp		No	vph	
Distance to adjacent Ra	qm		ft	
Con	version to pc/h	Under Base Cond	ditions	

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1567	199	vph	
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	412	52	V	
Trucks and buses	20	0	8	
Recreational vehicles	0	0	용	
Terrain type:	Level	Level		
Grade	8	8	8	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                  1.00
                                            1.00
                                  1814
                                            209
                                                                pcph
Flow rate, vp
              _____Estimation of V12 Merge Areas_____
               L =
                              (Equation 25-2 or 25-3)
                ΕQ
                       0.602 Using Equation 1
                P =
                FM
                v = v (P) = 1092 pc/h
                12 F FM
                      _____Capacity Checks_____
                                                 LOS F?
                       Actual
                                    Maximum
                        2023
                                    6750
                                                  No
    V
     FΟ
                       1301
                                    4600
                                                  No
     R12
          Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.1 pc/mi/ln
                                    12
                          R
Level of service for ramp-freeway junction areas of influence B
           _____Speed Estimation____
Intermediate speed variable,
                                       M = 0.274
                                       S
Space mean speed in ramp influence area,
                                       S = 51.4
                                                   mph
                                        R
                                        S = 54.2
                                                   mph
Space mean speed in outer lanes,
                                        0
```

Space mean speed for all vehicles,

0.909

1.000

S = 52.4

mph

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_____Diverge Analysis_____

Analyst: CH

Agency/Co.: Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp W of Dearborn Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 4 70.0 mph 3422 wph Volume on freeway

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	29	vph
Length of first accel/decel lane	120	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

vph

No

ft

_____Conversion to pc/h Under Base Conditions_____

Freeway Ramp Adjacent Junction Components Ramp 3422 29 0.95 0.95 Volume, V (vph) vph Peak-hour factor, PHF 901 8 25 7 0 0 Peak 15-min volume, v15 V Trucks and buses 읭 0 Level Level 0.00 % 0.00 % % % % 0.00 mi 0.00 mi 1.5 1.5 1.2 1.2 Recreational vehicles ջ Terrain type: Grade Length Trucks and buses PCE, ET
Recreational vehicle PCE, ER

Driver population factor, fP 1.00 1.00 Flow rate, vp 4052 32 pcph Estimation of V12 Diverge Areas____ $\Gamma =$ (Equation 25-8 or 25-9) ΕQ P =0.436 Using Equation 8 v = v + (v - v) P = 1785 pc/h12 R F R FD _____Capacity Checks_____ Actual Maximum LOS F? v = v4052 9600 No Fi F V 1785 4400 No 12 4020 9600 $\Delta = \Delta - \Delta$ No FO F R 32 2000 v No R _____Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 18.5 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence B ____Speed Estimation____ Intermediate speed variable, D = 0.431Space mean speed in ramp influence area, S = 57.9mph

0.889

0.966

S = 76.3

S = 66.9

0 -

mph

mph

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Space mean speed for all vehicles,

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_____Diverge Analysis_____

Analyst: CH

Agency/Co.: Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp W of Springwells
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 4 70.0 mph 3392 vph Volume on freeway

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	277	vph
Length of first accel/decel lane	350	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? Volume on adjacent ramp

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

vph

ft

______Conversion to pc/h Under Base Conditions_____

No

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3392	277	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	893	73	V
Trucks and buses	25	1	90
Recreational vehicles	0	0	90
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Heavy vehicle adjustment, fHV Driver population factor, fP
                              1.00
                                        1.00
Flow rate, vp
                               4017
                                        293
                                                          pcph
             _____Estimation of V12 Diverge Areas
              L =
                          (Equation 25-8 or 25-9)
               ΕQ
              P = 0.436 Using Equation 8
              FD
              v = v + (v - v) P = 1917 pc/h
               12 R F R FD
              _____Capacity Checks
                     Actual
                                Maximum
                                            LOS F?
    v = v
                     4017
                                9600
                                             No
    Fi F
                     1917 4400
                                             No
    12
                     3724 9600
    v = v - v
                                             No
    FO F R
                     293
                               2000
    V
                                             No
    R
     _____Level of Service Determination (if not F)_____
                  D = 4.252 + 0.0086 v - 0.009 L = 17.6 pc/mi/ln
Density,
                                  12 D
Level of service for ramp-freeway junction areas of influence B
 _____Speed Estimation_____
Intermediate speed variable,
                                   D = 0.454
                                   S = 57.3
Space mean speed in ramp influence area,
                                             mph
```

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.889

0.995

S = 76.6

S = 66.0 mph

0

mph

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Merg	111141 7010

Analyst: СН Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak

Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ramp E of Springwells
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3116	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	127	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No Volume on adjacent Ramp

vph

Position of adjacent Ramp Type of adjacent Ramp

Distance to adjacent Ramp ft

_____Conversion to pc/h Under Base Conditions____

Junction Components	Freeway	Ramp	Adjace: Ramp	nt
Volume, V (vph)	3116	127	-	vph
Peak-hour factor, PHF	0.95	0.95		-
Peak 15-min volume, v15	820	33		V
Trucks and buses	25	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	00		%	ે
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                1.00
                                          1.00
Flow rate, vp
                                3690
                                          140
                                                            pcph
                  Estimation of V12 Merge Areas
              L =
                            (Equation 25-2 or 25-3)
               ΕQ
               P = 0.678 Using Equation 4
               FM
               v = v (P) = 2502 pc/h
               12 F FM
                   _____Capacity Checks____
                      Actual
                                              LOS F?
                                 Maximum
                                  9600
                      3830
    V
                                               No
     FO
                      2642
                              4600
                                               No
     R12
          Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 16.6 pc/mi/ln
                             12
Level of service for ramp-freeway junction areas of influence B
         _____Speed Estimation
Intermediate speed variable,
                                     M = 0.271
                                     S
                                     S = 62.4  mph
Space mean speed in ramp influence area,
                                     R
Space mean speed in outer lanes,
                                     s = 69.7
                                                mph
Space mean speed for all vehicles,
                                    S = 64.5
                                                mph
```

0.889

0.952

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Diverge	Analysis

CH Analyst:

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Plaza Exit Ramp E of Waterman Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data
Ticeway	Data

Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 5 70.0 3243 mph vph Volume on freeway

_____Off Ramp Data_____

Right Side of freeway Number of lanes in ramp mph vph Free-Flow speed on ramp 45.0 969 Volume on ramp Length of first accel/decel lane 0 ft Length of second accel/decel lane 200 ft

_____Adjacent Ramp Data (if one exists)_____

No

Does adjacent ramp exist?

Volume on adjacent ramp

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

vph

ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3243	969	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	853	255	V
Trucks and buses	25	25	%
Recreational vehicles	0	0	엉
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Heavy vehicle adjustment, fHV
                              0.889
Driver population factor, fP
                               1.00
                                         1.00
Flow rate, vp
                                3840
                                         1148
                                                           pcph
             Estimation of V12 Diverge Areas
                           (Equation 25-8 or 25-9)
              L =
               ΕQ
              P = 0.260 Using Equation 0
               FD
              v = v + (v - v) P = 1848 pc/h
               12 R F R FD
                   ____Capacity Checks____
                                              LOS F?
                      Actual
                                 Maximum
    v = v
                      3840
                                 9600
                                              Νo
    Fi F
                      1848
                                 4400
                                              No
    12
    \nabla = \nabla - \nabla
                      2692
                                 9600
                                              No
    FO F R
                      1148
                                4100
                                              No
    V
    R
      Level of Service Determination (if not F)
                   D = 4.252 + 0.0086 v - 0.009 L = 18.3 pc/mi/ln
Density,
                                   12 D
                   R
Level of service for ramp-freeway junction areas of influence B
 Speed Estimation_____
Intermediate speed variable,
                                     D = 0.401
                                    S = 58.8
Space mean speed in ramp influence area,
                                               mph
                                     R
Space mean speed in outer lanes,
                                    S = 76.8
                                               mph
                                     0
```

Space mean speed for all vehicles,

0.889

S = 66.9

mph

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Diverge	Analysis

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp at Livernois
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2274	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	61	vph
Length of first accel/decel lane	687	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2274	61	vph
Peak-hour factor, PHF	0.95	0.95	<u>-</u>
Peak 15-min volume, v15	598	16	V
Trucks and buses	17	15	90
Recreational vehicles	0	0	90
Terrain type:	Level	Level	
Grade	0.00 %	0.00	90
Length	0.00 mi	0.00	mi mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Driver population factor, fP 1.00 1.00 Flow rate, vp 2597 69 pcph Estimation of V12 Diverge Areas (Equation 25-8 or 25-9) r = ΕQ P = 0.436 Using Equation 8 FDv = v + (v - v) P = 1171 pc/h12 R F R FD _____Capacity Checks_ Actual Maximum LOS F? v = v2597 9600 NoFi F 1171 4400 No V 12 2528 9600 No $\Delta = \Delta - \Delta$ FO F R 69 2000 NoV R Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 8.1 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence A _____Speed Estimation_____ D = 0.434Intermediate speed variable, S S = 57.8Space mean speed in ramp influence area, mph

R

0

S = 76.8

S = 66.9

mph

mph

0.922

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.930

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	Mer	ge Analysis_		
Analysis time period: Freeway/Dir of Travel:	I-75 NB Entrance Ram MDOT 2035 Hybrid			<u>-</u>
	Fr	eeway Data		
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	way	Merg 4 70.0 2213 n Ramp Data		mph vph
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	Righ 1 35.0 402 600	t	mph vph ft ft
	Adjacent Ra	amp Data (if	one exists	s)
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp	mp	No		vph
Distance to adjacent Ra		/1		ft
Con	version to po	c/h Under Bas	e Conditio	ons
Junction Components		Freeway	Ramp	Adjacent Ramp

Junction Components	Freeway	Ramp	Adjacen Ramp	ıt
Volume, V (vph)	2213	402		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	582	106		V
Trucks and buses	17	12		ે
Recreational vehicles	0	0		왕
Terrain type:	Level	Level		
Grade	90		%	%
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 2527 449 pcph Flow rate, vp Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.353 Using Equation 4 v = v (P) = 892 pc/h12 F FM Capacity Checks LOS F? Actual Maximum 9600 2976 No FΟ 1341 4600 No V R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.0 pc/mi/ln12 Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ M = 0.294Intermediate speed variable, S Space mean speed in ramp influence area, $S = 61.8 \quad mph$ R $S = 68.9 \quad mph$ Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.922

