2035 No Build 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
Major Diverge	NB I-75 / WB I-96 Diverge	AM	5254	12	-	0.943	1172	12.8	В
		Midday	2409	27	=	0.881	576	6.3	Α
		PM	3254	13	-	0.939	730	8.0	Α
	WB I-96 from WB I-96 (2-1 lane) merge to Gateway on-ramp	AM	1075	20	55	0.909	1245	22.6	С
1-Lane Segment		Midday	671	36	55	0.847	833	15.2	В
		PM	824	24	55	0.893	971	17.7	В
1-Lane Segment	EB I-96 from Gateway off-ramp to SB I-75	AM	773	29	55	0.873	932	16.9	В
		Midday	413	42	55	0.826	526	9.6	Α
		PM	891	10	55	0.952	985	17.9	В

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

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

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

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

Parsons

Phone: E-mail:		Fax:	
	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/2007		
Analysis Time Period:			
Freeway/Direction:	I-75 NB		
From/To:	Clark Exit/Clar	k Ent	
Jurisdiction:	Oldin Bale, Oldi	i diic.	
Analysis Year:	2035 (PAO)		
Description: Detroit		al Crossing Proj	ect
	Flow Inputs and	d Adjustments	
	_		
Volume, V		5173	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	1361	V
Trucks and buses		14	ଚ
Recreational vehicles		0	9
Terrain type:		Level	
Grade		0.00	90
Segment length		0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle P	CE, ER	1.2	
Heavy vehicle adjustme		0.935	
Driver population fact		1.00	
Flow rate, vp	•	1457	pc/h/ln
	Speed Inputs an	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density	crearance	1.00	interchange/mi
Number of lanes, N		4	Theer enange, mi
Free-flow speed:		Measured	
FFS or BFFS		55.0	mi/h
Lane width adjustment,	fT.W	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	menc, in	55.0	
rree-rrow speed, rrs		Urban Freew	mi/h Jay
	LOS and Perform		-
			·
Flow rate, vp		1457	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		26.5	pc/mi/ln
			-

Parsons

Phone: E-mail:		Fax:	
	Operational Ana	alysis	
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Detroit R	I-75 NB Clark Ent/Grand 2035 (PA0) iver Internation	al Crossing Proje	
	Flow Inputs and	d Adjustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles		5469 0.95 1439 14 0	veh/h v %
Terrain type: Grade Segment length Trucks and buses PCE, E Recreational vehicle PC		Level 0.00 0.00 1.5 1.2	% mi
Heavy vehicle adjustmen Driver population facto Flow rate, vp	t, fHV r, fp	0.935 1.00 1232	pc/h/ln
	Speed Inputs a	nd Adjustments	
Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density adj Number of lanes adjustment Free-flow speed, FFS	fLW tment, fLC ustment, fID	12.0 6.0 1.00 5 Measured 55.0 0.0 2.5 0.0 55.0 Urban Freewa	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
	LOS and Perfor	mance Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car s Number of lanes, N Density, D	peed, S	1232 55.0 55.0 5	pc/h/ln mi/h mi/h pc/mi/ln

Parsons

Phone: E-mail:		Fax:	
	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/2007		
Analysis Time Period:			
Freeway/Direction:	I-75 NB		
From/To:	Dearborn Exit/Sp	oringwells Exit	
Jurisdiction:			
Analysis Year:	2035 (PAO)		
Description: Detroit		al Crossing Pro	ject
	Flow Inputs and	d Adjustments	
Volume, V		5019	veh/h
Peak-hour factor, PHF	-	0.95	
Peak 15-min volume, v1	5	1321	V
Trucks and buses		14	00
Recreational vehicles		0	96
Terrain type:		Level	
Grade		0.00	96
Segment length		0.00	mi
Trucks and buses PCE,		1.5	
Recreational vehicle P	-	1.2	
Heavy vehicle adjustme		0.935	
Driver population fact	or, fp	1.00	
Flow rate, vp		1413	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		55.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adju	stment, fLC	0.0	mi/h
Interchange density ad	justment, fID	2.5	mi/h
Number of lanes adjust	ment, fN	1.5	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Free	way
	LOS and Perform	mance Measures	
Flow rate, vp		1413	pc/h/ln
Free-flow speed, FFS		55.0	mi/h
Average passenger-car	speed. S	55.0	mi/h
Number of lanes, N	opeca, s	4	1117 / 11
Density, D		25.7	pc/mi/ln
DOMOTOY, D		2 J • 1	DC/1111

Parsons

Phone: E-mail:		Fax:	
	Operational Ana	alysis	·
Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: Detroit F	I-75 NB Dragoon Ent/Clar 2035 (PAO) River Internations	al Crossing Projec	t
	Flow Inputs and	d Adjustments	
Volume, V Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:	i e	5356 0.95 1409 14 0 Level	veh/h v %
Grade Segment length Trucks and buses PCE, E Recreational vehicle PC Heavy vehicle adjustment Driver population factor	CE, ER nt, fHV	0.00 0.00 1.5 1.2 0.935 1.00	% mi
Flow rate, vp		1508	pc/h/ln
	Speed Inputs ar	nd Adjustments	
Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density adjustment of lanes adjustment	fLW stment, fLC ustment, fID	12.0 6.0 1.00 4 Measured 55.0 0.0 0.0 2.5	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Free-flow speed, FFS		55.0 Urban Freeway	mi/h
	LOS and Perform	nance Measures	
Flow rate, vp Free-flow speed, FFS Average passenger-car s Number of lanes, N Density, D	speed, S	1508 55.0 55.0 4 27.4	pc/h/ln mi/h mi/h pc/mi/ln
		2 / • 3	PC/ 1111

Parsons

Phone: E-mail:		Fax:	
	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	11/26/2007		
Analysis Time Period:			
Freeway/Direction:	I-75 NB		
From/To:	Grand Exit/WB I-	-96 Exit	
Jurisdiction:	GIGHA EXIC, WE I	JO HATE	
Analysis Year:	2035 (PA0)		
Description: Detroit R		al Crossing Projec	ct
	Flow Inputs and	d Adjustments	
Volume, V		5254	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		1383	V
Trucks and buses		12	8
Recreational vehicles		0	8
Terrain type:		Level	
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, E	${f T}$	1.5	
Recreational vehicle PCE, ER		1.2	
Heavy vehicle adjustment, fHV		0.943	
Driver population facto	r, fp	1.00	
Flow rate, vp		1172	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	_
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	0.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freeway	7
	LOS and Perform	nance Measures	
Flow rate, vp		1172	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		21.3	pc/mi/ln

Parsons

Phone: E-mail:		Fax:	
	Operational Ana	alysis	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/2007		
Analysis Time Period:	AM Peak		
Freeway/Direction:	I-75 NB		
From/To:	Livernois Exit/	Oragoon Ent.	
Jurisdiction:			
Analysis Year:			
Description: Detroit	River Internation	al Crossing Proje	ect
	Flow Inputs and	d Adjustments	
Volume, V		5177	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	1362	V
Trucks and buses		14	90
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 adjustme		0.935	
Driver population fact	or, ip	1.00	42. 42
Flow rate, vp		1458	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		4	
Free-flow speed:		Measured	
FFS or BFFS	5 m m	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, in	1.5 55.0	mi/h
Free-flow speed, FFS		Urban Freewa	mi/h ay
	LOS and Perform		-
		 -	/2 /2
Flow rate, vp		1458	pc/h/ln
Free-flow speed, FFS	amand C	55.0	mi/h
Average passenger-car	speed, S	55.0	mi/h
Number of lanes, N Density, D		4 26.5	pc/mi/ln
Delibred, D		20.5	PC/ III / TII

Fax: Phone: E-mail: Operational Analysis Analyst: СН Agency or Company: PARSONS
Date Performed: 8/152007
Analysis Time Period: AM Peak
Freeway/Direction: I-75 NB
From/To: Springwells Ent/Livernois Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ veh/h Volume, V 5316 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 1399 V 14 Trucks and buses Recreational vehicles Level Terrain type: 0.00 Grade 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 1497 pc/h/ln Flow rate, vp _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: mi/h FFS or BFFS 55.0 0.0 mi/h Lane width adjustment, fLW Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h 1.5 mi/h Number of lanes adjustment, fN 55.0 Free-flow speed, FFS mi/h Urban Freeway _____LOS and Performance Measures_____ pc/h/ln 1497 Flow rate, vp Free-flow speed, FFS mi/h mi/h 55.0 Average passenger-car speed, S 55.0 Number of lanes, N

27.2

Density, D

pc/mi/ln

Phone: Fax: E-mail: Operational Analysis Analyst: CHAgency or Company: PARSONS
Date Performed: 8/15/2007 Date Performed: 0,10,10
Analysis Time Period: AM Peak
Freeway/Direction: I-75 NB
From/To: Springwells Exit/Spring. Ent. From/To:
Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V veh/h 4762 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1253 Trucks and buses 14 0 Recreational vehicles Level Terrain type: 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 0.935 Driver population factor, fp 1.00 Flow rate, vp 1341 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width ft Right-shoulder lateral clearance 6.0 interchange/mi 1.00 Interchange density Number of lanes, N Free-flow speed: Measured mi/h mi/h 55.0 FFS or BFFS Lane width adjustment, fLW 0.0 0.0 mi/h
2.5 mi/h
1.5 mi/h
55.0 mi/h Lateral clearance adjustment, fLC Interchange density adjustment, fID 0.0 2.5 Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ pc/h/ln Flow rate, vp 1341 Free-flow speed, FFS mi/h mi/h 55.0 Average passenger-car speed, S 55.0 Number of lanes, N

24.4

pc/mi/ln

Density, D

PTG

26777 Central Park Blvd Southfield, MI 48076

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

E-mail: catherine.hartner@parsons.com

Operational Analy	ysis
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Analyst: CHAgency or Company: PARSONS
Date Performed: 11/17/08 11/17/08 Analysis Time Period: AM Peak
Freeway/Direction: I-75 NB
Erom/To:

From/To: I-96 WB Exit/I-75 NB S.D. Exit

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River Internationa	l Crossing Project	
Flow Inputs and	Adjustments	
Volume, V	4179	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1100	V
Trucks and buses	10	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	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1155	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 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 Perform	ance Measures	
Flow rate, vp	1155	pc/h/ln

55.0

55.0

21.0

mi/h

mi/h

pc/mi/ln

PTG

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

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Operational Analy	ysis
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: AM Peak
Freeway/Direction: I-75 NB

From/To: I-75 NB S.D. Exit/Amb. Ent.

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Flow Inputs and	d Adjustments	
Volume, V	4179	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1100	V
Trucks and buses	10	%
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	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1540	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	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 Freewa	ay
LOS and Perform	mance Measures	
LOS and Perform	mance Measures	pc/h/ln

55.0

55.0

28.0

mi/h

mi/h

pc/mi/ln

PTG

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

E-mail: catherine.hartner@parsons.com

Operational	Analysis
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: AM Peak
Freeway/Direction: I-75 NB

From/To: Amb. Ent./C-D Road Exit

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

Flow Inputs and	d Adjustments	
Volume, V	4932	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1298	V
Trucks and buses	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, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1808	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 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 Freewa	ay
LOS and Perform	mance Measures	
Flow rate, vp	1808	pc/h/ln

55.0

55.0

32.9

mi/h

mi/h

pc/mi/ln

Phone: Fax: E-mail: Operational Analysis_____ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Clark Exit/Clark Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V 2690 veh/h 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 708 V 25 Trucks and buses Recreational vehicles Terrain type: Level 응 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 796 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft 6.0 ft 1.00 interchange/mi Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h 2.5 1.5 Interchange density adjustment, fID mi/h mi/h Number of lanes adjustment, fN 55.0 Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures_____ pc/h/ln Flow rate, vp 796 Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0

4

14.5

pc/mi/ln

Number of lanes, N

Density, D

Fax:

Phone:

E-mail:		rax.			
	Operational Ana	alysis			
Amp large	CII				
Analyst:	CH				
Agency or Company:	PARSONS				
Date Performed: Analysis Time Period:	11/26/2007				
Freeway/Direction:					
From/To:	I-75 NB Clark Ent/Grand Exit				
Jurisdiction:	Clark Ent/Grand Exit				
Analysis Year:	2035 (PAO)				
Description: Detroit R		al Crossing Project	t		
	Flow Inputs and	d Adjustments			
Volume, V		3004	veh/h		
Peak-hour factor, PHF		0.95			
Peak 15-min volume, v15)	791	V		
Trucks and buses		25	%		
Recreational vehicles		0	%		
Terrain type:		Level			
Grade		0.00	8		
Segment length		0.00	mi		
Trucks and buses PCE, E		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 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		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 adjustm	nent, fN	0.0	mi/h		
Free-flow speed, FFS		55.0	mi/h		
	• .	Urban Freeway			
	LOS and Perform	mance Measures			
Flow rate, vp		711	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		12.9	pc/mi/ln		

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax: E-mail: Operational Analysis Analyst: CHAgency or Company: PARSONS
Date Performed: 8/15/2007 Date Performed:
Analysis Time Period:
Midday Peak
Freeway/Direction:
From/To:
Dearborn Exit/Springwells Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ veh/h Volume, V 2522 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 664 7.7 25 Trucks and buses Recreational vehicles Terrain type: Level မွ Grade 0.00 0.00 Segment length тi 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 747 pc/h/ln _____Speed Inputs and Adjustments_____ ft 12.0 Lane width 6.0 ft Right-shoulder lateral clearance 6.0 1.00 interchange/mi Interchange density Number of lanes, N Free-flow speed: Measured FFS or BFFS mi/h 55.0 Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 mi/h mi/h Number of lanes adjustment, fN 1.5 55.0 Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures_____ Flow rate, vp 747 pc/h/ln Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0

13.6

pc/mi/ln

Number of lanes, N

Density, D

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007 Date Performed: 0,10,212
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Dragoon Ent/Clark Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ veh/h Volume, V 2788 Peak-hour factor, PHF 0.95 75 -25 Peak 15-min volume, v15 734 V Trucks and buses Recreational vehicles 왕 Level Terrain type: % 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 825 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: 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 1.5 mi/h Number of lanes adjustment, fN mi/h mi/h 1.5 55.0 Free-flow speed, FFS Urban Freeway _____LOS and Performance Measures_____ pc/h/ln Flow rate, vp 825 Free-flow speed, FFS mi/h mi/h 55.0 Average passenger-car speed, S 55.0 Number of lanes, N 4 .