0.943

s = 65.5

mph

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	Merge	Analysis	
Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction:	M Peak -75 NB laza Ent. Ramp DOT 035 Hybrid	o E of Junction hal Crossing Pr	
	Freev	ay Data	
Type of analysis Number of lanes in freewa Free-flow speed on freewa Volume on freeway		Merge 4 70.0 2615	mph vph
	On Ra	amp Data	
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/dec Length of second accel/de		Right 2 45.0 122 790 1500	mph vph ft ft
	Adjacent Ramp	Data (if one e	exists)
Does adjacent ramp exist? Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp		No	vph ft
		Under Base Con	
Junction Components	_		amp Adjacent

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2615	122	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	688	32	v
Trucks and buses	16	25	90
Recreational vehicles	0	0	90
Terrain type:	Level	Level	
Grade	%		ું જ
Length	mi		mi mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Heavy vehicle adjustment, fHV
                                0.926
                                           0.889
Driver population factor, fP
                                 1.00
                                           1.00
Flow rate, vp
                                 2973
                                           144
                                                              pcph
                 _Estimation of V12 Merge Areas____
               L =
                            (Equation 25-2 or 25-3)
                ΕQ
               P =
                     0.209 Using Equation 0
                FM
               v = v (P) = 621 pc/h
                12 F FM
                    ____Capacity Checks_____
                       Actual
                                   Maximum
                                                LOS F?
                       3117
                                   9600
    v
                                                 No
     FO
                       765
                                   4600
                                                 No
    R12
         _____Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = -7.9 pc/mi/ln
                             12
                         R
Level of service for ramp-freeway junction areas of influence A
      _____Speed Estimation
Intermediate speed variable,
                                      M = 0.052
                                       S
Space mean speed in ramp influence area,
                                      S = 68.5 \quad mph
                                      R
Space mean speed in outer lanes,
                                      S = 67.6
                                                 mph
Space mean speed for all vehicles,
                                     S = 67.8
                                                 mph
```

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Merge	Analysis

Analyst:

Agency/Co.: Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ram
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid Junction: Entrance Ramp E of Clark

Description: Detroit River International Crossing Project

Frooman	Data
rreeway	Data
 . -	

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2737	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	312	vph
Length of first accel/decel lane	590	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? Volume on adjacent Ramp

Position of adjacent Ramp

Type of adjacent Ramp

Distance to adjacent Ramp

No

vph

ft

	Conversion	to	pc/h	Under	Base	Conditions		
Junction Components				Freewa	a 17	Ramp	Adjacent	

Junction Components	Freeway	Ramp	Adja	cent
			Ramp	
Volume, V (vph)	2737	312		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	720	82		V
Trucks and buses	19	16		양
Recreational vehicles	0	0		୍ଚ
Terrain type:	Level	Level		
Grade	90		%	%
Length	m	i	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE. ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV
                              0.913
                                        0.926
Driver population factor, fP
                               1.00
                                        1.00
Flow rate, vp
                               3155
                                         355
                                                           pcph
               Estimation of V12 Merge Areas_____
              L =
                          (Equation 25-2 or 25-3)
               ΕQ
              P = 0.361 Using Equation 4
              v = v (P) = 1140 pc/h
               12 F FM
                    _____Capacity Checks_____
                     Actual
                                Maximum
                                             LOS F?
                                 9000
                     3510
    V
                                              No
    FΟ
                     1495
                             4600
                                              No
    R12
   Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.3 pc/mi/ln
                           12
                       R
Level of service for ramp-freeway junction areas of influence B
  _____Speed Estimation____
Intermediate speed variable,
                                   M = 0.297
                                    S
Space mean speed in ramp influence area,
                                   S = 51.1 \quad mph
                                    R
Space mean speed in outer lanes,
                                    S = 53.2 \quad mph
Space mean speed for all vehicles,
                                   S = 52.3 mph
```

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Diverge	e Analysis	
		_

Analyst: CH

Agency/Co.: Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak Freeway/Dir of Travel: I-75 NB

Junction: Exit Ramp Eof Grand(Lafayette)
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Da+a
rreeway	Data

Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 5 mph vph 55.0 Volume on freeway 3049

_____Off Ramp Data_____

Side of freeway Right Number of lanes in ramp Free-Flow speed on ramp 35.0 mph Volume on ramp 204 vph Length of first accel/decel lane 235 ft Length of second accel/decel lane ft

_____Adjacent Ramp Data (if one exists)_____

No

vph

Does adjacent ramp exist?

Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

Conversion	to	pc/h	Under	Base	Conditions
------------	----	------	-------	------	------------

Junction Components	Freeway	Ramp	Adjace	nt
			Ramp	
Volume, V (vph)	3049	204		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	802	54		V
Trucks and buses	19	25		%
Recreational vehicles	0	0		9
Terrain type:	Level	Level		
Grade	0.00 %	0.00	%	용
Length	0.00 m	i 0.00	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV Driver population factor, fP
                              1.00
                                       1.00
Flow rate, vp
                              3514
                                       242
                                                         pcph
             Estimation of V12 Diverge Areas
              L =
                          (Equation 25-8 or 25-9)
              ΕQ
              P = 0.436 Using Equation 8
              v = v + (v - v) P = 1669 pc/h
               12 R F R FD
                  _____Capacity Checks____
                     Actual
                                Maximum
                                            LOS F?
    v = v
                     3514
                                9000
                                            No
    Fi F
                     1669 4400
    V
                                             No
    12
                     3272 9000
    v = v - v
                                             No
    FO F R
                     242
                               2000
                                            No
    V
    R
  _____Level of Service Determination (if not F)_____
                  D = 4.252 + 0.0086 v - 0.009 L = 16.5 pc/mi/ln
Density,
                                 12 D
Level of service for ramp-freeway junction areas of influence B
  Speed Estimation_____
                                   D = 0.450
Intermediate speed variable,
Space mean speed in ramp influence area,
                                  S = 49.2
                                            mph
Space mean speed in outer lanes,
                                  S = 60.3 \quad mph
```

Space mean speed for all vehicles,

0

S = 54.5 mph

0.913

0.889

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	Diverge	Analysis		
Jurisdiction:	I-75 NB Exit Ramp to NB MDOT 2035 Hybrid		oject	
	Freewa	y Data		
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway		Diverge 3 55.0 1890	mph vph	
	Off Ram	p Data		
Side of freeway Number of lanes in ramp Free-Flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	lecel lane decel lane	Right 1 55.0 32 1000	mph vph ft ft	
	Adjacent Ramp D	ata (11 one e:	xists)	
Does adjacent ramp exist Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp)	Ио	vph	
Distance to adjacent ra	ump		ft	
Cor	nversion to pc/h U	Inder Base Con	ditions	

Junction Components	Freeway	-	Ramp		Adjacent Ramp
Volume, V (vph)	1890		32		vph
Peak-hour factor, PHF	0.95		0.95		
Peak 15-min volume, v15	497		8		V
Trucks and buses	12		22		ફ
Recreational vehicles	0		0		8
Terrain type:	Level		Level		
Grade	0.00	용	0.00	용	૪
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

```
Driver population factor, fP
                                   2109
                                             37
                                                                 pcph
Flow rate, vp
            _____Estimation of V12 Diverge Areas____
                              (Equation 25-8 or 25-9)
                ΕQ
                P =
                       0.706 Using Equation 5
                v = v + (v - v) P = 1499 pc/h
                 12 R F R FD
                    _____Capacity Checks_____
                                    Maximum
                                                  LOS F?
                        Actual
                        2109
                                     6750
                                                   ÑО
    v = v
     Γi
                        1499
                                    4400
                                                   No
     12
                        2072
                                     6750
                                                   No
    v = v - v
        F R
     FO
                        37
                                     2200
                                                   No
    V
     R
       Level of Service Determination (if not F)_____
                    D = 4.252 + 0.0086 v - 0.009 L = 8.1 pc/mi/ln
Density,
                                      12 D
                     R
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                        D = 0.171
                                        S
Space mean speed in ramp influence area,
                                        S = 52.8
                                                    mph
                                        R
Space mean speed in outer lanes,
                                        S = 60.3
                                                    mph
                                        0
Space mean speed for all vehicles,
                                        S = 54.8
                                                    mph
```

0.943

1.00

0.901

1.00

Heavy vehicle adjustment, fHV

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E-mail: catherine.hartner@parsons.com			
	Merge Ana	lysis	
Analyst: Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction: Analysis Year: Description: Detroit R	I-75 NB Entrance Ramp from MDOT 2035 Hybrid		
	Freeway	Data	
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	Merge 3 55.0 1858	mph vph
	On Ramp	Data	
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	Right 1 35.0 213 870	mph vph ft ft
	_		>/
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp		No	vph
Distance to adjacent Ra	mp		ft
Con	version to pc/h Und	ler Base Conditio	ons

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1858	213	_	vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	489	56		v
Trucks and buses	12	0		8
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	8		%	8
Length	mi	:	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Driver population factor, fP
                                   1.00
                                              1.00
                                   2073
                                              224
                                                                  pcph
Flow rate, vp
           ______Estimation of V12 Merge Areas_____
                L =
                               (Equation 25-2 or 25-3)
                 ΕQ
                P =
                       0.602 Using Equation 1
                 FM
                       (P) = 1248
                                      pc/h
                v = v
                 12 F FM
                     _____Capacity Checks_____
                                                  LOS F?
                                     Maximum
                        Actual
                        2297
                                     6750
                                                   No
    V
     FΟ
                        1472
                                     4600
                                                   No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.4 pc/mi/ln
                                     12
                           R
Level of service for ramp-freeway junction areas of influence B
                 _____Speed Estimation___
Intermediate speed variable,
                                         M = 0.277
                                         S
Space mean speed in ramp influence area,
                                         S = 51.4
                                                    mph
                                         R
Space mean speed in outer lanes,
                                         S = 53.8
                                                    mph
                                         0
Space mean speed for all vehicles,
                                         S = 52.2
                                                    mph
```

0.943

1.000

Heavy vehicle adjustment, fHV

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Diverge	Analysis

Analyst: CH

Agency/Co.: PARSONS Date performed: 10/2/08 Analysis time period: AM Peak Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp to Ambassador Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data

Type of analysis Diverge Number of lanes in freeway 3 Free-flow speed on freeway 55.0 mph Volume on freeway 2361 vph

_____Off Ramp Data______

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	67	vph
Length of first accel/decel lane	785	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)_____

No

vph

Does adjacent ramp exist?

Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2361	67	Ramp vph
Peak-hour factor, PHF	0.95	0.95	· F
Peak 15-min volume, v15	621	18	V
Trucks and buses	9	25	8
Recreational vehicles	0	0	8
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	8
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Driver population factor, fP 1.00 1.00 79 2597 pcph Flow rate, vp _____Estimation of V12 Diverge Areas____ (Equation 25-8 or 25-9) L = ΕQ Ρ 0.691 Using Equation 5 $_{
m FD}$ + (v - v) P = 1820 pc/h12 R F R FD _____Capacity Checks_____ LOS F? Actual Maximum 2597 6750 v = vNo Fi F 1820 4400 No 12 v = v - v6750 2518 No F R FO79 2000 No R _____Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 12.8 pc/mi/lnDensity, 12 D R Level of service for ramp-freeway junction areas of influence B _____Speed Estimation____ Intermediate speed variable, D = 0.435S Space mean speed in ramp influence area, S = 49.3mph R

0.957

0.889

S = 60.3

S = 52.2

0

mph

mph

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Space mean speed for all vehicles,

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Merqe	Analysis	
	- -	

Analyst: CH Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak Freeway/Dir of Travel: I-75 SB

Junction: Service Dr Ent Ramp E of Grand
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3386	vph

_____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	23	vph
Length of first accel/decel lane	590	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? Volume on adjacent Ramp

vph

Position of adjacent Ramp Type of adjacent Ramp

Distance to adjacent Ramp

_____Conversion to pc/h Under Base Conditions_____

No

ft

Junction Components	Freeway	Ramp	Adjacent	-
77 / 1)	2206	0.0	Ramp	
Volume, V (vph)	3386	23		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	891	6		v
Trucks and buses	14	0		용
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	90		응	ଚ
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 3814 24 Flow rate, vp pcph Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.403 Using Equation 4 FMv = v (P) = 1536 pc/h12 F FM _____Capacity Checks____ Actual Maximum LOS F? 3838 9000 V Νo FΟ 1560 4600 V No R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.9 pc/mi/ln12 A R Level of service for ramp-freeway junction areas of influence B Speed Estimation_____ M = 0.298Intermediate speed variable, S Space mean speed in ramp influence area, S = 51.1 mph R

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.935

1.000

s = 52.7

S = 52.0

0

mph

mph

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______Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS Date performed: 8/15/08 Analysis time period: AM Peak Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp E of Clark

Junction:Exit Ramp EJurisdiction:MDOTAnalysis Year:2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3414	vph

_____Off Ramp Data_____

No

ft

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	581	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp

vph

______Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3414	581	vph
Peak-hour factor, PHF	0.95	0.95	- F
Peak 15-min volume, v15	898	153	V
Trucks and buses	14	0	000
Recreational vehicles	0	0	olo
Terrain type:	Level	Level	•
Grade	0.00 %	0.00 %	00
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

S = 48.7 mph

 $S = 60.3 \quad mph$

 $S = 53.6 \quad mph$

R

0

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______Diverge Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Plaza Exit Ramp E of Junction
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis Diverge Number of lanes in freeway 4 Free-flow speed on freeway 70.0 2833 mph Volume on freeway vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	216	vph
Length of first accel/decel lane	1475	ft
Length of second accel/decel lane	200	ft

Adjacent Ramp Data (if one exists)

No

Does adjacent ramp exist?

Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp

vph

ft

_____Conversion to pc/h Under Base Conditions____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2833	216	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	746	57	V
Trucks and buses	17	25	90
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	용
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment, fHV 0.922 Driver population factor, fP 1.00 1.00 Flow rate, vp 3236 256 pcph ____Estimation of V12 Diverge Areas L = (Equation 25-8 or 25-9) ΕQ P = 0.260 Using Equation 0 FDv = v + (v - v) P = 1031 pc/h12 R F R FD ____Capacity Checks___ Actual Maximum LOS F? v = v3236 9600 No Fi F 1031 4400 V No 12 2980 $\Delta = \Delta - \Delta$ 9600 Nο FO F R 256 4100 No v Level of Service Determination (if not F)_____ Density, D = 4.252 + 0.0086 v - 0.009 L = -15.2 pc/mi/ln12 Level of service for ramp-freeway junction areas of influence A _____Speed Estimation_____ Intermediate speed variable, D = 0.321

Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.889

S = 61.0

S = 76.4

S = 70.7 mph

R

0

mph

mph

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Merae	Analvsi	S
 	4	

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB

Ent. Ramp W of Junction Junction:

Junction:
Jurisdiction:

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Fr	eeway	Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2617	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	44	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

____Adjacent Ramp Data (if one exists)_____

No

Does adjacent ramp exist?

Volume on adjacent Ramp vph Position of adjacent Ramp

Type of adjacent Ramp Distance to adjacent Ramp ft

Conversion	τo	pc/n	unaer	Base	Conditions	
 -		-				

Junction Components	Freeway	Ramp	Adjacent
			Ramp
Volume, V (vph)	2617	4 4	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	689	12	v
Trucks and buses	15	7	ଚ୍ଚ
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	9	90	90
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 Flow rate, vp 2961 48 pcph _____Estimation of V12 Merge Areas L = (Equation 25-2 or 25-3) ΕQ P = 0.575 Using Equation 4 FMv = v (P) = 1702 pc/h12 F FM _____Capacity Checks_____ Actual Maximum LOS F? 3009 9600 No FΟ 1750 4600 No V R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.0 pc/mi/lnR 12 Level of service for ramp-freeway junction areas of influence B ____Speed Estimation____ Intermediate speed variable, M = 0.264S Space mean speed in ramp influence area, S = 62.6 mph R

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.930

0.966

S = 69.5

S = 65.3

mph

mph

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Diverge	e Analysis
 . ,	<u> </u>

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp at Jurisdiction: MDOT Analysis Year: 2035 Hybrid Exit Ramp at Dragoon

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2661	vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	319	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No

Volume on adjacent ramp vph Position of adjacent ramp

Type of adjacent ramp Distance to adjacent ramp ft

______Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2661	319	vph
Peak-hour factor, PHF	0.95	0.95	_
Peak 15-min volume, v15	700	8 4	V
Trucks and buses	14	1	96
Recreational vehicles	0	0	96
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

0

S = 76.8

S = 65.6 mph

mph

0.995

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______Diverge Analysis_____

CH Analyst:

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp E of Springwells

Junction:
Jurisdiction:

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3110	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	80	vph
Length of first accel/decel lane	1600	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)____

Does adjacent ramp exist?

Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

No vph

ft

____Conversion to pc/h Under Base Conditions____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3110	80	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	818 .	21	V
Trucks and buses	24	1	9.
Recreational vehicles	0	0	90
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment, fHV Driver population factor, fP 0.893 0.995 1.00 1.00 3667 85 Flow rate, vp pcph Estimation of V12 Diverge Areas_____ L = (Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 v = v + (v - v) P = 1647 pc/h12 R F R FD _____Capacity Checks____ Actual Maximum LOS F? v = v3667 9600 Nο Fi F 1647 4400 No 12 v = v - v3582 9600 Νo FO F R 85 2000 No Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 4.0 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence A _____Speed Estimation_____

Intermediate speed variable, D = 0.436 S Space mean speed in ramp influence area, D = 0.436 S Space mean speed in outer lanes, D = 0.436 Space mean speed in outer lanes, D = 0.436 Space mean speed for all vehicles, D = 0.436 Space mean speed for all vehicles, D = 0.436 Space mean speed in outer lanes, D = 0.436 Space me

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Volume on adjacent Ramp

Position of adjacent Ramp Type of adjacent Ramp Distance to adjacent Ramp

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	Merge A	Analysis		
Analyst: Agency/Co.: Date performed: Analysis time period:	8/15/08 AM Peak			
Freeway/Dir of Travel: I-75 SB Junction: Entrance Ramp W of Springwells Jurisdiction: MDOT				
Analysis Year: Description: Detroit R		al Crossing Pro	ject	
	Freewa	ay Data		
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	-	Merge 4 70.0 3030	mph vph	
	On Rar	mp Data		
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	Right 1 35.0 124 600	mph vph ft ft	
	Adjacent Ramp I	Data (if one ex	ists)	
Does adjacent ramp exis	t?	No		

Conversion	to	pc/h	Under	Base	Conditions
------------	----	------	-------	------	------------

Junction Components	Freeway	Ramp	Adjacent -	
			Ramp	
Volume, V (vph)	3030	124		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	797	33		V
Trucks and buses	24	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%		%	9
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

vph

ft

Driver population factor, fP 1.00 1.00 3572 133 Flow rate, vp pcph Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P . = 0.392 Using Equation 4 FMv = v (P) = 1401 pc/h12 F FM ____Capacity Checks_____ Actual Maximum LOS F? 3705 9600 V No FΟ 1534 4600 No V R12 _____Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.6 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation____ M = 0.297Intermediate speed variable, S Space mean speed in ramp influence area, $S = 61.7 \quad mph$ R Space mean speed in outer lanes, S = 67.9mph

0

S = 65.2

mph

0.893

0.980

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

HCS+: Ramps and Ramp Junctions Release 5.2

PTG

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Merge	Analysis

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Entrance Ramp W of Dearborn

Junction: Entrance Ram
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3153	vph

____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	59	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?

Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp

Distance to adjacent Ramp ft

_____Conversion to pc/h Under Base Conditions_____

No

vph

Junction Components		Freeway		Ramp	Ad	jacent
					Rar	np
Volume, V (vph)		3153		59		vph
Peak-hour factor, PHF		0.95		0.95		
Peak 15-min volume, v15		830		16		Λ
Trucks and buses		24		25		00
Recreational vehicles		0		0		90
Terrain type:		Level		Level		
Grade			왕		%	%
Length			mi		mi	mi
Trucks and buses PCE, ET		1.5		1.5		
Recreational vehicle PCE,	ER	1.2		1.2		

Driver population factor, fP 1.00 1.00 Flow rate, vp 3717 70 pcph _____Estimation of V12 Merge Areas_ L = (Equation 25-2 or 25-3) ΕQ P = 0.368 Using Equation 4 v = v (P) = 1369 pc/h12 F FM _____Capacity Checks____ Actual Maximum LOS F? 3787 9600 V No FO1439 4600 V No R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.5 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation Intermediate speed variable, M = 0.302S Space mean speed in ramp influence area, S = 61.5 mph

0.893

0.889

S = 67.6

S = 65.1

0

mph

mph

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Space mean speed for all vehicles,

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_____Diverge Analysis_____

CHAnalyst:

Agency/Co.: PARSONS Date performed: 10/2/08 Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 SB

Exit Ramp to Ambassador Junction:

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data

Type of analysis Diverge Number of lanes in freeway mph Free-flow speed on freeway 55.0 Volume on freeway 2519 vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	295	vph
Length of first accel/decel lane	785	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2519	295	vph	
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	663	78	V	
Trucks and buses	21	4	ૡ	
Recreational vehicles	0	0	8	
Terrain type:	Level	Level		
Grade	0.00 %	0.00	8 8	
Length	0.00 mi	0.00	mi mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

pcph 2930 317 Flow rate, vp _____Estimation of V12 Diverge Areas_____ (Equation 25-8 or 25-9) L = ΕQ 0.672 Using Equation 5 P = FDv = v + (v - v) P = 2073 pc/h12 R F R FD _____Capacity Checks_____ LOS F? Actual Maximum 2930 6750 No v = vFi F 4400 No 2073 12 6750 No 2613 v = v - vFO F R 2000 No 317 V R _____Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 15.0 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ D = 0.457Intermediate speed variable, S S = 49.1mph Space mean speed in ramp influence area, R S = 60.3mph Space mean speed in outer lanes, 0

S = 51.9

mph

0.905

1.00

0.980 1.00

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

Driver population factor, fP

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______Merge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 SB

Junction: Service Dr Ent Ramp E of Grand
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3048	vph

_____On Ramp Data_____

Right	
1	
35.0	mph
39	vph
590	ft
	ft
	1 35.0 39

______Adjacent Ramp Data (if one exists)_____

No

Does adjacent ramp exist?