15.0

pc/mi/ln

Density, D

Phone: E-mail:		Fax:					
Operational Analysis							
Analyst:	CH						
Agency or Company:	PARSONS						
Date Performed:	11/26/2007						
Analysis Time Period:	-						
Freeway/Direction:							
From/To: Jurisdiction:	Grand Exit/WB I-96 Exit						
Analysis Year:	2025 (D30)						
-		l Crossing Project	¬+				
Description: Detroit River International Crossing Project							
Flow Inputs and Adjustments							
Volume, V		2409	veh/h				
Peak-hour factor, PHF		0.95					
Peak 15-min volume, v15		634	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, ET		1.5					
Recreational vehicle PCE, ER		1.2					
Heavy vehicle adjustment, fHV		0.889					
Driver population factor Flow rate, vp	r, rp	1.00 571	pc/h/ln				
riow race, vp		J / I	pc/11/111				
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 adjus		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 Urban Freeway	mi/h ⁄				
	TOG		•				
LOS and Performance Measures							
Flow rate, vp		571	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		10.4	pc/mi/ln				

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Livernois Exit/Dragoon Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ veh/h Volume, V 2577 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 678 V 25 Trucks and buses Recreational vehicles Terrain type: Level Grade 0.00 Segment length 0.00 тi 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 763 pc/h/ln ______Speed Inputs and Adjustments_____ 12.0 ft Lane width ft interchange/mi 6.0 Right-shoulder lateral clearance 1.00 Interchange density Number of lanes, N Free-flow speed: Measured 55.0 FFS or BFFS mi/h 0.0 Lane width adjustment, fLW mi/h Lateral clearance adjustment, fLC 0.0 mi/h 2.5 1.5 Interchange density adjustment, fID mi/h Number of lanes adjustment, fN mi/h 1.5 55.0 Free-flow speed, FFS mi/h Urban Freeway _____LOS and Performance Measures_____ pc/h/ln Flow rate, vp 763 mi/h Free-flow speed, FFS 55.0 mi/h 55.0 Average passenger-car speed, S

4

13.9

pc/mi/ln

Number of lanes, N

Density, D

Phone: Fax: E-mail: ____Operational Analysis_____ Analyst: CH Analyst:
Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Springwells Ent/Livernois Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ 2701 veh/h Volume, V Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 711 V 25 Trucks and buses Recreational vehicles Level Terrain type: 0.00 Grade Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.889 Driver population factor, fp 1.00 800 Flow rate, vp pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N 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_____ Flow rate, vp 800 pc/h/ln mi/h mi/h Free-flow speed, FFS 55.0 55.0 Average passenger-car speed, S

4

14.5

pc/mi/ln

Number of lanes, N

Density, D

Phone: Fax: E-mail: Operational Analysis_____ Analyst: СН Analyst:
Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB
From/To: Springwells Exit/Spring. Ent. Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ veh/h Volume, V 2349 Peak-hour factor, PHF 0.95 618 Peak 15-min volume, v15 V 25 Trucks and buses Recreational vehicles Level Terrain type: Grade 0.00 읒 Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.889 Driver population factor, fp 1.00 695 Flow rate, vp pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft 6.0 ft 1.00 interchange/mi Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: Measured 55.0 FFS or BFFS 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 695 Flow rate, vp pc/h/ln mi/h mi/h Free-flow speed, FFS 55.0 Average passenger-car speed, S 55.0

4

12.6

pc/mi/ln

Number of lanes, N

Density, D

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E-mail: catherine.hartner@parsons.com

Operational	Analysis
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB

From/To: I-96 WB Exit/I-75 NB S.D. Exit

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Flow Inputs	and Adjustments	
Volume, V	1738	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	457	V
Trucks and buses	23	%
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	0.897	
Driver population factor, fp	1.00	
Flow rate, vp	510	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 Free	way
LOS and Perf	ormance Measures_	
Flow rate wn	510	nc/h/ln

Flow rate, vp	510	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	9.3	pc/mi/ln	

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Operational	Analysis
	•

Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 NB

From/To: I-75 NB S.D. Exit/Amb. Ent.

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River Internationa	al Crossing Projec	ct
Flow Inputs and	d Adjustments	
Volume, V	1738	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	457	V
Trucks and buses	23	%
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	0.897	
Driver population factor, fp	1.00	
Flow rate, vp	680	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	
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 Freeway	Y
LOS and Perform	mance Measures	
Flow rate, vp	680	pc/h/ln
		±

55.0

55.0

12.4

3

mi/h

mi/h

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Operational Analysis		Operational	Analysis	_
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Analyst: CHAgency or Company: PARSONS
Date Performed: 11/17/08 Analysis Time Period: Midday Peak Freeway/Direction: I-75 NB

From/To: Amb. Ent./C-D Road Exit

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

Description: Detroit River Internation	al Crossing Proj	iect
Flow Inputs an	d Adjustments	
Volume, V	1912	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	503	V
Trucks and buses	21	%
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	0.905	
Driver population factor, fp	1.00	
Flow rate, vp	741	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 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 Perfor	mance Measures	
Flow rate, vp	741	pc/h/ln
Date flow and DDC	F	- 1 /1-

55.0

55.0

13.5

mi/h

mi/h

Phone: Fax: E-mail: Operational Analysis_____ Analyst: СН Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: PM Peak
Freeway/Direction: I-75 NB
From/To: Clark Exit/Clark Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project Flow Inputs and Adjustments______ veh/h Volume, V 3481 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 916 v 23 Trucks and buses Recreational vehicles Level Terrain type: Grade 0.00 Segment length 0.00 Мi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.897 Driver population factor, fp 1.00 Flow rate, vp 1021 pc/h/ln _____Speed Inputs and Adjustments_____ ft 12.0 Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: FFS or BFFS 55.0 mi/h Lane width adjustment, fLW 0.0 mi/h 0.0 mi/h
2.5 mi/h
1.5 mi/h
55.0 mi/h Lateral clearance adjustment, fLC Interchange density adjustment, fID 0.0 2.5 Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ pc/h/ln 1021 Flow rate, vp Free-flow speed, FFS mi/h mi/h 55.0 Average passenger-car speed, S 55.0 Number of lanes, N 4

18.6

Density, D

Phone: E-mail:		Fax:	
	Operational Ana	alysis	
7 T	CIT		
Analyst:	CH		
Agency or Company: Date Performed:	PARSONS		
Analysis Time Period:	11/26/2007		
Freeway/Direction:	I-75 NB		
From/To:	Clark Ent/Grand	₽vi+	
Jurisdiction:	Clark Ent/Grand	EXIC	
Analysis Year:	2035 (PA0)		
Description: Detroit		al Crossing Projec	et
	Flow Inputs and	d Adjustments	
Volume, V		3923	veh/h
Peak-hour factor, PHF		0.95	veii/ii
Peak 15-min volume, v1	5	1032	V
Trucks and buses	<u>J</u>	22	& &
Recreational vehicles		0	8
Terrain type:		Level	O .
Grade		0.00	o _o
Segment length	t.	0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme		0.901	
Driver population fact		1.00	
Flow rate, vp		917	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	
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	justment, fID	2.5	mi/h
Number of lanes adjust	ment, fN	0.0	mi/h
Free-flow speed, FFS		55.0	mi/h
		Urban Freeway	7
	LOS and Perform	nance Measures	
Flow rate, vp		917	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		16.7	pc/mi/ln

Phone: E-mail:		Fax:	
_ 	Oporational Ana	alysis	
	operacional And	11 4 2 1 2	
Analyst:	СН		
Agency or Company:	PARSONS		
Date Performed:	8/15/2007		
Analysis Time Period:			
Freeway/Direction:	I-75 NB		
From/To:	Dearborn Exit/Sp	pringwells Exit	
Jurisdiction:	2025 / D701		
Analysis Year: Description: Detroit F		al Crossing Project	=
Description: Detroit i	(Ivel incelnation	ar crossing rrojec	
	Flow Inputs and	d Adjustments	
Volume, V		3069	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		808	V
Trucks and buses		25	00
Recreational vehicles		0	ଚ
Terrain type:		Level	
Grade		0.00	9
Segment length		0.00	mi
Trucks and buses PCE, I		1.5	
Recreational vehicle Po		1.2	
Heavy vehicle adjustmen		0.889	
Driver population factor	or, ip	1.00 909	pc/h/ln
Flow rate, vp		909	pc/11/111
	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,		0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad		2.5 1.5	mi/h mi/h
Number of lanes adjust:	ment, in	55.0	mi/h
Free-flow speed, FFS		Urban Freeway	
	LOS and Perfor	mance Measures	
Flow rate, vp		909	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	nc/mi/ln
Density, D		16.5	pc/mi/ln

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: Analyst:
Agency or Company:
Date Performed:
Analysis Time Period:
Freeway/Direction:
From/To:

PARSONS
8/15/2007
PM Peak
Freeway/Direction:
I-75 NB
Dragoon Ent/Clark Exit Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project Flow Inputs and Adjustments______ Volume, V 3582 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 943 v 23 0 Trucks and buses Recreational vehicles Level Terrain type: Grade 0.00 0.00 Segment length mί Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.897 Driver population factor, fp 1.00 Flow rate, vp 1051 pc/h/ln Speed Inputs and Adjustments_____ ft 12.0 Lane width ft interchange/mi 6.0 Right-shoulder lateral clearance 1.00 Interchange density Number of lanes, N Free-flow speed: Measured mi/h mi/h 55.0 FFS or BFFS Lane width adjustment, fLW 0.0 Lateral clearance adjustment, fLC Interchange density adjustment, fID mi/h mi/h mi/h 0.0 2.5 Number of lanes adjustment, fN 1.5 1.5 55.0 Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures_____ pc/h/ln Flow rate, vp 1051 mi/h mi/h Free-flow speed, FFS 55.0 Average passenger-car speed, S 55.0 4 Number of lanes, N

19.1

pc/mi/ln

Density, D

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: CH Agency or Company: PARSONS Date Performed: 11/26/2007 Analysis Time Period: PM Peak Freeway/Direction: I-75 NB From/To: Grand Exit/WB I-96 Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments____ Volume, V 3254 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 856 Trucks and buses 13 용 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 0.939 Driver population factor, fp 1.00 Flow rate, vp 730 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 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 730 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 13.3 pc/mi/ln

Phone: Fax: E-mail: Operational Analysis_____ СН Analyst: Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: PM Peak
Freeway/Direction: I-75 NB
From/To: Livernois Exit/Dragoon Ent. Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ 3144 veh/h Volume, V 0.95 Peak-hour factor, PHF 827 V Peak 15-min volume, v15 82 24 Trucks and buses Recreational vehicles 0 Level Terrain type: 0.00 Grade 응 0.00 Segment length Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.893 Driver population factor, fp 1.00 927 pc/h/ln Flow rate, vp _____Speed Inputs and Adjustments_____ ft Lane width 12.0 ft interchange/mi 6.0 Right-shoulder lateral clearance 1.00 Interchange density Number of lanes, N Free-flow speed: Measured 55.0 mi/h FFS or BFFS 0.0 mi/h Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID mi/h mi/h mi/h 0.0 2.5 Number of lanes adjustment, fN 1.5 55.0 Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures_____ 927 pc/h/ln Flow rate, vp mi/h mi/h 55.0 Free-flow speed, FFS 55.0 Average passenger-car speed, S Number of lanes, N 4

16.9

Density, D

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: PM Peak
Freeway/Direction: I-75 NB
From/To: Springwell From/To: Springwells Ent/Livernois Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ veh/h Volume, V 3284 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 80 23 864 Trucks and buses Recreational vehicles Level Terrain type: 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 0.897 Driver population factor, fp 1.00 Flow rate, vp 964 pc/h/ln ______Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 1.00 ft Right-shoulder lateral clearance interchange/mi Interchange density Number of lanes, N Free-flow speed: Measured 55.0 FFS or BFFS mi/h 0.0 Lane width adjustment, fLW mi/h Lateral clearance adjustment, fLC 0.0 mi/h 2.5 1.5 55.0 Interchange density adjustment, fID mi/h Number of lanes adjustment, fN mi/h Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures_____ pc/h/ln Flow rate, vp 964 mi/h mi/h Free-flow speed, FFS 55.0 55.0 Average passenger-car speed, S Number of lanes, N 4

17.5

Density, D

Phone: Fax: E-mail: ____Operational Analysis_____ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: PM Peak
Freeway/Direction: I-75 NB
From/To: Springwells Exit/Spring. Ent. Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project Flow Inputs and Adjustments_____ Volume, V 2868 veh/h 0.95 Peak-hour factor, PHF 755 Peak 15-min volume, v15 V 25 Trucks and buses 0 Recreational vehicles Terrain type: Level 0.00 Grade Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.889 Driver population factor, fp 1.00 849 pc/h/ln Flow rate, vp Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft Right-shoulder lateral clearance interchange/mi 1.00 Interchange density Number of lanes, N Free-flow speed: Measured 55.0 mi/h FFS or BFFS 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 Number of lanes adjustment, fN mi/h 55.0 Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures_____ pc/h/ln Flow rate, vp 849 55.0 mi/h mi/h Free-flow speed, FFS 55.0 Average passenger-car speed, S Number of lanes, N 4

15.4

Density, D

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Operational Analy	ysis
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Analyst: СН Agency or Company: PARSONS Date Performed: 11/17/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 NB

From/To: I-96 WB Exit/I-75 NB S.D. Exit

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Flow Inputs and	d Adjustments	
Volume, V	2430	veh/h
Peak-hour factor, PHF	0.95	veii/ii
Peak 15-min volume, v15	639	V
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	6
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	шт
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	668	pc/h/ln
riow race, vp	000	PC/11/111
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 adjustment, fLC	0.0	mi/h
	2.5	mi/h
Interchange density adjustment, fID		1 /1-
	1.5	mi/h
Number of lanes adjustment, fN	1.5 55.0	mi/n mi/h
Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS		mi/h
Number of lanes adjustment, fN Free-flow speed, FFS	55.0 Urban Free	mi/h way
Number of lanes adjustment, fN	55.0 Urban Free	mi/h way

Flow rate, vp	668	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	12.1	pc/mi/ln

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Operational Analy	ysis
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: PM Peak
Freeway/Direction: I-75 NB

From/To: I-75 NB S.D. Exit/Amb. Ent.