Volume on adjacent Ramp vph

Position of adjacent Ramp Type of adjacent Ramp

Distance to adjacent Ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3048	39	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	802	10	V
Trucks and buses	25	15	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	9	00	%
Length	mi	mj	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Driver population factor, fP 1.00 1.00 3609 44 Flow rate, vp pcph Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ 0.400 Using Equation 4 P = FMv = v (P) = 1445 pc/h12 F FM ____Capacity Checks____ LOS F? Actual Maximum 9000 3653 No FO 1489 4600 No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.4 pc/mi/lnR 12 Level of service for ramp-freeway junction areas of influence B Speed Estimation Intermediate speed variable, M = 0.297S $S = 51.1 \quad mph$ Space mean speed in ramp influence area, R

0.889

0.930

S = 52.9

S = 52.2

mph

mph

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Space mean speed for all vehicles,

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_____Diverge Analysis_____

Analyst:

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp E of Clark
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data______

Diverge Type of analysis Number of lanes in freeway Free-flow speed on freeway 4 55.0 mph 3089 vph Volume on freeway

____Off Ramp Data_____

Side of freeway Right Number of lanes in ramp Free-Flow speed on ramp 1 mph 35.0 291 vph ft Volume on ramp 1500 Length of first accel/decel lane Length of second accel/decel lane £t.

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp		Adjacent Ramp
Volume, V (vph)	3089	291		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	813	77		V
Trucks and buses	25	4		96
Recreational vehicles	0	0		96
Terrain type:	Level	Level		
Grade	0.00 %	0.00	용	00
Length	0.00 mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 3658 312 Flow rate, vp pcph _____Estimation of V12 Diverge Areas__ L = (Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 v = v + (v - v) P = 1771 pc/h12 R F R FD _____Capacity Checks_____ Actual Maximum LOS F? v = v3658 9000 No Fi F 1771 4400 No 12 3346 9000 v = v - vΝo FO F R 312 2000 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 6.0 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence A _____Speed Estimation_____ D = 0.456Intermediate speed variable, Space mean speed in ramp influence area, S = 49.1mph R

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.889

0.980

s = 60.3

 $S = 54.3 \quad mph$

mph

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_____Diverge Analysis______

Analyst: СН

Agency/Co.: PARSONS
Date performed: 8/15/08 Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB

Junction: Plaza Exit Ramp E of Junction
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data______

Diverge Type of analysis Number of lanes in freeway
Free-flow speed on freeway 4 70.0 mph 2798 vph Volume on freeway

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	395	vph
Length of first accel/decel lane	1475	ft
Length of second accel/decel lane	200	ft

Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

ft

Conversion to pc/h Under Base Conditions_____

No

vph

Junction Components	Freeway	,	Ramp		Adjacent Ramp
Volume, V (vph)	2798		395		vph
Peak-hour factor, PHF	0.95		0.95		-
Peak 15-min volume, v15	736		104		V
Trucks and buses	25		25		%
Recreational vehicles	0		0		%
Terrain type:	Level		Level		
Grade	0.00	왕	0.00	%	%
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.889

0.889

s = 76.6

 $S = 69.8 \quad mph$

0

mph

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Merge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 SB

Junction: Ent. Ramp W of Junction

Junction: Ent. Ramp w
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2403	vph

_____On Ramp Data_____

No

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	172	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent Ramp vph

Position of adjacent Ramp

Type of adjacent Ramp

Distance to adjacent Ramp ft

______Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2403	172		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	632	45		v
Trucks and buses	25	25		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	9	
Length	mi	m j	. n	ni
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                               1.00
                                        1.00
                               2846
                                        204
Flow rate, vp
                                                           pcph
             _____Estimation of V12 Merge Areas_____
              L =
                           (Equation 25-2 or 25-3)
               ΕQ
              P = 0.555 Using Equation 4
               FM
              v = v (P) = 1581 pc/h
               12 F FM
                   _____Capacity Checks_____
                     Actual
                                Maximum
                                             LOS F?
                      3050
                                 9600
                                              No
    FO
                      1785
                             4600
                                              No
    R12
      Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.2 pc/mi/ln
                           12
                       R
Level of service for ramp-freeway junction areas of influence B
 _____Speed Estimation_____
Intermediate speed variable,
                                    M = 0.264
                                     S
Space mean speed in ramp influence area,
                                    S = 62.6  mph
                                    R
Space mean speed in outer lanes,
                                    S = 69.5 \quad mph
Space mean speed for all vehicles,
                                   S = 65.3  mph
```

0.889

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_____Diverge Analysis______

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp at Dragoon

Junction: Exit Ramp at Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0 mph	
Volume on freeway	2575 vph	

Off Ramp Data_____

No

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	143	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2575	143	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	678	38	V
Trucks and buses	25	11	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	8
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 3049 Flow rate, vp 159 pcph __Estimation of V12 Diverge Areas_____ L = (Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 FDv = v + (v - v) P = 1419 pc/h12 R F R FD _____Capacity Checks_____ Actual Maximum LOS F? v = v3049 9600 No Fi F 1419 4400 No 12 2890 9600 v = v - vNoFO F R 159 2000 NoR Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 6.2 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence A _____Speed Estimation_____ Intermediate speed variable, D = 0.442S Space mean speed in ramp influence area, S = 57.6mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

0

S = 76.8

 $S = 66.5 \quad mph$

mph

0.889

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_____Diverge Analysis______

CH Analyst:

Agency/Co.: PARSONS Date performed: 8/15/08 Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 SB

Exit Ramp E of Springwells Junction: Junction: Exit Ramp E
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Dっ+っ
rreewav	Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2924	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	36	vph
Length of first accel/decel lane	1600	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)______

Does adjacent ramp exist?

Volume on adjacent ramp

Position of adjacent ramp

Type of adjacent ramp

Distance to adjacent ramp

Conversion to pc/h Under Base Conditions

	COHVELDION	PC, 11	OHACL		001101010110		
	=	_					
Junction Components			Freewa	аy	Ramp	Adjacent Ramp	

No

vph

£t

Junction Components	rreeway	Ramp	Adjacent	•
			Ramp	
Volume, V (vph)	2924	36		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	769	9		V
Trucks and buses	25	11		%
Recreational vehicles	0	0		90
Terrain type:	Level	Level		
Grade	0.00 %	0.00	00	ુ
Length	0.00 mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 40 pcph 3463 Flow rate, vp Estimation of V12 Diverge Areas___ L = (Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 v = v + (v - v) P = 1532 pc/h12 R F R FD _____Capacity Checks_____ Maximum LOS F? Actual 9600 v = v3463 NoFi F 1532 4400 Νo V 12 3423 9600 No v = v - vFO F R 2000 40 NoLevel of Service Determination (if not F)______ D = 4.252 + 0.0086 v - 0.009 L = 3.0 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence A _____Speed Estimation_____ D = 0.432Intermediate speed variable, Space mean speed in ramp influence area, S = 57.9 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

0

s = 76.8

S = 67.1 mph

mph

0.889

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Merge Analysis_____

Analyst: CH

PARSONS Agency/Co.: Date performed: 8/15/08 Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 SB

Entrance Ramp W of Springwells Junction:

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	пата

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2888	vph

_____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	281	vph
Length of first accel/decel lane	600	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent Ramp

Position of adjacent Ramp

Type of adjacent Ramp

Distance to adjacent Ramp

_____Conversion to pc/h Under Base Conditions_____

No

vph

ft

Junction Components	Freeway	Ramp	Adjacen Ramp	nt
Volume, V (vph)	2888	281	_	vph
Peak-hour factor, PHF	0.95	0.95		_
Peak 15-min volume, v15	760	74		V
Trucks and buses	25	20		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%		용	용
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 3420 325 pcph Flow rate, vp Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.368 Using Equation 4 v = v (P) = 1260 pc/h12 F FM ____Capacity Checks_____ LOS F? Actual Maximum 3745 9600 No FO 1585 4600 Νo V R12 Level of Service Determination (if not F)______ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.9 pc/mi/lnR 12 Level of service for ramp-freeway junction areas of influence B Speed Estimation_____ M = 0.298Intermediate speed variable, S S = 61.7 mph Space mean speed in ramp influence area, R $S = 67.9 \quad mph$ Space mean speed in outer lanes,

Space mean speed for all vehicles, S = 65.1 mph

0.889

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_____Merge Analysis_____

CH Analyst:

PARSONS Agency/Co.: Date performed: 8/15/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB

Entrance Ramp W of Dearborn Junction:

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_	-
Freeway	Data
TTCCMGA	Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3169	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	42	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)______

Does adjacent ramp exist?

Volume on adjacent Ramp

Position of adjacent Ramp

Type of adjacent Ramp

Distance to adjacent Ramp

vph

ft

_____Conversion to pc/h Under Base Conditions______

No

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3169	42	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	834	11	V
Trucks and buses	25	24	90
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	용	96
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 3753 50 pcph Flow rate, vp Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.371 Using Equation 4 FΜ v = v (P) = 1392 pc/h12 F FM _____Capacity Checks_____ LOS F? Actual Maximum 3803 9600 Nο FΟ 4600 1442 No V R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.6 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, M = 0.302S $S = 61.5 \quad mph$ Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

 $S = 67.6 \quad mph$

S = 65.1 mph

0.889

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Diverge	Analysis

Analyst: CH

Agency/Co.: PARSONS
Date performed: 10/2/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction:

Exit Ramp to Ambassador

Jurisdiction:

MDOT

Analysis Year:

2035 Hybrid

Description: Detroit River International Crossing Project

Freewa	y Data
Type of analysis	Diverge

Number of lanes in freeway 3
Free-flow speed on freeway 55.0 mph
Volume on freeway 4953 vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	398	vph
Length of first accel/decel lane	785	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent ramp

Position of adjacent ramp

Type of adjacent ramp

Distance to adjacent ramp ft

Conversion	to	pc/h	Under	Base	Conditions
------------	----	------	-------	------	------------

Junction Components	Freeway	Ramp	Adjacent Ramp		
Volume, V (vph)	4953	398	_	vph	
Peak-hour factor, PHF	0.95	0.95			
Peak 15-min volume, v15	1303	105		V	
Trucks and buses	8	4		8	
Recreational vehicles	0	0		%	
Terrain type:	Level	Level			
Grade	0.00 %	0.00	8	8	
Length	0.00 m:	i 0.00	mi	mi	
Trucks and buses PCE, ET	1.5	1.5			
Recreational vehicle PCE, ER	1.2	1.2			

1.00 Driver population factor, fP 1.00 427 5422 pcph Flow rate, vp _____Estimation of V12 Diverge Areas_____ L = (Equation 25-8 or 25-9) ΕQ P = 0.605 Using Equation 5 FDv = v + (v - v) P = 3448 pc/h12 R F R FD _____Capacity Checks_____ LOS F? Actual Maximum 6750 5422 No v = vFi F 4400 No 3448 12 4995 6750 No v = v - vFO F R 427 2000 NoV R _____Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 26.8 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence C ____Speed Estimation_____ D = 0.466Intermediate speed variable, S S = 48.9mph Space mean speed in ramp influence area, R Space mean speed in outer lanes, S = 56.5mph

0

S = 51.5

mph

0.962

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

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_____Merge Analysis_____

Analyst: CH Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Service Dr Ent Ramp E of Grand
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis Merge Number of lanes in freeway 4 4 55.0 mph vph Free-flow speed on freeway Volume on freeway 6041

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	469	vph
Length of first accel/decel lane	590	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent Ramp vph

Position of adjacent Ramp Type of adjacent Ramp

Distance to adjacent Ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	-
Volume, V (vph)	6041	469		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1590	123		v
Trucks and buses	9	21		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%		%	왕
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                1.00
                                          1.00
Flow rate, vp
                                         546
                                6645
                                                             pcph
          _____Estimation of V12 Merge Areas_____
               L =
                           (Equation 25-2 or 25-3)
               ΕQ
               P = 0.338 Using Equation 4
               FM
               v = v (P) = 2243 pc/h
               12 F FM
                   _____Capacity Checks____
                                 Maximum
                                               LOS F?
                      Actual
                      7191
                                  9000
                                               No
     FΟ
                      2789
                              4600
                                               No
    v
     R12
          Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.3 pc/mi/ln
                            12
                        R
Level of service for ramp-freeway junction areas of influence C
  _____Speed Estimation____
                                     M = 0.343
Intermediate speed variable,
                                      S
                                     S = 50.5 \quad mph
Space mean speed in ramp influence area,
                                     R
                                     S = 48.9  mph
Space mean speed in outer lanes,
```

Space mean speed for all vehicles,

0.957

0.905

S = 49.5 mph

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_____Diverge Analysis_____

Analyst: CH

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp E of Clark
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway Data______

Diverge Type of analysis Number of lanes in freeway 4 55.0 mph 6512 vph Free-flow speed on freeway Volume on freeway

_____Off Ramp Data_____

Side of freeway Right Number of lanes in ramp Free-Flow speed on ramp 1 mph 35.0 Volume on ramp 274 vph Length of first accel/decel lane 1500 ft Length of second accel/decel lane ft

______Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp vph

Position of adjacent ramp

Type of adjacent ramp

Distance to adjacent ramp ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	6512	274	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	1714	72	V
Trucks and buses	10	8	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

No

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 7197 300 pcph Flow rate, vp _____Estimation of V12 Diverge Areas L = (Equation 25-8 or 25-9) ΕQ 0.436 Using Equation 8 P = FDv = v + (v - v) P = 3307 pc/h12 R F R FD Capacity Checks_____ Maximum LOS F? Actual 9000 $\Delta = \Delta$ 7197 No Fi F 3307 4400 Νo v 12 6897 9000 No v = v - vFO F R 300 2000 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 19.2 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ D = 0.455Intermediate speed variable, Space mean speed in ramp influence area, S = 49.1 mph R

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.952

0.962

S = 56.6

S = 52.9 mph

0

mph

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_____Diverge Analysis______

Analyst: CHAgency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Plaza Exit Ramp E of Junction
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 4 70.0 mph 6238 vph Volume on freeway

Off Ramp Data_____

No

vph

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	937	vph
Length of first accel/decel lane	1475	ft
Length of second accel/decel lane	200	ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

C	Conversion	to	pc/h	. Unde	er E	Base	Conditions	

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	6238	937	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	1642	247	V
Trucks and buses	10	16	90
Recreational vehicles	0	0	9
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	<u> </u>
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustme Driver population fact Flow rate, vp		1.00 1	.926 .00 065	pcph
······································	Estimation o	f V12 Diverge A	reas	
L = EQ	· (Eq	uation 25-8 or	25-9)	
	0.260 Usi	ng Equation 0		
	r v + (v - v) R F R	P = 2581 pc FD	e/h	
	Capaci	ty Checks		
v = v	Actual 6895	Maximum 9600	LOS F? No	
Fi F	2581	4400	No	
12 v = v - v FO F R	5830	9600	No	
v R	1065	4100	No	
Level	. of Service Det	ermination (if	not F)	
Density,	D = 4.252 + 0.		L = -1.9	pc/mi/ln
Level of service for r			-	
	Speed Es	timation		
Intermediate speed var	riable,	D = 0.	394	
Space mean speed in ra	mp influence ar	S ea, S = 59 R	0.0 mph	
Space mean speed in ou	iter lanes,	S = 72	2.3 mph	
Space mean speed for a	all vehicles,	S = 66	5.6 mph	

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rqe Analysis

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Ent. Ramp W of Junction

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freeway	Data	
	Daca	

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5301	vph

On	Ramp	Data
	-	

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	285	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

No

Volume on adjacent Ramp vph Position of adjacent Ramp

Type of adjacent Ramp

Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions		Conversion	to	pc/h	Under	Base	Conditions
--	--	------------	----	------	-------	------	------------

Junction Components	Freeway	Ramp	Adjace: Ramp	nt
Volume, V (vph)	5301	285	*	vph
Peak-hour factor, PHF	0.95	0.95		1
Peak 15-min volume, v15	1395	75		V
Trucks and buses	9	10		90
Recreational vehicles	0	0		ે
Terrain type:	Level	Level		
Grade	90		90	ે
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV
                               0.957
Driver population factor, fP
                                1.00
                                          1.00
Flow rate, vp
                                5831
                                          315
                                                             pcph
                  Estimation of V12 Merge Areas
                            (Equation 25-2 or 25-3)
               L =
               ΕQ
               P = 0.542 Using Equation 4
               FM
               v = v (P) = 3158 pc/h
               12 F FM
                   ____Capacity Checks
                                  Maximum
                      Actual
                                               LOS F?
    v
                      6146
                                  9600
                                               No
    FΟ
                      3473
                                 4600
                                               No
    R12
        Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.3 pc/mi/ln
                            12
Level of service for ramp-freeway junction areas of influence C
     _____Speed Estimation____
Intermediate speed variable,
                                     M = 0.367
                                     S
Space mean speed in ramp influence area,
                                     S = 59.7 \quad mph
                                     R
Space mean speed in outer lanes,
                                     S = 67.0
                                                mph
Space mean speed for all vehicles,
                                    S = 62.7
                                               mph
```

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Diverge	Analysis

Analyst: CH

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp at Dragoon
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5586	vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	149	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?

Volume on adjacent ramp

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

No

ft

vph

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	5586		149		vph
Peak-hour factor, PHF	0.95		0.95		•
Peak 15-min volume, v15	1470		39		v
Trucks and buses	9		24		%
Recreational vehicles	0		0		%
Terrain type:	Level		Level		
Grade	0.00	응	0.00	용	%
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