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Flow Inputs a	nd Adjustments	
Volume, V	2430	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	639	V
Trucks and buses	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, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	891	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
Jumber 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 Free	way
LOS and Perfo	rmance Measures_	

Flow rate, vp	891	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
Density, D 16.2 pc/mi/ln

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Operational	Analysis
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Analyst: СН Agency or Company: PARSONS
Date Performed: 11/17/08 11/17/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 NB

From/To: Amb. Ent./C-D Road Exit

MDOT Jurisdiction:

Analysis Year: 2035 No Build

Flow Inputs an	d Adjustments	
Volume, V	2617	veh/h
Peak-hour factor, PHF	0.95	·
Peak 15-min volume, v15	689	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	955	pc/h/ln
Speed Inputs a	nd Adjustments_	
Lane width	12.0	ft
Lane width Right-shoulder lateral clearance	12.0 6.0	ft ft
Right-shoulder lateral clearance	6.0	ft
Right-shoulder lateral clearance Interchange density	6.0	ft
Right-shoulder lateral clearance Interchange density Number of lanes, N	6.0 1.00 3	ft
Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed:	6.0 1.00 3 Measured	ft interchange/mi
Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS	6.0 1.00 3 Measured 55.0	ft interchange/mi mi/h
Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW	6.0 1.00 3 Measured 55.0 0.0	ft interchange/mi mi/h mi/h
Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC	6.0 1.00 3 Measured 55.0 0.0	ft interchange/mi mi/h mi/h mi/h
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	6.0 1.00 3 Measured 55.0 0.0 0.0	ft interchange/mi mi/h mi/h mi/h mi/h
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	6.0 1.00 3 Measured 55.0 0.0 0.0 2.5	ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
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	6.0 1.00 3 Measured 55.0 0.0 2.5 3.0 55.0	ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h

Flow rate, vp	955	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	
Density, D	17.4	pc/mi/ln

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Operational Analysis

Analyst: CH Agency or Company: PARSONS Date Performed: 11/17/08 Analysis Time Period: AM Peak Freeway/Direction: I-75 SB

From/To: C-D Road Ent. / Amb. Exit

MDOT Jurisdiction:

Analysis Year: 2035 No Build

Flow Inputs a	nd Adjustments	
Volume, V	2423	veh/h
Peak-hour factor, PHF	0.95	·
Peak 15-min volume, v15	638	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	884	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	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 Free	way
LOS and Perfo	rmance Measures_	

Flow rate, vp	884	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	
Density, D	16.1	pc/mi/ln

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Operational Analy	ysis
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Analyst: СН PARSONS Agency or Company: Date Performed: 11/17/08 Analysis Time Period: AM Peak Freeway/Direction: I-75 SB

From/To: Amb. Exit / EB I-96 Ent.

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Flow Inputs an	d Adjustments	
Volume, V	2309	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	608	V
Trucks and buses	7	%
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	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	839	pc/h/ln
	039	pc/11/111
· -	and Adjustments	pe/11/111
Speed Inputs a		ft
Speed Inputs a	and Adjustments	
Speed Inputs a Lane width Right-shoulder lateral clearance	and Adjustments	ft
Speed Inputs a Sane width Right-shoulder lateral clearance Interchange density	and Adjustments 12.0 6.0	ft ft
Speed Inputs a Sane width Right-shoulder lateral clearance Interchange density	and Adjustments 12.0 6.0 1.00	ft ft
Speed Inputs a Sane width Right-shoulder lateral clearance Interchange density	12.0 6.0 1.00 3	ft ft
Speed Inputs a Speed Inputs a Sight-shoulder lateral clearance Interchange density Sumber of lanes, N Free-flow speed: FFS or BFFS	12.0 6.0 1.00 3 Measured	ft ft interchange/mi
Speed Inputs a Speed Inputs a Speed Inputs a Sight-shoulder lateral clearance Interchange density Number of lanes, Number of lanes, Number of BFFS or BFFS Sane width adjustment, fLW	12.0 6.0 1.00 3 Measured 55.0	ft ft interchange/mi mi/h
Speed Inputs a Lane width Right-shoulder lateral clearance Interchange density Number of lanes, Number of lanes, Number of BFFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC	12.0 6.0 1.00 3 Measured 55.0 0.0	ft ft interchange/mi mi/h mi/h
Speed Inputs a 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	12.0 6.0 1.00 3 Measured 55.0 0.0	ft ft interchange/mi mi/h mi/h mi/h
Speed Inputs a Cane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Cane width adjustment, fLW Cateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN	12.0 6.0 1.00 3 Measured 55.0 0.0 0.0	ft ft interchange/mi mi/h mi/h mi/h mi/h
Speed Inputs a Cane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Cane width adjustment, fLW Cateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN	12.0 6.0 1.00 3 Measured 55.0 0.0 0.0 2.5 3.0	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
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	12.0 6.0 1.00 3 Measured 55.0 0.0 0.0 2.5 3.0 55.0	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h

55.0

55.0

15.3

mi/h

mi/h

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Operational Analysis

Analyst: СН Agency or Company: PARSONS Date Performed: 11/17/08 Analysis Time Period: AM Peak Freeway/Direction: I-75 SB

From/To: EB I-96 Ent. / Amb. Ent.

Jurisdiction: MDOT

Analysis Year: 2035 No Build Description: Detroit River International Crossing Project Flow Inputs and Adjustments				
Peak-hour factor, PHF	0.95			
Peak 15-min volume, v15	811	V		
Trucks and buses	13	%		
Recreational vehicles	0	8		
Terrain type:	Level			
Grade	0.00	%		
Segment length	0.00	mi		
Frucks 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	864	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 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 Freew	vay		
LOS and Perform	nance Measures			

LOS and		Measures
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Flow rate, vp	864	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	15.7	pc/mi/ln

Phone: Fax: E-mail: Operational Analysis_____ Analyst: СН Agency or Company: PARSONS
Date Performed: 8/15/2007 Analysis Time Period: AM Peak
Freeway/Direction: I-75 SB
From/To: Clark Exit/Clark Ent. Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ 3274 veh/h Volume, V Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 862 V Trucks and buses 17 Recreational vehicles 0 Level Terrain type: 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 pc/h/ln Flow rate, vp 935 Speed Inputs and Adjustments_____ 12.0 ft Lane width Right-shoulder lateral clearance 6.0 ft interchange/mi 1.00 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 mi/h 0.0 Interchange density adjustment, fID 2.5 mi/h Number of lanes adjustment, fN 1.5 mi/h 1.5 mi/n 55.0 mi/h Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ Flow rate, vp 935 pc/h/ln Free-flow speed, FFS 55.0 mi/h Average passenger-car speed, S 55.0 mi/h

4

17.0

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: СН Agency or Company: PARSONS
Date Performed: 8/15/2007 Analysis Time Period: AM Peak
Freeway/Direction: I-75 SB
From/To: Clark Ent/Dragoon Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V veh/h 3335 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 878 v Trucks and buses 17 Recreational vehicles Terrain type: Level Grade 0.00 Segment length 0.00 Мi 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 952 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 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 mi/h 55.0 mi/h Number of lanes adjustment, fN 1.5 Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ Flow rate, vp 952 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

17.3

pc/mi/ln

Fax: Phone: E-mail: Operational Analysis______ CH Analyst: Agency or Company: PARSONS
Date Performed: 8/15/2007 Analysis Time Period: AM Peak Freeway/Direction: I-75 SB From/To: Dragoon Exit/Livernois Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V 3086 veh/h 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 812 V 18 Trucks and buses 0 Recreational vehicles Terrain type: Level 0.00 Grade Segment length 0.00 шi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.917 Driver population factor, fp 1.00 Flow rate, vp 885 pc/h/ln Speed Inputs and Adjustments_____ 12.0 ft 6.0 ft 1.00 interchange/mi Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N 4 Free-flow speed: Measured mi/h FFS or BFFS 55.0 mi/h mi/h mi/h mi/h Lane width adjustment, fLW 0.0 Lateral clearance adjustment, fLC Interchange density adjustment, fID 0.0 2.5 Number of lanes adjustment, fN 1.5 55.0 mi/h Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ pc/h/ln Flow rate, vp 885 55.0 Free-flow speed, FFS mi/h mi/h Average passenger-car speed, S 55.0 Number of lanes, N 4 16.1 pc/mi/ln Density, D

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: Analyst: CH
Agency or Company: PARSONS
Date Performed: 8/15/2007 Analysis Time Period: AM Peak
Freeway/Direction: I-75 SB
From/To: EB I-96 Ent/Grand Ent.
Jurisdiction: Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ 3695 Volume, V veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 972 15 Trucks and buses Recreational vehicles Terrain type: Level 0.00 Grade Segment length 0.00 mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 Flow rate, vp 1045 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft 6.0 ft 1.00 interchange/mi 12.0 ft Lane width 6.0 Right-shoulder lateral clearance Interchange density
Number of lanes, N 4 Free-flow speed: Measured mi/h FFS or BFFS 55.0 Lane width adjustment, fLW 0.0 mi/h mi/h Lateral clearance adjustment, fLC 0.0 2.5 mi/h
1.5 mi/h
55.0 mi/h Interchange density adjustment, fID 2.5 1.5 Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway ___LOS and Performance Measures_____ pc/h/ln Flow rate, vp 1045 mi/h Free-flow speed, FFS 55.0 Average passenger-car speed, S 55.0 mi/h Number of lanes, N Density, D pc/mi/ln 19.0

Fax: Phone: E-mail: Operational Analysis_____ Analyst: CH
Agency or Company: PARSONS
Date Performed: 8/15/2007 Analysis Time Period: AM Peak
Freeway/Direction: I-75 SB
From/To: Ent N. of Grand/Clark Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project Flow Inputs and Adjustments 3725 Volume, V veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 980 V 15 Trucks and buses Recreational vehicles 0 음 Terrain type: Level Grade 0.00 읒 0.00 Segment length Мi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 pc/h/ln 1054 Flow rate, vp ______Speed Inputs and Adjustments_____ 12.0 ft 6.0 ft 1.00 interchange/mi 12.0 ft Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N 4 Free-flow speed: Measured FFS or BFFS 55.0 mi/h mi/h Lane width adjustment, fLW 0.0 0.0 mi/h
0.0 mi/h
2.5 mi/h
1.5 mi/h
55.0 mi/h Lateral clearance adjustment, fLC 0.0 2.5 1.5 Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ 1054 Flow rate, vp pc/h/ln Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0

4

19.2 pc/mi/ln

Number of lanes, N

Phone: E-mail:		Fax:	
	Operational Ana	alysis	
Analyst:	CH		
Agency or Company: Date Performed:	PARSONS		
Analysis Time Period:	8/15/2007		
Freeway/Direction:	I-75 SB		
From/To:	Livernois Ent/Sp	oringwells Exit	
Jurisdiction:			
Analysis Year:	2035 (PAO)		
Description: Detroit	River Internation	al Crossing Proj	ject
	Flow Inputs and	d Adjustments	
Volume, V		3208	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v1	5	844	V
Trucks and buses		17	96
Recreational vehicles		0	%
Terrain type:		Level	_
Grade		0.00	9
Segment length	n m	0.00	mi
Trucks and buses PCE,		1.5 1.2	
Recreational vehicle Post Heavy vehicle adjustment	·	0.922	
Driver population fact		1.00	
Flow rate, vp	V-/ -P	916	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,		0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad	-	2.5	mi/h
Number of lanes adjusts	ment, in	1.5 55.0	mi/h
Free-flow speed, FFS		Urban Freev	mi/h way
	LOS and Perform	mance Measures	
Flow rate was	••	016	ng/h/ln
Flow rate, vp Free-flow speed, FFS		916 55.0	pc/h/ln mi/h
Average passenger-car	speed. S	55.0	mi/h
Number of lanes, N	-F-00%, D	4	411-4-7-4-4
Density, D		16.7	pc/mi/ln