```
Driver population factor, fP
                                1.00
                                          1.00
Flow rate, vp
                                6145
                                          176
                                                            pcph
                 Estimation of V12 Diverge Areas____
              L =
                           (Equation 25-8 or 25-9)
               ΕQ
              P = 0.436 Using Equation 8
               FD
               v = v + (v - v) P = 2778 pc/h
               12 R F R FD
                   ____Capacity Checks
                      Actual
                                 Maximum
                                              LOS F?
    v = v
                      6145
                                 9600
                                              No
    Fi F
                      2778 4400
    v
                                              No
    12
    \Delta = \Delta - \Delta
                      5969
                              9600
                                              No
    FO F R
    v
                      176
                                 2000
                                              No
    R
       _____Level of Service Determination (if not F)____
                   D = 4.252 + 0.0086 v - 0.009 L = 17.9 pc/mi/ln
Density,
                                  12 D
Level of service for ramp-freeway junction areas of influence B
       _____Speed Estimation____
Intermediate speed variable,
                                     D = 0.444
                                    S = 57.6
Space mean speed in ramp influence area,
                                               mph
Space mean speed in outer lanes,
                                    s = 74.1
                                               mph
```

0

S = 65.6 mph

0.957

0.893

Heavy vehicle adjustment, fHV

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Diverge Analysis

Analyst: CH

Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp E of Springwells
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5927	vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	37	vph
Length of first accel/decel lane	1600	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp

_____Conversion to pc/h Under Base Conditions_____

ft

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	5927		37		vph
Peak-hour factor, PHF	0.95		0.95		-
Peak 15-min volume, v15	1560		10		V
Trucks and buses	13		24		90
Recreational vehicles	0		0		90
Terrain type:	Level		Level		
Grade	0.00	용	0.00	%	0,0
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

0.939

0.893

S = 74.5

S = 66.2

0

mph

mph

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

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	Merge	Analysis
Analyst:	СН	

Analyst: Ch
Agency/Co.: PARSONS
Date performed: 8/15/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Entrance Ramp W of Springwells

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

#reeway	Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5890	vph

On	Ramp	Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	356	vph
Length of first accel/decel lane	600	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist? No Volume on adjacent Ramp

Volume on adjacent Ramp vph Position of adjacent Ramp

Type of adjacent Ramp

Distance to adjacent Ramp ft

Conversion	ı to	pc/h	Under	Base	Conditions	
		_				

Junction Components	Freeway	Ramp	Adjacen	t
			Ramp	
Volume, V (vph)	5890	356		vph
Peak-hour factor, PHF	0.95	0.95		_
Peak 15-min volume, v15	1550	94		V
Trucks and buses	12	8		્ર
Recreational vehicles	0	0		્ર
Terrain type:	Level	Level		
Grade	9	Š	%	ૄ
Length	n	ni	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV Driver population factor, fP
                                 0.943
                                            0.962
                                  1.00
                                            1.00
Flow rate, vp
                                  6572
                                            390
                                                               pcph
                  Estimation of V12 Merge Areas
               L =
                             (Equation 25-2 or 25-3)
                ΕQ
               P = 0.360 Using Equation 4
                FM
               v = v (P) = 2367 pc/h
                12 F FM
                   _____Capacity Checks_____
                       Actual
                                   Maximum
                                                LOS F?
    v
                       6962
                                   9600
                                                 No
     FO
                       2757
                                  4600
                                                 No
    R12
        Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.0 pc/mi/ln
                             12
Level of service for ramp-freeway junction areas of influence C
          _____Speed Estimation____
Intermediate speed variable,
                                       M = 0.340
                                       S
Space mean speed in ramp influence area,
                                      S = 60.5  mph
                                       R
Space mean speed in outer lanes,
                                       S = 64.2  mph
```

S = 62.7 mph

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Phone: 248-936-114/ E-mail: catherine.hartner@p	parsons.com	Fax: 2	248-936-13	176		
	Merge Ar	alysis				
Date performed: 8/15 Analysis time period: PM Freeway/Dir of Travel: I-75	Peak 5 SB rance Ramp W c 6 Hybrid					
	Freeway	Data	·			
Type of analysis Number of lanes in freeway Free-flow speed on freeway Volume on freeway		Merge 4 70.0 6247		mph vph		
	On Ramp	Data				
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/decel Length of second accel/decel		Right 1 35.0 82 500		mph vph ft ft		
Ad	jacent Ramp Da	ta (if or	ne exists)	-	
Does adjacent ramp exist? Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp		No		vph		
Distance to adjacent Ramp				ft		
Convers	ion to pc/h Un	der Base	Condition	ns		
Junction Components	Fr	eeway	Ramp		Adjacent Ramp	
Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses	0.	47 95 44	82 0.95 22 4			vph v %

Junction Components	Freeway	Ramp	Adjacen Ramp	t
Volume, V (vph)	6247	82	-	vph
Peak-hour factor, PHF	0.95	0.95		1
Peak 15-min volume, v15	1644	22		v
Trucks and buses	12	4		8
Recreational vehicles	0	0		8
Terrain type:	Level	Level		
Grade	96		%	ે
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Driver population factor, fP
                                1.00
                                         1.00
Flow rate, vp
                                6970
                                        88
                                                           pcph
                 Estimation of V12 Merge Areas
              L =
                           (Equation 25-2 or 25-3)
               ΕQ
              P = 0.366 Using Equation 4
               FM
              v = v (P) = 2552 pc/h
               12 F FM
                  _____Capacity Checks
                      Actual
                                 Maximum
                                             LOS F?
                      7058
                                 9600
    v
                                              No
    FΟ
                      2640
                              4600
                                              No
    R12
        Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.9 pc/mi/ln
                           12
Level of service for ramp-freeway junction areas of influence C
      _____Speed Estimation
Intermediate speed variable,
                                    M = 0.341
                                     S
Space mean speed in ramp influence area,
                                   S = 60.5  mph
                                    R
Space mean speed in outer lanes,
                                    S = 63.8 \quad mph
```

0.943

0.980

S = 62.5

mph

Heavy vehicle adjustment, fHV

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Distance to adjacent ramp

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	Diverg	e Analysis		
Analyst: Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction: Analysis Year: Description: Detroit R	AM Peak I-96 EB Exit Ramp to Am MDOT 2035 Hybrid		ect	
	Freew	ay Data		·
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	way	Diverge 2 55.0 1628	mph vph	
	Off Ra	.mp Data		
Side of freeway Number of lanes in ramp Free-Flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	lecel lane	Right 1 35.0 629 770	mph vph ft ft	
	Adjacent Ramp	Data (if one exi	ists)	
Does adjacent ramp exist Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp)	No	vph	
7'			c L	

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	1628		629		vph
Peak-hour factor, PHF	0.95		0.95		
Peak 15-min volume, v15	428		166		V
Trucks and buses	25		25		용
Recreational vehicles	0		, 0		용
Terrain type:	Level		Level		
Grade	0.00	용	0.00	ક	8
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

______Conversion to pc/h Under Base Conditions_____

ft

Driver population factor, fP 1.00 1.00 1928 745 Flow rate, vp pcph _____Estimation of V12 Diverge Areas_____ L = (Equation 25-8 or 25-9) ΕQ 1.000 Using Equation 0 P = v = v + (v - v) P = 1928 pc/h12 R F R FD _____Capacity Checks_____ LOS F? Actual Maximum 1928 4500 v = vNo Fi F 4400 No 1928 12 4500 1183 No v = v - vFO F R 2000 745 No V R _____Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 13.9 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, D = 0.495S Space mean speed in ramp influence area, S = 48.6mph R Space mean speed in outer lanes, S = N/Amph

0

S = 48.6

mph

0.889

0.889

Heavy vehicle adjustment, fHV

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Analysis
·

Analyst: CH

Agency/Co.: PARSONS
Date performed: 10/2/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-96 EB

Junction: Exit Ramp to Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

Freew	vay Data		
Type of analysis Number of lanes in freeway Free-flow speed on freeway Volume on freeway	Diverge 2 55.0 1061	mph vph	

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	286	vph
Length of first accel/decel lane	770	ft
Length of second accel/decel lane		ft

Off Ramp Data

_______Adjacent Ramp Data (if one exists)_______

No

Does adjacent ramp exist?

Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp vph

ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1061		286			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	279		75			V
Trucks and buses	25		13			용
Recreational vehicles	0		0			8
Terrain type:	Level		Level			
Grade	0.00 %	Ś	0.00	용	٩	ड
Length	0.00 m	ni	0.00	mi	r	ni
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Driver population factor, fP 321 1256 pcph Flow rate, vp _____Estimation of V12 Diverge Areas_____ (Equation 25-8 or 25-9) L = ΕO 1.000 Using Equation 0 P = FDv = v + (v - v) P = 1256 pc/h12 R F R FD _____Capacity Checks_____ Maximum LOS F? Actual No 1256 4500 v = vFi F 4400 No 1256 12 935 4500 No v = v - vFO F R 321 2000 No V R _____Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 8.1 pc/mi/lnDensity, 12 D R Level of service for ramp-freeway junction areas of influence A _____Speed Estimation_____ D = 0.457Intermediate speed variable, S Space mean speed in ramp influence area, S = 49.1mph R Space mean speed in outer lanes, S = N/Amph 0

0.889

1.00

0.939

1.00

S = 49.1

mph

Heavy vehicle adjustment, fHV

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E-Mail. Catherine.narthereparbons.com				
	Diverge Ar	alysis		
Analyst: Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction: Analysis Year: Description: Detroit R	I-96 EB Exit Ramp to Ambass MDOT 2035 Hybrid		=	
	Freeway I	Oata		
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	way	Diverge 2 55.0 2027	mph vph	
	Off Ramp I	Ja La		
Side of freeway Number of lanes in ramp Free-Flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	lecel lane	Right 1 35.0 651 770	mph vph ft ft	
Adjacent Ramp Data (if one exists)				
Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp		No	vph	
Distance to adjacent ra	amp		ft	

Conversion to	pc/h Under B	ase	Conditi	ons		
Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2027		651		-	vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	533		171			V
Trucks and buses	8		6			%
Recreational vehicles	0		0			&
Terrain type:	Level		Level			
Grade	0.00	ક	0.00	용	ç	j Š
Length	0.00	mi	0.00	mi	r	ni
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

```
Driver population factor, fP
                                   1.00
                                              1.00
                                   2219
                                              706
                                                                  pcph
Flow rate, vp
            _____Estimation of V12 Diverge Areas____
                L =
                              (Equation 25-8 or 25-9)
                 ΕQ
                       1.000 Using Equation 0
                P =
                 _{
m FD}
                v = v + (v - v) P = 2219 pc/h
                 12 R F R FD
                      _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                                     4500
                        2219
                                                    No
    v = v
     Fi F
                        2219
                                     4400
                                                    No
     12
                        1513
                                     4500
                                                    No
     v = v - v
     FO F R
                        706
                                     2000
                                                    No
    V
     R
         _____Level of Service Determination (if not F)_____
                     D = 4.252 + 0.0086 \text{ v} - 0.009 \text{ L} = 16.4 \text{ pc/mi/ln}
Density,
                                       12 D
Level of service for ramp-freeway junction areas of influence B
  _____Speed Estimation_____
                                         D = 0.492
Intermediate speed variable,
                                          S
Space mean speed in ramp influence area,
                                         S = 48.6
                                                    mph
                                         R
                                         S = N/A
                                                     mph
Space mean speed in outer lanes,
                                         0
                                        S = 48.6
```

0.962

0.971

mph

Heavy vehicle adjustment, fHV

HCS+: Freeway Weaving Release 5.2

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Operational Analysis_____

Analyst:

CH

Agency/Co.: PARSONS
Date Performed: 8/15/08

Analysis Time Period: AM Peak

Freeway/Dir of Travel: I-75 NB

Weaving Location: From Springwells Ent/PlazaExit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF	70	mph
Weaving number of lanes, N	5	
Weaving segment length, L	1850	ft
Terrain type	Level	
Grade		90
Length		mi
Weaving type	A	
Volume ratio, VR	0.15	
Weaving ratio, R	0.44	

Conversion to pc/h Under Base Conditions____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	4345	0	394	333	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	1143	0	104	88	V
Trucks and buses	11	0	25	10	%
Recreational vehicles	0	0	0	0	90
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.948	1.000	0.889	0.952	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	4825	0	466	368	pc/h

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.45	0.20
Weaving and non-weaving speeds, Si	56.30	64.97
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

Maximum number of lanes, Nw (max) (Exhibit 24-7)

Type of operation is

1.23

Unconstrained

______Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	63.53	mph
Weaving segment density, D	17.81	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	11419	pc/h
Capacity as a 15-minute flow rate, c	10824	pc/h
Capacity as a full-hour volume, ch	10283	pc/h

		If Max Exceeded See Not	
	Analyzed	Maximum	Note
Weaving flow rate, Vw	834	2800	a
Average flow rate (pcphpl)	1131	2400	b
Volume ratio, VR	0.15	0.20	С
Weaving ratio, R	0.44	N/A	d
Weaving length (ft)	1850	2500	е
Notes:			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date Performed: 8/15/08 Analysis Time Period: AM Peak Freeway/Dir of Travel: I-75 NB

Weaving Location: From Clark Ent. to Grand Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_					
	n	n	77	-	C
	11	\sim	u		

Freeway free-flow speed, SFF	55 mph
Weaving number of lanes, N	5
Weaving segment length, L	1100 ft
Terrain type	Level
Grade	%
Length	mi
Weaving type	A
Volume ratio, VR	0.04
Weaving ratio, R	0.10

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	5339	0	20	174	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	1405	0	5	46	V
Trucks and buses	13	0	25	23	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.939	1.000	0.889	0.897	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	5985	0	23	204	pc/h

______Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.60	0.22
Weaving and non-weaving speeds, Si	43.11	51.80
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 0.55

Maximum number of lanes, Nw (max) (Exhibit 24-7) 1.40

Type of operation is Unconstrained

_____Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	51.42	mph
Weaving segment density, D	24.16	pc/mi/ln
Level of service, LOS	С	
Capacity of base condition, cb	9484	pc/h
Capacity as a 15-minute flow rate, c	8905	pc/h
Capacity as a full-hour volume, ch	8460	pc/h

		If Max Exceeded See No	
	Analyzed	Maximum	Note
Weaving flow rate, Vw	227	2800	a
Average flow rate (pcphpl)	1242	2250	b
Volume ratio, VR	0.04	0.20	С
Weaving ratio, R	0.10	N/A	d
Weaving length (ft)	1100	2500	е
Notes:			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

CH Analyst: Agency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: Midday Peak Freeway/Dir of Travel: I-75 NB

Weaving Location: From Springwells Ent/PlazaExit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF	70	mph
Weaving number of lanes, N	5	-
Weaving segment length, L	1850	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
Volume ratio, VR	0.35	
Weaving ratio, R	0.25	

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	1768	0	708	248	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	465	0	186	65	V
Trucks and buses	25	0	25	18	양
Recreational vehicles	0	0	0	0	용
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	1.000	0.889	0.917	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2093	0	838	284	pc/h

Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.87	0.11
Weaving and non-weaving speeds, Si	47.06	69.30
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

Maximum number of lanes, Nw (max) (Exhibit 24-7)

Type of operation is

1.98

1.40

Constrained

______Weaving Segment Speed, Density, Level of Service and Capacity_____

Weaving segment speed, S 59.49 mph
Weaving segment density, D 10.81 pc/mi/ln
Level of service, LOS B
Capacity of base condition, cb 11131 pc/h
Capacity as a 15-minute flow rate, c 9894 pc/h
Capacity as a full-hour volume, ch 9399 pc/h

_____Limitations on Weaving Segments_____

		If Max Exceeded See No	
	Analyzed	Maximum	Note
Weaving flow rate, Vw	1122	2800	a
Average flow rate (pcphpl)	643	2400	b
Volume ratio, VR	0.35	0.20	С
Weaving ratio, R	0.25	N/A	d
Weaving length (ft)	1850	2500	е
Notoge			

Notes:

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

CH Analyst:

Agency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: Midday Peak

Freeway/Dir of Travel: I-75 NB

Weaving Location: From Clark Ent. to Grand Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

______Inputs_____

Freeway free-flow speed, SFF	55	mph
Weaving number of lanes, N	5	_
Weaving segment length, L	1100	ft
Terrain type	Level	
Grade		90
Length		mi
Weaving type	А	
Volume ratio, VR	0.18	
Weaving ratio, R	0.42	

______Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	1958	0	244	177	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	515	0	64	47	v
Trucks and buses	25	0	25	25	olo
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	1.000	0.889	0.889	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2318	0	288	209	pc/h

______Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.37	0.13
Weaving and non-weaving speeds, Si	47.89	54.75
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

Maximum number of lanes, Nw (max) (Exhibit 24-7)

Type of operation is

1.30

Unconstrained

__Weaving Segment Speed, Density, Level of Service and Capacity_____

Weaving segment speed, S Weaving segment density, D Level of service, LOS		mph pc/mi/ln
Capacity of base condition, cb	B 9040	pc/h
Capacity as a 15-minute flow rate, c Capacity as a full-hour volume, ch	8036 7634	pc/h pc/h

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	497	2800	a
Average flow rate (pcphpl)	563	2250	b
Volume ratio, VR	0.18	0.20	C
Weaving ratio, R	0.42	N/A	d
Weaving length (ft)	1100	2500	e
Notes:			•

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

СН Analyst: Agency/Co.:

Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: PM Peak Freeway/Dir of Travel: I-75 NB

Weaving Location: From Springwells Ent/PlazaExit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF Weaving number of lanes, N	70 5	mph
Weaving segment length, L	1850	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
Volume ratio, VR	0.34	
Weaving ratio, R	0.11	

_____Conversion to pc/h Under Base Conditions____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2147	0	969	127	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	565	0	255	33	V
Trucks and buses	18	0	25	10	9
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.917	1.000	0.889	0.952	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2463	0	1147	140	pc/h

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	1.00	0.13
Weaving and non-weaving speeds, Si	44.96	68.28
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) Maximum number of lanes, Nw (max) (Exhibit 24-7) 1.40 Type of operation is Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	57.96	mph
Weaving segment density, D	12.94	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	11131	pc/h
Capacity as a 15-minute flow rate, c	10212	pc/h
Capacity as a full-hour volume, ch	9701	pc/h

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	1287	2800	a
Average flow rate (pcphpl)	750	2400	b
Volume ratio, VR	0.34	0.20	С
Weaving ratio, R	0.11	N/A	d
Weaving length (ft)	1850	2500	е
Notes.			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- Capacity occurs under constrained operating conditions.
- Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such
- Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h f. (Type A), 4,000 (Type B), 3,500 (Type C).
- Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such
- Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such
- Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

Analyst: CH Agency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: PM Peak

Freeway/Dir of Travel: I-75 NB

Weaving Location: From Clark Ent. to Grand Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF	55	mph	
Weaving number of lanes, N	5	-	
Weaving segment length, L	1100	ft	
Terrain type	Level		
Grade		ଚ୍ଚ	
Length		mi	
Weaving type	A		
Volume ratio, VR	0.17		
Weaving ratio, R	0.41		

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2533	0	204	312	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	667	0	54	82	V
Trucks and buses	17	0	25	16	90
Recreational vehicles	0	0	0	0	양
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.922	1.000	0.889	0.926	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2892	0	241	354	pc/h

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.45	0.17
Weaving and non-weaving speeds, Si	46.07	53.43
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 1.30
Maximum number of lanes, Nw (max) (Exhibit 24-7) 1.40
Type of operation is Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	52.01	mph
Weaving segment density, D	13.41	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	9074	pc/h
Capacity as a 15-minute flow rate, c	8363	pc/h
Capacity as a full-hour volume, ch	7945	pc/h

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	595	2800	a
Average flow rate (pcphpl)	697	2250	b
Volume ratio, VR	0.17	0.20	С
Weaving ratio, R	0.41	N/A	d
Weaving length (ft)	1100	2500	е
Notes.			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

Analyst: CH Agency/Co.: PARSONS
Date Performed: 8/15/08

Analysis Time Period: AM Peak Freeway/Dir of Travel: I-75 SB

Weaving Location: From Amb. Ent. to Clark Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs______

Freeway free-flow speed, SFF	55 mph	
Weaving number of lanes, N	5	
Weaving segment length, L	1316 ft	
Terrain type	Level	
Grade	00	
Length	mi	
Weaving type	A	
Volume ratio, VR	0.19	
Weaving ratio, R	0.17	

Conversion to pc/h Under Base Conditions_____

	Non-Wea	ving	Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2718	0	581	115	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	715	0	153	30	V
Trucks and buses	17	0	0	0	8
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.922	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	3104	0	611	121	pc/h

_______Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	1.03	0.10
Weaving and non-weaving speeds, Si	37.14	55.78
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

Maximum number of lanes, Nw (max) (Exhibit 24-7)

Type of operation is

1.44

Constrained

Weaving Segment Speed, Density, Level of Service and Capacity_____

Weaving segment speed, S	50.90	mph
Weaving segment density, D	15.07	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	9182	pc/h
Capacity as a 15-minute flow rate, c	8463	pc/h
Capacity as a full-hour volume, ch	8040	pc/h

	If Max Exc		eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	732	2800	a
Average flow rate (pcphpl)	767	2250	b