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: Analyst: CH
Agency or Company: PARSONS
Date Performed: 8/15/2007 Analysis Time Period: AM Peak
Freeway/Direction: I-75 SB
From/To: Springwells Exit/Spring. Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ 2608 Volume, V veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 686 Trucks and buses 22 Recreational vehicles 0 Terrain type: Level Grade 0.00 Segment length 0.00 Мi 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 762 pc/h/ln _____Speed Inputs and Adjustments____ 12.0 ft Lane width Right-shoulder ____ Interchange density of lanes, N Right-shoulder lateral clearance 6.0 ft ft interchange/mi 1.00 4 Free-flow speed: Measured FFS or BFFS mi/h 55.0 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 mi/h 55.0 mi/h Number of lanes adjustment, fN 1.5 Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ Flow rate, vp 762 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

13.9

pc/mi/ln

HCS+: Basic Freeway Segments Release 5.2

Fax: Phone: E-mail: _____Operational Analysis_____ Analyst: CH
Agency or Company: PARSONS
Date Performed: 8/15/2007 Analyst: CHAnalysis Time Period: AM Peak
Freeway/Direction: I-75 SB
From/To: Springwells Ent/Dearborn Ent.
Turisdiction: Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_ Volume, V 2812 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 740 v 20 Trucks and buses 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 0.909 Driver population factor, fp 1.00 Flow rate, vp 814 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft 6.0 ft 1.00 interchange/mi Lane width Right-shoulder lateral clearance 6.0 Interchange density
Number of lanes, N 4 Free-flow speed: Measured mi/h FFS or BFFS 55.0 0.0 mi/h
0.0 mi/h
2.5 mi/h
1.5 mi/h
55.0 mi/h Lane width adjustment, fLW 0.0 Lateral clearance adjustment, fLC 0.0 Lateral clearance adjustment, fLC Interchange density adjustment, fID 2.5 Number of lanes adjustment, fN 1.5 Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ Flow rate, vp 814 pc/h/ln Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0 Number of lanes, N 4 Density, D 14.8 pc/mi/ln

PTG

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Operational	Analysis
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB

From/To: C-D Road Ent. / Amb. Exit

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Flow Inputs and	d Adjustments	
Trade and Tr	25.61	ala /la
Volume, V	2561	veh/h
Peak-hour factor, PHF	0.95 674	
Peak 15-min volume, v15	19	V %
Trucks and buses		
Recreational vehicles	0	%
Terrain type:	Level	8
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	0.913	
Driver population factor, fp	1.00	(1 (7
Flow rate, vp	984	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	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
	2 0	mi/h
Number of lanes adjustment, fN	3.0	/
	55.0	mi/h
Number of lanes adjustment, fN		mi/h
Number of lanes adjustment, fN Free-flow speed, FFS	55.0	mi/h ay
Number of lanes adjustment, fN Free-flow speed, FFS	55.0 Urban Freew	mi/h ay

55.0

55.0

17.9

mi/h

mi/h

pc/mi/ln

PTG

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Operational Analysis	O ₇	perational	Analysis	
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Analyst: СН Date Performed: 11/17/00 11/17/08 Analysis Time Period: Midday Peak Freeway/Direction: I-75 SB

From/To: Amb. Exit / EB I-96 Ent.

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River International	l Crossing Project	
Flow Inputs and	Adjustments	
Volume, V	2167	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	570	V
Trucks and buses	21	४
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	0.905	
Driver population factor, fp	1.00	
Flow rate, vp	840	pc/h/ln
Speed Inputs and	d 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 Freeway	
LOS and Performa	ance Measures	
Flow rate, vp	840	pc/h/ln

55.0

55.0

15.3

mi/h

mi/h

pc/mi/ln

PTG

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Operational Analysis		Operational	Analysis
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB

From/To: EB I-96 Ent. / Amb. Ent.

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River Internation	al Crossing Proje	ect
Flow Inputs and	d Adjustments	
Volume, V	2580	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	679	v
Trucks and buses	24	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	0.893	
Oriver population factor, fp	1.00	
Flow rate, vp	760	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	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 Freewa	ч
LOS and Perform	mance Measures	
Flow rate, vp	760	pc/h/ln
··, ·F		T //

55.0

55.0

13.8

mi/h

mi/h

pc/mi/ln

Phone: Fax: E-mail: _____Operational Analysis______ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007 Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Clark Exit/Clark Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project Flow Inputs and Adjustments Volume, V 2693 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 709 V 25 Trucks and buses 용 0 Recreational vehicles 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 797 pc/h/ln Speed Inputs and Adjustments_____ Lane width 12.0 ft Right-shoulder lateral clearance 6.0 Right-snource Interchange density ft interchange/mi 1.00 4 Free-flow speed: Measured FFS or BFFS mi/h 55.0 mi/h Lane width adjustment, fLW 0.0 Lateral clearance adjustment, fLC 0.0 mi/h 2.5 Interchange density adjustment, fID mi/h 1.5 mi/h 55.0 mi/h Number of lanes adjustment, fN 1.5 Free-flow speed, FFS Urban Freeway LOS and Performance Measures_____ Flow rate, vp 797 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

14.5

pc/mi/ln

Fax: Phone: E-mail: _____Operational Analysis______ СН Analyst: Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Clark Ent/Dragoon Exit Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ veh/h 2854 Volume, V 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 751 V 25 Trucks and buses Recreational vehicles Level Terrain type: 용 0.00 Grade Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.889 Driver population factor, fp 1.00 845 pc/h/ln Flow rate, vp _____Speed Inputs and Adjustments_____ ft 12.0 Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: 55.0 mi/h FFS or BFFS 0.0 mi/h Lane width adjustment, fLW 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_____ pc/h/ln mi/h mi/h 845 Flow rate, vp Free-flow speed, FFS 55.0 Average passenger-car speed, S 55.0

15.4

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: Operational Analysis_____ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Dragoon Exit/Livernois Ent. Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V veh/h 2828 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 744 V 25 Trucks and buses Recreational vehicles Level Terrain type: 용 Grade 0.00 Segment length 0.00 Мi 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 837 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 1.00 ft Right-shoulder lateral clearance interchange/mi Interchange density Number of lanes, N Free-flow speed: Measured FFS or BFFS 55.0 mi/h 0.0 Lane width adjustment, fLW mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 2.5 1.5 Number of lanes adjustment, fN mi/h 55.0 Free-flow speed, FFS mi/h Urban Freeway _____LOS and Performance Measures_____ pc/h/ln Flow rate, vp 837 Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0

4

15.2

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: Operational Analysis Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007 Date Performed: 0,10,200
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: EB I-96 Ent/Grand Ent. Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ 2977 veh/h Volume, V Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 783 V Trucks and buses Recreational vehicles Level Terrain type: 0.00 Grade 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 881 pc/h/ln _____Speed Inputs and Adjustments____ ft Lane width 12.0 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: 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 1.5 mi/h mi/h Number of lanes adjustment, fN 55.0 Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures_____ Flow rate, vp 881 pc/h/ln Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0

16.0

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: CHAgency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Ent N. of Grand/Clark Exit Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V 3021 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 25 795 V Trucks and buses Recreational vehicles Level Terrain type: 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 894 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: 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 1.5 mi/h Number of lanes adjustment, fN 1.5 mi/h 55.0 mi/h Free-flow speed, FFS Urban Freeway _____LOS and Performance Measures_____ pc/h/ln Flow rate, vp 894 Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0

16.3

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Livernois Ent/Springwells Exit Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments veh/h Volume, V 3130 Peak-hour factor, PHF 0.95 824 Peak 15-min volume, v15 V 25 Trucks and buses Recreational vehicles Level Terrain type: 0.00 용 Grade Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.889 Driver population factor, fp 1.00 927 Flow rate, vp pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft 6.0 ft 1.00 interchange/mi Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: Measured 55.0 FFS or BFFS mi/h 0.0 Lane width adjustment, fLW mi/h 0.0 mi/h
0.0 mi/h
2.5 mi/h
1.5 mi/h
55.0 mi/h Lateral clearance adjustment, fLC 0.0 Interchange density adjustment, fID 2.5 Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway _____LOS and Performance Measures_____ pc/h/ln Flow rate, vp 927 mi/h mi/h Free-flow speed, FFS 55.0 55.0 Average passenger-car speed, S

4

16.9

pc/mi/ln

Number of lanes, N

Phone: E-mail: Fax:

Operational	Analysis
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СН Analyst:

Agency or Company: PARSONS Date Performed: 8/15/2007 Analysis Time Period: Midday Peak Freeway/Direction: I-75 SB

From/To: Springwells Exit/Spring. Ent.

Jurisdiction:

Analysis Year: 2035 (PAO)

Flow Inputs	and Adjustments	
Volume, V	2719	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	716	V
Trucks and buses	25	%
Recreational vehicles	0	8
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	805	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 Free	eway
LOS and Perf	ormance Measures_	

Flow rate, vp	805	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	14.6	pc/mi/ln

Phone: Fax: E-mail: Operational Analysis______ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak
Freeway/Direction: I-75 SB
From/To: Springwells Ent/Dearborn Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ veh/h 3025 Volume, V 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 796 V 25 Trucks and buses Recreational vehicles Level Terrain type: 0.00 읒 Grade Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.889 Driver population factor, fp 1.00 896 pc/h/ln Flow rate, vp _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N 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_____ 896 Flow rate, vp pc/h/ln mi/h mi/h Free-flow speed, FFS 55.0 55.0 Average passenger-car speed, S

4

16.3

pc/mi/ln

Number of lanes, N

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Operational Analysis	
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Analyst: СН Agency or Company: PARSONS
Date Performed: 11/17/08 Date Performed: 11/17/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 SB

From/To: C-D Road Ent. / Amb. Exit

Description: Detroit River Internation	al Crossing Pro	ject
Flow Inputs and	d Adjustments	
Volume, V	4893	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1288	V
Trucks and buses	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, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1794	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	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 Free	way
LOS and Perform	mance Measures_	
Flow rate, vp	1794	pc/h/ln

Flow rate, vp Free-flow speed, FFS	1794 55.0	pc/h/ln mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N	3	
Density, D	32.6	pc/mi/ln

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	Operational	Analysis
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Analyst: СН Date Performed: PARSONS

Analysis 11/17/08 Analysis Time Period: PM Peak Freeway/Direction: I-75 SB

From/To: Amb. Exit / EB I-96 Ent.

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River Internationa	al Crossing Project	E
Flow Inputs and	d Adjustments	
Volume, V	4238	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1115	V
Trucks and buses	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, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1554	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	
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 Freeway	
LOS and Perform	nance Measures	
Flow rate, vp	1554	pc/h/ln

55.0

55.0

28.3

mi/h

mi/h

pc/mi/ln

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Operational Analysis

Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB

From/To: EB I-96 Ent. / Amb. Ent.

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River Internation	ar crossing rroje	
Flow Inputs and	d Adjustments	
Volume, V	5129	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1350	V
Trucks and buses	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, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1410	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 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 Freewa	У
LOS and Perform	mance Measures	
Flow rate, vp	1410	pc/h/ln
		F 0 / 11 / 111

55.0

55.0

25.6

mi/h

mi/h

pc/mi/ln

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/16/2007
Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Clark Exit/Clark Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments____ veh/h Volume, V 5354 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1409 v 12 Trucks and buses 응 Recreational vehicles Level Terrain type: Grade 0.00 읭 Segment length 0.00 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER Heavy vehicle adjustment, fHV 0.943 Driver population factor, fp 1.00 Flow rate, vp 1493 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft 6.0 ft 1.00 interchange/mi Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N 4 Free-flow speed: Measured FFS or BFFS 55.0 mi/h 0.0 mi/h
0.0 mi/h
2.5 mi/h
1.5 mi/h
55.0 mi/h 0.0 Lane width adjustment, fLW Lateral clearance adjustment, fLC 0.0 Interchange density adjustment, fID 2.5 Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway LOS and Performance Measures____ pc/h/ln mi/h mi/h Flow rate, vp 1493 Free-flow speed, FFS 55.0 55.0 Average passenger-car speed, S Number of lanes, N 4

Density, D

pc/mi/ln

27.1

Fax: Phone: E-mail: Operational Analysis_____ CH Analyst: Agency or Company: PARSONS
Date Performed: 8/16/2007 Date Performed: 0,-2.

Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
Clark Ent/Dragoon Exit Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ 5884 veh/h Volume, V 0.95 Peak-hour factor, PHF 1548 Peak 15-min volume, v15 V 11 Trucks and buses Recreational vehicles Level Terrain type: 0.00 용 Grade 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 1634 pc/h/ln Flow rate, vp _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: Measured mi/h FFS or BFFS 55.0 Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID mi/h 2.5 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_____ pc/h/ln mi/h mi/h 1634 Flow rate, vp Free-flow speed, FFS 55.0 55.0 Average passenger-car speed, S

4

29.7

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: Operational Analysis______ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/16/2007 Date Performed: 0,11.
Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Dragoon Exit/Livernois Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments veh/h Volume, V 5814 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1530 V Trucks and buses 용 Recreational vehicles Terrain type: Level 0.00 응 Grade 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 1614 pc/h/ln Flow rate, vp _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: mi/h FFS or BFFS 55.0 Lane width adjustment, fLW 0.0 mi/h 0.0 mi/h 2.5 mi/h 1.5 mi/h 55.0 mi/h Lateral clearance adjustment, fLC Interchange density adjustment, fID 0.0 2.5 Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway _____LOS and Performance Measures_____ pc/h/ln mi/h mi/h Flow rate, vp 1614 Free-flow speed, FFS 55.0 55.0 Average passenger-car speed, S

4 29.3

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: _____Operational Analysis_____ Analyst: СН Agency or Company: PARSONS
Date Performed: 8/16/2007
Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: EB I-96 Ent/Grand Ent. Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments veh/h Volume, V 5562 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1464 V 11 Trucks and buses Recreational vehicles Level Terrain type: Grade 0.00 용 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 1544 Flow rate, vp pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: Measured 55.0 FFS or BFFS mi/h 0.0 mi/h
0.0 mi/h
2.5 mi/h
1.5 mi/h
55.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 Interchange density adjustment, fID 2.5 1.5 Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway LOS and Performance Measures____ pc/h/ln mi/h mi/h 1544 Flow rate, vp Free-flow speed, FFS 55.0 Average passenger-car speed, S 55.0

4

28.1 pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: ___Operational Analysis_____ CH Analyst: Agency or Company: PARSONS
Date Performed: 8/16/2007 Date Performed: 0,10, 10
Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Ent N. of Grand/Clark Exit Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V veh/h 5801 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1527 V Trucks and buses Recreational vehicles Level Terrain type: Grade 0.00 읭 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 1611 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi ft Right-shoulder lateral clearance Interchange density Number of lanes, N Measured Free-flow speed: 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_____ pc/h/ln mi/h mi/h Flow rate, vp 1611 Free-flow speed, FFS 55.0 Average passenger-car speed, S 55.0

29.3

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: _____Operational Analysis____ Analyst: CH Agency or Company: PARSONS
Date Performed: 8/16/2007 Date Performed: 0, ___.

Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Livernois Ent/Springwells Exit Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments____ Volume, V veh/h 6068 Peak-hour factor, PHF 0.95 1597 Peak 15-min volume, v15 V 11 Trucks and buses Recreational vehicles Level Terrain type: Grade 0.00 용 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 1685 pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 ft 1.00 interchange/mi Right-shoulder lateral clearance Interchange density Number of lanes, N 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 mi/h 55.0 mi/h 1.5 Number of lanes adjustment, fN Free-flow speed, FFS Urban Freeway _____LOS and Performance Measures_____ pc/h/ln Flow rate, vp 1685 Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0

4 30.6

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: Operational Analysis_____ CH Analyst: Agency or Company: PARSONS
Date Performed: 8/16/2007 Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Springwells Exit/Spring. Ent. Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V veh/h 5810 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1529 V 11 Trucks and buses Recreational vehicles Terrain type: Level Grade 0.00 Segment length 0.00 тi 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 1613 Flow rate, vp pc/h/ln _____Speed Inputs and Adjustments_____ Lane width 12.0 ft 6.0 1.00 Right-shoulder lateral clearance ft interchange/mi Interchange density Number of lanes, N 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 Number of lanes adjustment, fN mi/h 55.0 Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures_____ pc/h/ln Flow rate, vp 1613 Free-flow speed, FFS mi/h 55.0 mi/h Average passenger-car speed, S 55.0

29.3

pc/mi/ln

Number of lanes, N

Phone: Fax: E-mail: Operational Analysis_____ Analyst: СН Agency or Company: PARSONS
Date Performed: 8/16/2007 Date Perrormed: 0,11.

Analysis Time Period: PM Peak
Freeway/Direction: I-75 SB
From/To: Springwells Ent/Dearborn Ent. Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Flow Inputs and Adjustments_____ Volume, V veh/h 6313 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 1661 V Trucks and buses Recreational vehicles Level Terrain type: 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 1744 Flow rate, vp pc/h/ln _____Speed Inputs and Adjustments_____ 12.0 ft Lane width 6.0 1.00 ft Right-shoulder lateral clearance interchange/mi Interchange density Number of lanes, N Measured Free-flow speed: FFS or BFFS mi/h 55.0 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 Number of lanes adjustment, fN mi/h 55.0 Free-flow speed, FFS mi/h Urban Freeway _____LOS and Performance Measures_____ pc/h/ln Flow rate, vp 1744 Free-flow speed, FFS 55.0 mi/h mi/h Average passenger-car speed, S 55.0 Number of lanes, N

31.7

pc/mi/ln

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Operational Analysis

Analyst: СН Agency or Company: PARSONS Date Performed: 11/17/08 Analysis Time Period: AM Peak Freeway/Direction: I-96 WB

From/To: I-75 Split/Amb. Ent. (2-lanes)

Jurisdiction: MDOT

Flow Inputs and	Adjustments	
Volume, V	1075	veh/h
Peak-hour factor, PHF	0.95	· C12, 11
Peak 15-min volume, v15	283	V
Trucks and buses	20	%
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	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	622	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	
Tide tid. Speed		
FFS or BFFS	55.0	mi/h
FFS or BFFS Lane width adjustment, fLW	55.0 0.0	mi/h mi/h
FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC		
FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID	0.0 0.0 2.5	mi/h
FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN	0.0 0.0	mi/h mi/h
FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID	0.0 0.0 2.5	mi/h mi/h mi/h
FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN	0.0 0.0 2.5 4.5	<pre>mi/h mi/h mi/h mi/h</pre>
FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN	0.0 0.0 2.5 4.5 55.0 Urban Freeway	<pre>mi/h mi/h mi/h mi/h</pre>

Flow rate, vp	622	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	11.3	pc/mi/ln

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Operational	Analysis
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Analyst: СН Agency or Company: PARSONS
Date Performed: 11/17/08 11/17/08 Analysis Time Period: AM Peak Freeway/Direction: I-96 WB

From/To: Amb. Ent. / Michigan Exit

MDOT Jurisdiction:

Analysis Year: 2035 No Build

Flow Inputs an	d Adjustments	
Volume, V	1834	veh/h
Peak-hour factor, PHF	0.95	,
Peak 15-min volume, v15	483	V
Trucks and buses	21	%
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	0.905	
Driver population factor, fp	1.00	
Flow rate, vp	1067	pc/h/ln
Speed Inputs a	nd Adjustments_	
Lane width	12.0	ft
	12.0 6.0	ft ft
Right-shoulder lateral clearance		
	6.0	ft
Right-shoulder lateral clearance Interchange density	6.0	ft
Right-shoulder lateral clearance Interchange density Number of lanes, N	6.0 1.00 2	ft
Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed:	6.0 1.00 2 Measured	ft interchange/mi
Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS	6.0 1.00 2 Measured 55.0	ft interchange/mi mi/h
Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW	6.0 1.00 2 Measured 55.0 0.0	ft interchange/mi mi/h mi/h
Right-shoulder lateral clearance Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, fLW Lateral clearance adjustment, fLC	6.0 1.00 2 Measured 55.0 0.0	ft interchange/mi mi/h mi/h mi/h
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	6.0 1.00 2 Measured 55.0 0.0 0.0	ft interchange/mi mi/h mi/h mi/h mi/h
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	6.0 1.00 2 Measured 55.0 0.0 2.5	ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h
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	6.0 1.00 2 Measured 55.0 0.0 2.5 4.5	ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h mi/h

Flow rate, vp	1067	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	19.4	pc/mi/ln

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Operational	Analysis
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Analyst: СН Agency or Company: PARSONS Date Performed: 11/17/08 Analysis Time Period: Midday Peak Freeway/Direction: I-96 WB

From/To: I-75 Split/Amb. Ent. (2-lanes)

Jurisdiction: MDOT

Flow rate, vp

Density, D

Free-flow speed, FFS

Number of lanes, N

Average passenger-car speed, S

Analysis Year: 2035 No Build Description: Detroit River Internations	al Crossing Pro	ject
Flow Inputs and	d Adjustments	
Volume, V	671	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	177	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	397	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	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 Free	way
LOS and Perform	mance Measures_	
_		

397

55.0

55.0

7.2

2

pc/h/ln

pc/mi/ln

mi/h

mi/h

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Operational	Analysis
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Analyst: CHAgency or Company: PARSONS
Date Performed: 11/17/08 11/17/08 Analysis Time Period: Midday Peak Freeway/Direction: I-96 WB

From/To: Amb. Ent. / Michigan Exit

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

Description: Detroit River International Crossing Project			
Flow Inputs an	d Adjustments		
Volume, V	1071	veh/h	
Peak-hour factor, PHF	0.95		
Peak 15-min volume, v15	282	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	634	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		
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	ay	
LOS and Perfor	mance Measures		
Flow rate, vp	634	pc/h/ln	
Date file and DDC	FF 0		

55.0

55.0

11.5

mi/h

mi/h

pc/mi/ln

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Operation	al Analysis

Analyst: CH Agency or Company: PARSONS
Date Performed: 11/17/09 11/17/08 Analysis Time Period: PM Peak Freeway/Direction: I-96 WB

From/To: I-75 Split/Amb. Ent. (2-lanes)

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

200

Analysis Year: 2035 No Build Description: Detroit River Internations	al Crossing Project	:
Flow Inputs and	d Adjustments	
Volume, V	824	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	217	V
Trucks and buses	24	%
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	0.893	
Driver population factor, fp	1.00	
Flow rate, vp	486	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	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 Freeway	
LOS and Perform	nance Measures	
Flow rate, vp	486	pc/h/ln
		± ' '

55.0

55.0

8.8

2

mi/h

mi/h

pc/mi/ln

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Operational Analysis	
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: PM Peak
Freeway/Direction: I-96 WB

From/To: Amb. Ent. / Michigan Exit

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Description: Detroit River Internation	al Crossing Proj	ect
Flow Inputs an	d Adjustments	
Volume, V	1240	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	326	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	734	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	
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
<u>-</u>	Urban Freew	ay
LOS and Perfor	mance Measures	
Flow rate, vp	734	pc/h/ln

55.0

55.0

13.3

mi/h

mi/h

pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

PTG

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Operational	Analysis
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: AM Peak
Freeway/Direction: I-96 EB

From/To: Michigan Ent. / Amb. Exit

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Flow Inputs an	d Adjustments	
Volume, V	1120	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	295	V
Trucks and buses	25	%
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, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	663	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	
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
daterar crearance adjustment, the	2.5	mi/h
	4.5	
Interchange density adjustment, fID	4.5	mi/h
Interchange density adjustment, fID Number of lanes adjustment, fN		mi/h mi/h
Interchange density adjustment, fID Number of lanes adjustment, fN	4.5	mi/h
Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS	4.5 55.0	mi/h way

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	2	
Density, D	12.1	pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

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______Operational Analysis_______

CHAnalyst: Agency or Company: PARSONS
Date Performed: 11/17/08

MDOT

Jurisdiction: Analysis Year: 2035 No Build

Average passenger-car speed, S

Number of lanes, N

Density, D

Analysis Year: 2035 No Build Description: Detroit River International	l Crossing Project	_
Description: Decroit River international	r crossing ridjec	
Flow Inputs and	Adjustments	
Volume, V	909	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	239	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	538	pc/h/ln
Speed Inputs and	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
Free-flow speed, FFS	55.0	mi/h
	Urban Freeway	
LOS and Performa	ance Measures	
Flow rate, vp	538	pc/h/ln
Free-flow speed, FFS	55.0	mi/h

55.0

9.8

mi/h

pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational	Analysis
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Analyst: CH
Agency or Company: PARSONS
Date Performed: 11/17/08
Analysis Time Period: PM Peak
Freeway/Direction: I-96 EB

From/To: Michigan Ent. / Amb. Exit

Jurisdiction: MDOT

Free-flow speed, FFS

Number of lanes, N

Density, D

Average passenger-car speed, S

Analysis Year: 2035 No Build

Flow Inputs and	d Adjustments	
Volume, V	1864	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	491	V
Trucks and buses	15	%
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	0.930	
Driver population factor, fp	1.00	
Flow rate, vp	1055	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	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
	2.5	mi/h
Interchange density adjustment, fID		1 (3
	4.5	mi/h
Number of lanes adjustment, fN	4.5 55.0	mi/h mi/h
Number of lanes adjustment, fN		mi/h
<pre>Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFSLOS and Perform</pre>	55.0	mi/h way
Number of lanes adjustment, fN Free-flow speed, FFS	55.0 Urban Free	mi/h way

55.0

55.0

19.2

mi/h

mi/h

pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax: E-mail: _____Merge Analysis_____ CH Analyst: Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB Agency/Co.: Junction: Clark Entrance Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data______ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 5173 vph Free-flow speed on freeway Volume on freeway vph _____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 55.0 mph Volume on ramp 297 vph Length of first accel/decel lane 590 ft Length of second accel/decel lane _____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_____ Freeway Ramp Adjacent Junction Components

 5173
 297

 0.95
 0.95

 1361
 78

 14
 19

 0
 0

 Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 V Trucks and buses ę Recreational vehicles Level Level Terrain type:

б mi

1.5 1.2

1.5 1.2

9

тi

용

тi

Grade

Length

Trucks and buses PCE, ET Recreational vehicle PCE, ER

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                                1.00
                                          1.00
Flow rate, vp
                                5826
                                         342
                                                             pcph
              __Estimation of V12 Merge Areas_____
               L =
                           (Equation 25-2 or 25-3)
               ΕQ
               P = 0.295 Using Equation 4
               _{
m FM}
               v = v (P) = 1717 pc/h
               12 F FM
                    _____Capacity Checks_____
                      Actual
                                  Maximum
                                              LOS F?
                      6168
                                  9000
                                               No
    FΟ
                      2059
                              4600
                                               No
    V
    R12
          Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.7 pc/mi/ln
                    R 12 A
Level of service for ramp-freeway junction areas of influence B
_____Speed Estimation_____
Intermediate speed variable,
                                     M = 0.287
                                     S
Space mean speed in ramp influence area,
                                    S = 51.3 mph
                                     R
Space mean speed in outer lanes,
                                     S = 49.4 \quad mph
                                     0
```

Space mean speed for all vehicles,

0.935

0.913

S = 50.0

mph

Phone: Fax: E-mail: _____Merge Analysis_____ Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB Junction: Dragoon Entrance Ramp Jurisdiction: Jurisdiction:
Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data______ Type of analysis Merge 55.0 mph 5177 Number of lanes in freeway Free-flow speed on freeway Volume on freeway vph _____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 30.0 mph Volume on ramp 179 vph ft Length of first accel/decel lane 830 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 Freeway Ramp Adjacent Junction Components Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 V Trucks and buses 90 Recreational vehicles

% mi

Terrain type:

Grade Length

Trucks and buses PCE, ET
Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 Flow rate, vp 5831 197 pcph _____Estimation of V12 Merge Areas____ L = (Equation 25-2 or 25-3) ΕQ P = 0.502 Using Equation 4 FMv = v (P) = 2925 pc/h12 F FM _____Capacity Checks____ Maximum Actual LOS F? 6028 9000 NoFΟ 4600 No 3122 R12 _____Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.5 pc/mi/lnR 12 Level of service for ramp-freeway junction areas of influence C _____Speed Estimation____ Intermediate speed variable, M = 0.360S Space mean speed in ramp influence area, S = 50.3 mph R Space mean speed in outer lanes, S = 51.6 mph

Space mean speed for all vehicles,

0

S = 50.9 mph

0.935

0.957

Phone: Fax: E-mail: Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB Agency/Co.: Junction: Springwells Entrance Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data______ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 4762 vph Free-flow speed on freeway Volume on freeway ____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 25.0 mph Volume on ramp 554 vph Length of first accel/decel lane 390 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_____ Freeway Ramp Adjacent Junction Components Ramp 4762 554 Volume, V (vph) vph Peak-hour factor, PHF 0.95 0.95 Peak 15-min volume, v15 V Trucks and buses 양 Recreational vehicles Terrain type: Grade

Length

Trucks and buses PCE, ET
Recreational vehicle PCE, ER

mi 0.12 mi

1.5 1.5 1.2 1.2

mi

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 Flow rate, vp 5364 606 pcph _____Estimation of V12 Merge Areas L = (Equation 25-2 or 25-3) ΕQ P = 0.316 Using Equation 4 FMv = v (P) = 1695 pc/h12 F FM _____Capacity Checks_____ Actual Maximum LOS F? 5970 9000 No FΟ 2301 4600 V No R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.7 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence C _____Speed Estimation____

Intermediate speed variable,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Space mean speed in ramp influence area,

0.935

0.962

M = 0.340

 $S = 50.6 \quad mph$

S = 50.2 mph

 $S = 50.3 \quad mph$

S

R

0

Phone: E-mail:

Fax:

Diverge	Analysis_
---------	-----------

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Clark Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

	Freeway	Data
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Type of analysis	Diverge
Number of lanes in freeway	4
Free-flow speed on freeway	55.0 mph
Volume on freeway	5173 vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	183	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

No

ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5173	183	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	1361	48	V
Trucks and buses	14	7	90
Recreational vehicles	0	0	96
Terrain type:	Level	Grade	
Grade	0.00 %	1.00 %	90
Length	0.00 mi	0.17 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
                                    0.966
                            1.00
                                     1.00
                             5826
                                     199
Flow rate, vp
                                                       pcph
       ______Estimation of V12 Diverge Areas_____
             T =
                        (Equation 25-8 or 25-9)
              EQ
             P = 0.436 Using Equation 8
             v = v + (v - v) P = 2652 pc/h
              12 R F R FD
                 _Capacity Checks_____
                    Actual
                             Maximum
                                          LOS F?
   v = v
                    5826
                              9000
                                           No
    Fi F
                   2652 4400
   V
                                           No
    12
                   5627 9000
   \nabla = \Delta - \Delta
                                         No
    FO F R
                          2000
                    199
                                          No
    R
      _____Level of Service Determination (if not F)_____
                 D = 4.252 + 0.0086 v - 0.009 L = 22.6 pc/mi/ln
Density,
                               12 D
Level of service for ramp-freeway junction areas of influence C
 _____Speed Estimation_____
Intermediate speed variable,
                                 D = 0.511
```

R

0

S = 58.0 mph

S = 53.2 mph

Space mean speed in ramp influence area, S = 48.4 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Phone: E-mail: Fax:

_____Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Dearborn Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

F	re	еī	мa	V	D	а	ta

Type of analysis	Diverge
Number of lanes in freeway	3
Free-flow speed on freeway	55.0 mph
Volume on freeway	5019 vph

Off Ramp Data_____

No

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	103	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)	5019	103	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	1321	27	V
Trucks and buses	14	12	9
Recreational vehicles	0	0	96
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	

Heavy vehicle adjustment, fHV Driver population factor, fP 0.935 0.943 1.00 1.00 5653 115 Flow rate, vp pcph ______Estimation of V12 Diverge Areas_____ L = (Equation 25-8 or 25-9) ΕQ P = 0.613 Using Equation 5 v = v + (v - v) P = 3512 pc/h12 R F R FD ____Capacity Checks_____ Maximum LOS F? Actual $\Delta = \Delta$ 5653 6750 No Fi F 3512 4400 V No 12 5538 6750 No v = v - vFO F R 115 2000 No R _____Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 33.4 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence D _____Speed Estimation_____

Intermediate speed variable,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Space mean speed in ramp influence area, S = 48.5 mph

D = 0.503

 $S = 55.9 \quad mph$

S = 51.0 mph

R

0

Phone: E-mail: Fax:

___Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Grand Blvd Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PA0)

Description: Detroit River International Crossing Project

Freewav	Data
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Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0 r	mph
Volume on freeway	5254	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	216	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	Adjacent Ramp
Volume, V (vph)	5254	216	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	1383	57	V
Trucks and buses	12	25	용
Recreational vehicles	0	0	9
Terrain type:	Level	Grade	
Grade	0.00 %	2.94 %	9
Length	0.00 mi	0.13 m	. 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
                             5862 256
Flow rate, vp
                                                      pcph
            Estimation of V12 Diverge Areas_____
             L =
                        (Equation 25-8 or 25-9)
              EQ
             P = 0.436 Using Equation 8
             v = v + (v - v) P = 2317 pc/h
              12 R F R FD
             _____Capacity Checks_____
                             Maximum
                                          LOS F?
                    Actual
                    4983
                              9000
                                          No
    Fi F
                    2317 4400
                                          No
   V
    12
                   4727 9000
   v = v - v
                                         No
    FO F R
   V
                    256
                          2000
                                          No
    R
      Level of Service Determination (if not F)_____
                 D = 4.252 + 0.0086 v - 0.009 L = 22.1 pc/mi/ln
Density,
                               12 D
Level of service for ramp-freeway junction areas of influence C
_____Speed Estimation_____
Intermediate speed variable,
                                 D = 0.516
Space mean speed in ramp influence area, S = 48.3 mph
                                  R
Space mean speed in outer lanes,
                                 S = 59.0  mph
```

Space mean speed for all vehicles,

0.943 0.889

0

S = 53.5 mph

Phone: E-mail: Fax:

_____Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS Agency/Co.: FARSONS
Date performed: 8/15/2007
Analysis time period: AM Peak Freeway/Dir of Travel: I-75 NB

Junction: Livernois Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

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	5177	vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	138	vph
Length of first accel/decel lane	300	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)	5177	138	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	1362	36	V
Trucks and buses	14	0	9
Recreational vehicles	0	0	9
Terrain type:	Level	Grade	
Grade	0.00 %	2.60 %	90
Length	0.00 mi	0.16 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Heavy vehicle adjustment, fHV 0.935 1.000 Driver population factor, fP 1.00 1.00
                              1.00 1.00
5831 145
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 = 2624 pc/h
              12 R F R FD
              _____Capacity Checks_____
                     Actual
                               Maximum
                                            LOS F?
    v = v
                     5831
                                9000
                                             No
    Fi F
                     2624 4400
                                             No
    V
    12
                             9000
    \Delta = \Delta - \Delta
                    5686
                                             No
    FO F R
                     145
                               2000
                                            No
    V
    Level of Service Determination (if not F)______
                  D = 4.252 + 0.0086 v - 0.009 L = 24.1 pc/mi/ln
Density,
Level of service for ramp-freeway junction areas of influence C
_____Speed Estimation_____
Intermediate speed variable,
                                   D = 0.506
Space mean speed in ramp influence area,
                                   S = 48.4
                                             mph
                                    R
```

S = 58.0 mph

 $S = 53.3 \quad mph$

0

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Phone: E-mail:

Fax:

Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Springwells Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

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	4762 vph	

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	257	vph
Length of first accel/decel lane	250	ft
Length of second accel/decel lane		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)	4762	257	vph
Peak-hour factor, PHF	0.95	0.95	_
Peak 15-min volume, v15	1253	68	V
Trucks and buses	14	2	용
Recreational vehicles	0	0	엉
Terrain type:	Level	Grade	
Grade	0.00 %	-3.31 %	96
Length	0.00 mi	0.14 m	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Space mean speed for all vehicles,

pcph

	Estimation of	V12 Diverge Areas	S
	L = (Equa	tion 25-8 or 25-9	9)
	EQ P = 0.436 Using FD	Equation 8	
	v = v + (v - v) P 12 R F R F	_	
	Capacity	Checks	
	Actual		LOS F?
v = v Fi F	5364	9000	No
v 12	2493	4400	No ·
v = v - v	5091	9000	No
FO F R V R	273	1900	No
	evel of Service Deter	mination (if not	F)
Density,	D = 4.252 + 0.00	86 v - 0.009 L	= 23.4 pc/mi/ln
Level of service f	or ramp-freeway junct		
	Speed Esti	mation	
Intermediate speed	variable,	D = 0.583	
Space mean speed i	n ramp influence area	S = 47.4	mph
Space mean speed i	n outer lanes,	$ \begin{array}{c} R\\S\\=58.6\\0\end{array} $	mph

S = 52.8

mph

PTG

26777 Central Park Blvd Southfield, MI 48076

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_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

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

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis

Number of lanes in freeway

Free-flow speed on freeway

Volume on freeway

Diverge

3

Free 3

4179

vph

_____Off Ramp Data______

Side of freeway

Number of lanes in ramp

Free-Flow speed on ramp

Volume on ramp

Length of first accel/decel lane

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)	4179	0	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	1100	0	V
Trucks and buses	10	0	%
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	

```
Driver population factor, fP
                                1.00
                                          1.00
                                4619
Flow rate, vp
                                                            pcph
              _____Estimation of V12 Diverge Areas_____
              L =
                           (Equation 25-8 or 25-9)
               ΕQ
              P = 0.645 Using Equation 5
               FD
              v = v + (v - v) P = 2977 pc/h
               12 R F R FD
               _____Capacity Checks_____
                                             LOS F?
                                 Maximum
                      Actual
    v = v
                      4619
                                 6750
                                              No
    Fi F
                      2977
                                4400
                                             No
    V
    12
    v = v - v
                      4619
                                 6750
                                              No
    FO F R
                      0
                                 2000
                                              No
    R
      _____Level of Service Determination (if not F)______
                  D = 4.252 + 0.0086 v - 0.009 L = 20.9 pc/mi/ln
Density,
Level of service for ramp-freeway junction areas of influence C
  _____Speed Estimation_______
Intermediate speed variable,
                                    D = 0.428
                                     S
                                    S = 49.4
Space mean speed in ramp influence area,
                                               mph
                                     R
Space mean speed in outer lanes,
                                    S = 57.8 \quad mph
                                     0
```

S = 52.1 mph

0.952

1.000

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

PTG

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E-mail: catherine.hartner@parsons.com

______Merge Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ramp from Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

_____Freeway Data_______

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4179	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	753	vph
Length of first accel/decel lane	870	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)	4179	753	vph	
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1100	198	V	
Trucks and buses	10	0	%	
Recreational vehicles	0	0	%	
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	m	i mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustm Driver population fac Flow rate, vp		1.00	1.000 1.00 793	pcph
	Estimation c	of V12 Merge Ar	eas	
L EÇ		quation 25-2 or	25-3)	
	= 0.602 Usi	ng Equation 1		
	= v (P) = 27	/80 pc/h		
	Capaci	ty Checks		
V FO		Maximum 6750	LOS F? No	
v R12	3573	4600	No	
Leve	l of Service Det	ermination (if	not F)	
Density, D = 5.475 + R Level of service for	R	12	A	pc/mi/ln
	Speed Es	stimation		
Intermediate speed va	riable,	M = 0 S	.399	
Space mean speed in r	amp influence ar	rea, S = 4 R	9.8 mph	
Space mean speed in c	uter lanes,	S = 5 0	0.2 mph	
Space mean speed for	all vehicles,	S = 4	9.9 mph	

Phone: E-mail:

Fax:

Merge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

Junction: Clark Entrance Ramp

Jurisdiction:

Analysis Year: 2035 (PA0)

Description: Detroit River International Crossing Project

Freewav Da	ta	
------------	----	--

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2690	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	314	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 ft

_____Conversion to pc/h Under Base Conditions_____

No

vph

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2690	314	vph
Peak-hour factor, PHF	0.95	0.95	-
Peak 15-min volume, v15	708	83	v
Trucks and buses	25	22	90
Recreational vehicles	0	0	90
Terrain type:	Level	Level	
Grade	90	90	8
Length	mi	. n	ni 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 Flow rate, vp 3186 367 pcph Estimation of V12 Merge Areas_____ (Equation 25-2 or 25-3) EQ P = 0.292 Using Equation 4 FMv = v (P) = 929 pc/h12 F FM _____Capacity Checks_____ Maximum Actual LOS F? 3553 9000 No FΟ 1296 4600 No V R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.7 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, M = 0.270S Space mean speed in ramp influence area, S = 51.5 mph R Space mean speed in outer lanes, $S = 52.7 \quad mph$ 0