Volume ratio, VR	0.19	0.20	С
Weaving ratio, R	0.17	N/A	d
Weaving length (ft)	1316	2500	е
Notes:			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

Analyst:

Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: AM Peak
Freeway/Dir of Travel: I-75 SB

Weaving Location: From JunctionEnt. to Drag.Exit Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF	70	mph
Weaving number of lanes, N	5	•
Weaving segment length, L	1140	ft
Terrain type	Level	
Grade		9
Length		mi
Weaving type	A	
Volume ratio, VR	0.13	
Weaving ratio, R	0.12	

_____Conversion to pc/h Under Base Conditions_____

	Non-Wea	ving	Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2298	0	319	44	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	605	0	84	12	V
Trucks and buses	16	0	1	7	90
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.926	1.000	0.995	0.966	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2612	0	337	47	pc/h

Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.35	0.12
Weaving and non-weaving speeds, Si	59.55	68.67
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 0.99
Maximum number of lanes, Nw (max) (Exhibit 24-7) 1.40
Type of operation is Unconstrained

______Weaving Segment Speed, Density, Level of Service and Capacity_____

Weaving segment speed, S 67.35 mph
Weaving segment density, D 8.90 pc/mi/ln
Level of service, LOS A
Capacity of base condition, cb 10840 pc/h
Capacity as a 15-minute flow rate, c 10037 pc/h
Capacity as a full-hour volume, ch 9535 pc/h

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	384	2800	a
Average flow rate (pcphpl)	599	2400	b
Volume ratio, VR	0.13	0.20	С
Weaving ratio, R	0.12	N/A	d
Weaving length (ft)	1140	2500	е
Notes:			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

Analyst: CH Agency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: AM Peak
Freeway/Dir of Travel: I-75 SB

Weaving Location: From Plaza Ent. to Spring.Exit
Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF Weaving number of lanes, N	7 0 5	mph
Weaving segment length, L	1600	ft
Terrain type	Level	
Grade		9
Length		mi
Weaving type	A	
Volume ratio, VR	0.28	
Weaving ratio, R	0.08	

____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2262	0	80	768	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	595	0	21	202	V
Trucks and buses	17	0	1	25	9
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.922	1.000	0.995	0.889	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2583	0	8 4	909	pc/h

______Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.96	0.11
Weaving and non-weaving speeds, Si	45.56	69.14
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

Maximum number of lanes, Nw (max) (Exhibit 24-7)

Type of operation is

1.70

1.40

Constrained

__Weaving Segment Speed, Density, Level of Service and Capacity____

Weaving segment speed, S	60.45	mph
Weaving segment density, D	11.83	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	10891	pc/h
Capacity as a 15-minute flow rate, c	10038	pc/h
Capacity as a full-hour volume, ch	9536	pc/h

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	993	2800	a
Average flow rate (pcphpl)	715	2400	b
Volume ratio, VR	0.28	0.20	С
Weaving ratio, R	0.08	N/A	d
Weaving length (ft)	1600	2500	е
Notes:			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

СН Analyst:

Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: Midday Peak Freeway/Dir of Travel: I-75 SB

Weaving Location: From Amb. Ent. to Clark Exit Jurisdiction: MDOT

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF	55	mph
Weaving number of lanes, N	5	
Weaving segment length, L	1316	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
Volume ratio, VR	0.11	
Weaving ratio, R	0.24	

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2709	0	291	89	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	713	0	77	23	V
Trucks and buses	25	0	0	7	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	1.000	1.000	0.966	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	3208	0	306	96	pc/h

________Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.36	0.13
Weaving and non-weaving speeds, Si	48.13	54.93
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

Maximum number of lanes, Nw (max) (Exhibit 24-7)

Type of operation is

1.04

Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity____

Weaving segment speed, S	54.07	mph
Weaving segment density, D	13.35	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	9643	pc/h
Capacity as a 15-minute flow rate, c	8572	pc/h
Capacity as a full-hour volume, ch	8143	pc/h

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	402	2800	a
Average flow rate (pcphpl)	722	2250	b
Volume ratio, VR	0.11	0.20	С
Weaving ratio, R	0.24	N/A	d
Weaving length (ft)	1316	2500	е
Notes.			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

Analyst: CH

Agency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: Midday Peak Freeway/Dir of Travel: I-75 SB

Weaving Location: From JunctionEnt. to Drag.Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF	70 mph
Weaving number of lanes, N	5
Weaving segment length, L	1140 ft
Terrain type	Level
Grade	9
Length	mi
Weaving type	A
Volume ratio, VR	0.12
Weaving ratio, R	0.44

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2260	0	143	172	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	595	0	38	45	v
Trucks and buses	25	0	11	25	양
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	1.000	0.948	0.889	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2676	0	158	203	pc/h

_______Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.35	0.12
Weaving and non-weaving speeds, Si	59.61	68.76
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 0.95
Maximum number of lanes, Nw (max) (Exhibit 24-7) 1.40
Type of operation is Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	67.52	mph
Weaving segment density, D	9.00	pc/mi/ln
Level of service, LOS	A	
Capacity of base condition, cb	10909	pc/h
Capacity as a 15-minute flow rate, c	9697	pc/h
Capacity as a full-hour volume, ch	9212	pc/h

	If		eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	361	2800	a
Average flow rate (pcphpl)	607	2400	b
Volume ratio, VR	0.12	0.20	С
Weaving ratio, R	0.44	N/A	d
Weaving length (ft)	1140	2500	е
Notes.			

- Notes:
- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

CH Analyst:

Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: Midday Peak
Freeway/Dir of Travel: I-75 SB Agency/Co.:

Weaving Location: From Plaza Ent. to Spring.Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

- 6 61 1 077	7.0	1.
Freeway free-flow speed, SFF	70	mph
Weaving number of lanes, N	5	
Weaving segment length, L	1600	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
Volume ratio, VR	0.18	
Weaving ratio, R	0.06	

____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	·V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2396	0	36	492	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	631	0	9	129	v
Trucks and buses	25	0	11	25	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	1.000	0.948	0.889	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2837	0	39	582	pc/h

______Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.34	0.13
Weaving and non-weaving speeds, Si	59.94	68.02
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 1.30
Maximum number of lanes, Nw (max) (Exhibit 24-7) 1.40
Type of operation is Unconstrained

__Weaving Segment Speed, Density, Level of Service and Capacity____

Weaving segment speed, S Weaving segment density, D	66.41	mph pc/mi/ln
Level of service, LOS Capacity of base condition, cb Capacity as a 15-minute flow rate, c	В 11029 9804	pc/h pc/h
Capacity as a full-hour volume, ch	9314	pc/h pc/h

	If Max F		eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	621	2800	a
Average flow rate (pcphpl)	691	2400	b
Volume ratio, VR	0.18	0.20	С
Weaving ratio, R	0.06	N/A	d
Weaving length (ft)	1600	2500	е
Notes:			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

Phone: E-mail: Fax:

_____Operational Analysis_____

Analyst: CH

Agency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15 Analysis Time Period: PM Peak Freeway/Dir of Travel: I-75 SB

Weaving Location: From Amb. Ent. to Clark Exit

Jurisdiction: MDOT
Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF	55	mph
Weaving number of lanes, N	5	
Weaving segment length, L	1316	ft
Terrain type	Level	
Grade		୍
Length		mi
Weaving type	A	
Volume ratio, VR	0.14	
Weaving ratio, R	0.31	

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	5658	0	274	580	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	1489	0	72	153	v
Trucks and buses	9	0	8	22	%
Recreational vehicles	0	0	0	0	양
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.957	1.000	0.962	0.901	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	6223	0	299	677	pc/h

__Weaving and Non-Weaving Speeds______

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.73	0.34
Weaving and non-weaving speeds, Si	40.95	48.59
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

Maximum number of lanes, Nw (max) (Exhibit 24-7)

Type of operation is

1.25

Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	47.39	mph
Weaving segment density, D	30.38	pc/mi/ln
Level of service, LOS	D	
Capacity of base condition, cb	9502	pc/h
Capacity as a 15-minute flow rate, c	9093	pc/h
Capacity as a full-hour volume, ch	8638	pc/h

		If Max Exceeded See Note	
	Analyzed	Maximum	Note
Weaving flow rate, Vw	976	2800	a
Average flow rate (pcphpl)	1439	2250	b
Volume ratio, VR	0.14	0.20	С
Weaving ratio, R	0.31	N/A	d
Weaving length (ft)	1316	2500	е
Notes:			

- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

PTG

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_____Operational Analysis_____

Analyst: CHAgency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15/08 Analysis Time Period: PM Peak

Freeway/Dir of Travel: I-75 SB

Weaving Location: From JunctionEnt. to Drag.Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF 70 mph Weaving number of lanes, N 5 Weaving segment length, L 1140 ft Terrain type Level
Weaving segment length, L 1140 ft
Wedving Begmene Tengen, =
Toylol
Terrain type Level
Grade %
Length mi
Weaving type A
Volume ratio, VR 0.08
Weaving ratio, R 0.36

______Conversion to pc/h Under Base Conditions_____

	Non-Wea	ving	Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	5152	0	149	285	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	1356	0	39	75	v
Trucks and buses	9	0	24	10	
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.957	1.000	0.893	0.952	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	5667	0	175	315	pc/h

Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.63	0.25
Weaving and non-weaving speeds, Si	51.74	62.91
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 0.80
Maximum number of lanes, Nw (max) (Exhibit 24-7) 1.40
Type of operation is Unconstrained

_____Weaving Segment Speed, Density, Level of Service and Capacity_____

Weaving segment speed, S	61.85	mph
Weaving segment density, D	19.91	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	11048	pc/h
Capacity as a 15-minute flow rate, c	10572	pc/h
Capacity as a full-hour volume, ch	10043	pc/h

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	490	2800	a
Average flow rate (pcphpl)	1231	2400	b
Volume ratio, VR	0.08	0.20	С
Weaving ratio, R	0.36	N/A	d
Weaving length (ft)	1140	2500	е
Notos.			

- Notes:
- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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_____Operational Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date Performed: 8/15/08
Analysis Time Period: PM Peak
Freeway/Dir of Travel: I-75 SB

Weaving Location: From Plaza Ent. to Spring.Exit Jurisdiction: MDOT Analysis Year: 2035 Hybrid

Description: Detroit River International Crossing Project

_____Inputs

Freeway free-flow speed,	SFF	70	mph
Weaving number of lanes,	N	5	-
Weaving segment length, I	L	1600	ft
Terrain type		Level	
Grade			90
Length			mi
Weaving type		A	
Volume ratio, VR		0.09	
Weaving ratio, R		0.07	

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	5400	0	37	490	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	1421	0	10	129	v
Trucks and buses	9	0	24	25	90
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.957	1.000	0.893	0.889	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	5940	0	43	580	pc/h

_______Weaving and Non-Weaving Speeds_____

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.53	0.22
Weaving and non-weaving speeds, Si	54.22	63.98
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 0.94
Maximum number of lanes, Nw (max) (Exhibit 24-7) 1.40
Type of operation is Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	62.91	mph
Weaving segment density, D	20.87	pc/mi/ln
Level of service, LOS	С	
Capacity of base condition, cb	11565	pc/h
Capacity as a 15-minute flow rate, c	11067	pc/h
Capacity as a full-hour volume, ch	10514	pc/h

		If Max Exc		
	Analyzed	Maximum	Note	
Weaving flow rate, Vw	623	2800	a	
Average flow rate (pcphpl)	1312	2400	b	
Volume ratio, VR	0.09	0.20	С	
Weaving ratio, R	0.07	N/A	d	
Weaving length (ft)	1600	2500	е	
Notes.				

- Notes:
- a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
- b. Capacity constrained by basic freeway capacity.
- c. Capacity occurs under constrained operating conditions.
- d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
- e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
- g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
- h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
- i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.