Space mean speed for all vehicles,

0.889

1.00

0.901

S = 52.3 mph

Phone: E-mail: Fax:

Merge Analysis_____

CH Analyst:

PARSONS Agency/Co.: Date performed: 8/15/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

Junction: Dragoon Entrance Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

	Freeway Data		
Type of analysis Number of lanes in freeway Free-flow speed on freeway Volume on freeway	Merge 4 55.0 2577	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 lane Length of second accel/decel lane	Right 1 30.0 212 830	mph vph ft 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 B	ase	Conditio	ns		
Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2577		212		vph	
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	678		56		V	
Trucks and buses	25		16		96	
Recreational vehicles	0		0		90	
Terrain type:	Level		Grade			
Grade		%	-2.00	용	90	
Length		mi	0.15	тi	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 3052 241 pcph __Estimation of V12 Merge Areas____ L = (Equation 25-2 or 25-3) ΕQ P = 0.496 Using Equation 4 FMv = v (P) = 1514 pc/h12 F FM _____Capacity Checks_____ Maximum Actual LOS F? 3293 9000 No FO1755 4600 No V R12 Level of Service Determination (if not F)______ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.8 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, M = 0.294S Space mean speed in ramp influence area, S = 51.2 mph R Space mean speed in outer lanes, S = 54.0 mph

Space mean speed for all vehicles,

0

S = 52.5 mph

0.889

0.926

Phone: Fax: E-mail: Merge Analysis_____ CH Analyst: Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB Junction: Springwells Entrance Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 2349 vph Free-flow speed on freeway Volume on freeway vph _____On Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 Free-flow speed on ramp 25.0 mph Volume on ramp vph 352 Length of first accel/decel lane 390 ft Length of second accel/decel lane ft _____Adjacent Ramp Data (if one exists)_____ Does adjacent ramp exist? No

Conversion	to	pc/h	Under	Base	Conditions

Volume on adjacent Ramp

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

Junction Components	Freeway	Ramp	Adjacent
			Ramp
Volume, V (vph)	2349	352	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	618	93	v
Trucks and buses	25	15	90
Recreational vehicles	0	0	૭
Terrain type:	Level	Grade	
Grade	왕	-2.00 %	%
Length	mi	0.12 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

vph

ft

Heavy vehicle adjustment, fHV 0.889 0.930 Driver population factor, fP 1.00 1.00 Flow rate, vp 2782 398

__Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.342 Using Equation 4 FMv = v (P) = 951 pc/h12 F FM ____Capacity Checks____ Actual Maximum LOS F? 3180 9000 NoFΟ 1349 4600 No V R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.4 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, M = 0.317

pcph

Intermediate speed variable, M=0.317 S

Space mean speed in ramp influence area, S=50.9 mph

R

Space mean speed in outer lanes, S=53.5 mph

O

Space mean speed for all vehicles, S=52.4 mph

Phone: E-mail: Fax:

____Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

Junction: Clark Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PA0)

Description: Detroit River International Crossing Project

rieeway Dati			Freeway	Data
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Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2690	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	97	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	Adjace Ramp	nt
Volume, V (vph)	2690	97		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	708	26		V
Trucks and buses	25	14		96
Recreational vehicles	0	0		96
Terrain type:	Level	Grade		
Grade	0.00 %	1.00	90	રુ
Length	0.00 m	ni 0.17	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
                                   0.935
                            1.00
                                     1.00
                            3186
Flow rate, vp
                                     109
                                                      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 = 1451 pc/h
              12 R F R FD
                ____Capacity Checks_____
                   Actual
                             Maximum
                                         LOS F?
   v = v
                    3186
                              9000
                                          No
    Fi F
                   1451 4400
   V
                                          No
    12
                   3077
                           9000
   v = v - v
                                         No
    FO F R
                    109
                          2000
                                         No
    R
     Level of Service Determination (if not F)_____
                 D = 4.252 + 0.0086 v - 0.009 L = 12.2 pc/mi/ln
Density,
                               12 D
Level of service for ramp-freeway junction areas of influence B
 _____Speed Estimation_____
                                 D = 0.503
Intermediate speed variable,
Space mean speed in ramp influence area, S = 48.5 mph
```

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

0

 $S = 60.3 \quad mph$

S = 54.3 mph

Phone: E-mail:

Fax:

____Diverge Analysis______

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

Junction: Dearborn Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

Freewav Data	F	r	е	е	W	a	V	D	a	t	а
--------------	---	---	---	---	---	---	---	---	---	---	---

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2522	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	50	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_____

No

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2522	50		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	664	13		v
Trucks and buses	25	8		%
Recreational vehicles	0	0		%
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		

pcph

Fi F 2057 4400 No12 2932 6750 $\Delta = \Delta - \Delta$ No FO F R

55 2000 No R

Level of Service Determination (if not F)

D = 4.252 + 0.0086 v - 0.009 L = 20.9 pc/mi/lnDensity,

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, D = 0.498

Space mean speed in ramp influence area, S = 48.5 mph

R Space mean speed in outer lanes, S = 60.3 mph

0 Space mean speed for all vehicles, $S = 51.7 \quad mph$

Fax: Phone: E-mail: _____Diverge Analysis______ CH Analyst: Agency/Co.: Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 NB Junction: Grand Blvd Exit Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Diverge Type of analysis Number of lanes in freeway 55.0 mph 2409 vph Free-flow speed on freeway Volume on freeway Off Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 Free-Flow speed on ramp 30.0 mph 595 vph Volume on ramp 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_____ Adjacent Freeway Ramp Junction Components Ramp

2409 595 V

0.95 0.95
634 157 V

25 25 25
0 0 0 %

Level Grade
0.00 % 2.94 % %
0.00 mi 0.13 mi mi

1.5 1.5 Ramp vph Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 V

1.5 1.2

1.5 1.2

Trucks and buses

Grade Length

Recreational vehicles Terrain type:

Trucks and buses PCE, ET Recreational vehicle PCE, ER

응

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 2853 705 pcph 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 = 1642 pc/h12 R F R FD _____Capacity Checks_____ Maximum LOS F? Actual v = v2853 9000 No Fi F 1642 4400 No V 12 9000 2148 No v = v - vFO F R 705 2000 No V R _____Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 16.3 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, D = 0.556

Space mean speed in ramp influence area, S = 47.8 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.889 0.889

R

0

S = 60.3 mph

S = 52.4 mph

Phone: Fax: E-mail: Diverge Analysis_____ CH Analyst: Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: Midday Peak Freeway/Dir of Travel: I-75 NB Jurisdiction:

Analysis Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway 4 55.0 mph 2577 vph Free-flow speed on freeway Volume on freeway vph Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 30.0 mph Free-Flow speed on ramp Volume on ramp vph 124 Length of first accel/decel lane 300 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)	2577	124	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	678	33	V
Trucks and buses	25	17	90
Recreational vehicles	0	0	90
Terrain type:	Level	Grade	
Grade	0.00 %	2.60 %	୍
Length	0.00 mi	0.16 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 0.922 1.00 1.00 3052 142 Flow rate, vp pcph _____Estimation of V12 Diverge Areas_____ L = (Equation 25-8 or 25-9) EQ P = 0.436 Using Equation 8 v = v + (v - v) P = 1411 pc/h12 R F R FD _____Capacity Checks_____ LOS F? Actual Maximum 3052 9000 NoFi F 1411 4400 No V 12 2910 9000 $\Delta = \Delta - \Delta$ No FO F R V 142 2000 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 13.7 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, D = 0.506

R

0

S = 60.3 mph

S = 54.2 mph

Space mean speed in ramp influence area, S = 48.4 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Fax: Phone: E-mail: _____Diverge Analysis_____ CH Analyst: Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: MD Peak Freeway/Dir of Travel: I-75 NB Springwells Exit Ramp Junction: Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data______ Diverge Type of analysis Number of lanes in freeway 4 55.0 mph 2349 vph Free-flow speed on freeway Volume on freeway vph Off Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 Free-Flow speed on ramp 25.0 mph 173 vph Volume on ramp Length of first accel/decel lane 250 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.

	•			
Junction Components	Freeway	Ramp	Adjacent	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	2349		173		vph
Peak-hour factor, PHF	0.95		0.95		-
Peak 15-min volume, v15	618		46		V
Trucks and buses	25		7		90
Recreational vehicles	0		0		90
Terrain type:	Level		Grade		
Grade	0.00	용	-3.31	용	୍ ଚ
Length	0.00	mi	0.14	тi	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 0.966 1.00 1.00 Flow rate, vp 2782 188 pcph ___Estimation of V12 Diverge Areas_____ (Equation 25-8 or 25-9) EQ P = 0.436 Using Equation 8 v = v + (v - v) P = 1319 pc/h12 R F R FD ____Capacity Checks_____ Actual Maximum LOS F? 2782 9000 Νo Fi F 1319 4400 No 12 9000 v = v - v2594 No FO F R 188 1900 No R Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 13.3 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____

Intermediate speed variable, D = 0.575 S Space mean speed in ramp influence area, S = 47.5 mph R Space mean speed in outer lanes, S = 60.3 mph 0 Space mean speed for all vehicles, S = 53.5 mph

PTG

26777 Central Park Blvd Southfield, MI 48076

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_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

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

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis

Number of lanes in freeway

Free-flow speed on freeway

Volume on freeway

Diverge

3

Freeby

1738

_____Off Ramp Data______

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	0	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)	1738	0	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	457	0	V
Trucks and buses	23	0	%
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	

```
Driver population factor, fP
                               1.00
                                         1.00
                               2040
Flow rate, vp
                                                           pcph
              _____Estimation of V12 Diverge Areas_____
              L =
                           (Equation 25-8 or 25-9)
               ΕQ
              P = 0.709 Using Equation 5
               FD
              v = v + (v - v) P = 1446 pc/h
               12 R F R FD
               _____Capacity Checks_____
                                            LOS F?
                                 Maximum
                     Actual
    v = v
                      2040
                                 6750
                                              No
    Fi F
                     1446
                                4400
                                             No
    V
    12
    v = v - v
                     2040
                                6750
                                              No
    FO F R
                      0
                                 2000
                                             No
    R
      _____Level of Service Determination (if not F)______
                  D = 4.252 + 0.0086 v - 0.009 L = 7.7 pc/mi/ln
Density,
Level of service for ramp-freeway junction areas of influence A
  _____Speed Estimation______
Intermediate speed variable,
                                    D = 0.428
                                     S
                                   S = 49.4
Space mean speed in ramp influence area,
                                               mph
                                     R
Space mean speed in outer lanes,
                                   S = 60.3  mph
                                    0
```

S = 52.2 mph

0.897

1.000

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

PTG

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______Merge Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ramp from Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 NoBuild

Description: Detroit River International Crossing Project

______Freeway Data______

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1738	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	870	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)	1738	174		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	457	46		v
Trucks and buses	23	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%		%	%
Length	mi		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	1.000 1.00 183	pcph
	Estimation o	f V12 Merge Are	eas	
L = EQ	(Eq	uation 25-2 or	25-3)	
	0.602 Usi	ng Equation 1		
v = 12	v (P) = 12 $F FM$	28 pc/h		
	Capaci	ty Checks		
v FO		Maximum 6750	LOS F?	
v R12	1411	4600	No	
Level	of Service Det	ermination (if	not F)	
Density, D = 5.475 + 0 R Level of service for r	R	12	A	pc/mi/ln
	Speed Es	timation		
Intermediate speed var	iable,	M = 0	. 276	
Space mean speed in ra	mp influence ar	rea, $S = 52$	1.4 mph	
Space mean speed in ou	ter lanes,	R S = 53 0	3.9 mph	
Space mean speed for a	ll vehicles,	S = 52	2.3 mph	

Phone: E-mail:

Fax:

Merge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Clark Entrance Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

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	3481 vph	

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	442	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

ft

_____Conversion to pc/h Under Base Conditions_____

No

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3481	442		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	916	116		V
Trucks and buses	23	15		%
Recreational vehicles	0	0		9
Terrain type:	Level	Level		
Grade	90	엉	%	
Length	mi	mi	m	i
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
                              4086
Flow rate, vp
                                       500
                                                         pcph
      _____Estimation of V12 Merge Areas_____
              L =
                         (Equation 25-2 or 25-3)
              ΕQ
              P = 0.275 Using Equation 4
              v = v (P) = 1123 pc/h
              12 F FM
             _____Capacity Checks_____
                    Actual
                              Maximum
                                           LOS F?
                               9000
                     4586
                                            No
    FO
                     1623
                            4600
                                            No
    R12
        Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 14.2 pc/mi/ln
                   R
                          12
Level of service for ramp-freeway junction areas of influence B
 _____Speed Estimation_____
Intermediate speed variable,
                                  M = 0.276
                                   S
Space mean speed in ramp influence area,
                                  S = 51.4  mph
                                   R
Space mean speed in outer lanes,
                                   S = 51.5
                                             mph
```

Space mean speed for all vehicles,

0.897

0.930

 $S = 51.4 \quad mph$

Phone: Fax: E-mail: Merge Analysis____ Analyst: CH Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB Junction: Dragoon Entrance Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 3144 mph Free-flow speed on freeway Volume on freeway vph _____On Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 Free-flow speed on ramp 30.0 mph Volume on ramp vph 439 Length of first accel/decel lane 830 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

 _Conversion	to	pc/h	Under	Base	Conditions	

ft

Type of adjacent Ramp Distance to adjacent Ramp

Junction Components	Freeway		Ramp	Adja	cent
77 - 1	2111		420	Ramp	1-
Volume, V (vph)	3144		439		vph
Peak-hour factor, PHF	0.95		0.95		
Peak 15-min volume, v15	827		116		V
Trucks and buses	24		9		90
Recreational vehicles	0		0		%
Terrain type:	Level		Grade		
Grade		용	-2.00	90	olo
Length		mi	0.15	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
                              3707
Flow rate, vp
                                       483
                                                         pcph
             _____Estimation of V12 Merge Areas_____
              r =
                         (Equation 25-2 or 25-3)
              ΕQ
              P = 0.466 Using Equation 4
              FM
              v = v (P) = 1727 pc/h
              12 F FM
                _____Capacity Checks_____
                              Maximum
                                          LOS F?
                    Actual
                     4190
                               9000
                                            No
    FΟ
                     2210 4600
                                            No
    R12
    Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.3 pc/mi/ln
                      R 12
Level of service for ramp-freeway junction areas of influence B
 _____Speed Estimation_____
Intermediate speed variable,
                                  M = 0.307
                                   S
Space mean speed in ramp influence area, S = 51.0 mph
                                   R
Space mean speed in outer lanes,
                                   S = 53.2 \quad mph
                                   0
```

Space mean speed for all vehicles,

0.893 0.957

S = 52.0 mph

Phone: E-mail: Fax:

_____Merge Analysis_____

Analyst: CH

Agency/Co.: PARSONS Date performed: 8/15/2007
Analysis time period: PM Peak Freeway/Dir of Travel: I-75 NB

Junction:

Springwells Entrance Ramp

Jurisdiction:

Analysis Year: 2035 (PA0)

Description: Detroit River International Crossing Project

Freewa	av	Data
	- 4	

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2868	vph

On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	390	ft
Length of second accel/decel lane		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)	2868	415		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	755	109		V
Trucks and buses	25	2		90
Recreational vehicles	0	0		90
Terrain type:	Level	Grade		
Grade	9	-2.00	9	è
Length	mi	0.12	mi r	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 3396 441 Flow rate, vp pcph _____Estimation of V12 Merge Areas_____ r = (Equation 25-2 or 25-3) ΕQ P = 0.337 Using Equation 4 FMv = v (P) = 1143 pc/h12 F FM Capacity Checks Actual Maximum LOS F? 9000 3837 No FO 1584 4600 No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.2 pc/mi/lnR 12 Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_ Intermediate speed variable, M = 0.321S Space mean speed in ramp influence area, $S = 50.8 \quad mph$ R

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.889

0.990

S = 52.7 mph

 $S = 51.9 \quad mph$

Phone: Fax: E-mail: _____Diverge Analysis_____ Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: PM Peak Analyst: СН Freeway/Dir of Travel: I-75 NB Junction: Clark Exit Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data______ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 4 55.0 mph 3481 vph Volume on freeway _____Off Ramp Data____ Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp 30.0 mph Volume on ramp 101 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? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp £t. ______Conversion to pc/h Under Base Conditions_____ Junction Components Freeway Ramp Adjacent Ramp 3481 101 0.95 0.95 916 27 23 17 0 0 Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses 용 Recreational vehicles 용 Level Grade
0.00 % 1.00 %
0.00 mi 0.17 mi Terrain type: Grade Length

1.5 1.2

1.5 1.2

Trucks and buses PCE, ET
Recreational vehicle PCE, ER

mi

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                              1.00
                                        1.00
Flow rate, vp
                              4086
                                       115
                                                          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 = 1846 pc/h
               12 R F R FD
                  _____Capacity Checks_____
                     Actual
                                Maximum
                                            LOS F?
    v = v
                     4086
                                9000
                                             No
    Fi F
                    1846 4400
                                             No
    12
    v = v - v
                    3971 9000
                                             No
    FO F R
                     115
    V
                                2000
                                             No
    R
    _____Level of Service Determination (if not F)_____
Density,
                  D = 4.252 + 0.0086 v - 0.009 L = 15.6 pc/mi/ln
                                 12
Level of service for ramp-freeway junction areas of influence B
______Speed Estimation_____
Intermediate speed variable,
                                   D = 0.503
Space mean speed in ramp influence area, S = 48.5 mph
                                    R
Space mean speed in outer lanes,
                                   S = 59.9  mph
```

Space mean speed for all vehicles,

0

S = 54.1 mph

0.897

0.922

Phone: Fax: E-mail: _____Diverge Analysis_____ Analyst: CH
Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB Analyst: СН Junction: Dearborn Exit Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 3 55.0 mph 3069 vph Volume on freeway Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp 30.0 mph Volume on ramp 35 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? 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_____ Freeway Ramp Adjacent Junction Components Ramp 3069 35 0.95 0.95 808 9 25 6 0 0 Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses 양

1.5 1.2

용

Level Level
0.00 % 0.00 % %
0.00 mi 0.00 mi mi

1.5

1.2

Recreational vehicles

Length

Trucks and buses PCE, ET
Recreational vehicle PCE, ER

Terrain type: Grade

pcph

Estimation of V1	12 Diverge Areas
------------------	------------------

L = (Equation 25-8 or 25-9) ΕQ P = 0.667 Using Equation 5 v = v + (v - v) P = 2438 pc/h12 R F R FD

Capacity Checks

v = v Fi F	Actual 3634	Maximum 6750	LOS F? No
v 12	2438	4400	No
v = v - v FO F R	3596	6750	No
v R	38	2000	No

_____Level of Service Determination (if not F)_____

Density,

$$D = 4.252 + 0.0086 \text{ v} - 0.009 \text{ L} = 24.1 \text{ pc/mi/ln}$$
 $R = 12 \text{ D}$

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, D = 0.496Space mean speed in ramp influence area, S = 48.5mph R Space mean speed in outer lanes, S = 59.6mph 0 Space mean speed for all vehicles, S = 51.7 mph Phone: E-mail:

Fax:

____Diverge Analysis______

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Grand Blvd Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PA0)

Description: Detroit River International Crossing Project

Fr	cee	way	Da	ta

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0 mph	
Volume on freeway	3254 vph	

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	669	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?

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)	3254	669	-	vph
Peak-hour factor, PHF	0.95	0.95		_
Peak 15-min volume, v15	856	176		V
Trucks and buses	13	25		ૄ
Recreational vehicles	0	0		9
Terrain type:	Level	Grade		
Grade	0.00 %	2.94	9	90
Length	0.00 m:	i 0.13	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 0.939 0.889 1.00 1.00 3648 Flow rate, vp 792 pcph Estimation of V12 Diverge Areas (Equation 25-8 or 25-9) ΕQ P = 0.436 Using Equation 8 v = v + (v - v) P = 2037 pc/h12 R F R FD _____Capacity Checks Actual Maximum LOS F? 3648 9000 No Fi F 2037 4400 No 12 2856 9000 v = v - vNo FO F R 792 2000 Νo Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 19.7 pc/mi/lnDensity, 12 Level of service for ramp-freeway junction areas of influence B Speed Estimation_____

Intermediate speed variable, D = 0.564 S Space mean speed in ramp influence area, S = 47.7 mph R Space mean speed in outer lanes, S = 60.3 mph 0 Space mean speed for all vehicles, S = 52.5 mph

Phone: E-mail: Fax:

Diverge Analysis

Analyst: CH

Agency/Co.: PARSONS Date performed: 8/15/2007
Analysis time period: PM Peak Freeway/Dir of Travel: I-75 NB

Junction: Livernois Exit Ramp

Junction: Livernois in Jurisdiction: Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

Freeway Data	Ld
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Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3144	vph

____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	140	vph
Length of first accel/decel lane	300	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

Junction	Components	Freeway	-	Adjacent Ramp

_____Conversion to pc/h Under Base Conditions_____

No

vph

			Ramp	
Volume, V (vph)	3144	140	V	7ph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	827	37	Ţ	7
Trucks and buses	24	0	9	5
Recreational vehicles	0	0	9	Ś
Terrain type:	Level	Grade		
Grade	0.00 %	2.60 %	00	
Length	0.00 m	ni 0.16 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 1.000 0.893 1.00 1.00 3707 147 Flow rate, vp pcph Estimation of V12 Diverge Areas L = (Equation 25-8 or 25-9) EQ P = 0.436 Using Equation 8 v = v + (v - v) P = 1699 pc/h12 R F R FD _____Capacity Checks_____ LOS F? Actual Maximum v = v3707 9000 NoFi F 1699 4400 V No 12 9000 v = v - v3560 No FO F R 147 2000 No R Level of Service Determination (if not F) D = 4.252 + 0.0086 v - 0.009 L = 16.2 pc/mi/lnDensity, 12 D Level of service for ramp-freeway junction areas of influence B

_____Speed Estimation_____

Space mean speed in ramp influence area, S = 48.4 mph

D = 0.506

S = 60.3 mph

S = 54.2 mph

R

0

Intermediate speed variable,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Phone: E-mail:

Fax:

_____Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/15/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Springwells Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

Freeway Da	a t	Ċ	3
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Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0 mg	oh
Volume on freeway	2868 vr	oh

_____Off Ramp Data_____

No

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	202	vph
Length of first accel/decel lane	250	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 p	pc/h	Under	Base	Conditions
-----------------	------	-------	------	------------

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2868	202	-
			vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	755	53	V
Trucks and buses	25	1	%
Recreational vehicles	0	0	90
Terrain type:	Level	Grade	
Grade	0.00 %	-3.31 %	90
Length	0.00 mi	0.14 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 0.995 1.00 1.00 3396 214 Flow rate, vp 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 = 1601 pc/h12 R F R FD ____Capacity Checks_____ LOS F? Actual Maximum v = v3396 9000 No Fi F 1601 4400 No V 12 9000 3182 $\Delta = \Delta - \Delta$ No FO F R 214 1900 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 15.8 pc/mi/lnDensity,

Level of service for ramp-freeway junction areas of influence B

_____Speed Estimation_____

Intermediate speed variable, D = 0.577Space mean speed in ramp influence area, S = 47.5 mph R Space mean speed in outer lanes, $S = 60.3 \quad mph$ 0

Space mean speed for all vehicles, $S = 53.5 \quad mph$ PTG

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_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

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

Jurisdiction: MDOT

Analysis Year: 2035 No Build

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	2430	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	0	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

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)	2430	0	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	639	0	V
Trucks and buses	9	0	%
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	

```
Driver population factor, fP
                                1.00
                                          1.00
                                2673
Flow rate, vp
                                                            pcph
              _____Estimation of V12 Diverge Areas_____
              L =
                           (Equation 25-8 or 25-9)
               ΕQ
              P = 0.693 Using Equation 5
               FD
              v = v + (v - v) P = 1853 pc/h
               12 R F R FD
               _____Capacity Checks_____
                                            LOS F?
                                 Maximum
                      Actual
    v = v
                      2673
                                 6750
                                              No
    Fi F
                      1853
                                4400
                                              No
    V
    12
    v = v - v
                      2673
                                 6750
                                              No
    FO F R
                      0
                                 2000
                                              No
    R
      _____Level of Service Determination (if not F)______
                  D = 4.252 + 0.0086 v - 0.009 L = 11.2 pc/mi/ln
Density,
Level of service for ramp-freeway junction areas of influence B
  _____Speed Estimation_______
Intermediate speed variable,
                                    D = 0.428
                                     S
                                    S = 49.4
Space mean speed in ramp influence area,
                                               mph
                                     R
Space mean speed in outer lanes,
                                    S = 60.3 \quad mph
```

0

S = 52.3 mph

0.957

1.000

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

PTG

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______Merge Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 NB

Junction: Entrance Ramp from Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2430	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	187	vph
Length of first accel/decel lane	870	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)	2430	187		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	639	49		v
Trucks and buses	9	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	۶		8
Length	mi	r	ıi r	ni
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustm Driver population fac Flow rate, vp			1.000 1.00 197	pcph
	Estimation c	of V12 Merge Ar	ceas	
ΕÇ)	quation 25-2 or		
P FN	= 0.602 Usi	ng Equation 1	L	
	= v (P) = 16	009 pc/h		
	Capaci	ty Checks		
v FO		Maximum 6750	LOS F? No	
v R12	1806	4600	No	
Leve	el of Service Det	ermination (if	not F)	
Density, D = 5.475 + R Level of service for	R	12	A	pc/mi/ln
	Speed Es	stimation		
Intermediate speed va	riable,	M = 0 S	0.284	
Space mean speed in r	amp influence ar		51.3 mph	
Space mean speed in o	outer lanes,	R S = 5 0	53.0 mph	
Space mean speed for	all vehicles,	S = 5	51.9 mph	

PTG

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_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp to Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

______Freeway Data______

Type of analysis

Number of lanes in freeway

Free-flow speed on freeway

Volume on freeway

Diverge

3

Free 3

1120

wph

_____Off Ramp Data______

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	349	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)	1120	349	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	295	92	V
Trucks and buses	25	18	%
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	

Driver population fac		1.00 1	.00	
Flow rate, vp		1326 4	00	pcph
	Estimation of	V12 Diverge A	reas	
L EQ	_	ation 25-8 or	25-9)	
· · · · · · · · · · · · · · · · · · ·	= 0.708 Usin	g Equation 5		
v	= v + (v - v) P R F R		/h	
	Capacit	y Checks		
v = v Fi F	Actual 1326	Maximum 6750	LOS F? No	
v 12	1056	4400	No	
v = v - v FO F R	926	6750	No	
v R	400	2000	No	
Leve	l of Service Dete	rmination (if	not F)	
Density,	D = 4.252 + 0.0	086 v - 0.009		pc/mi/ln
Level of service for	ramp-freeway junc			
	Speed Est	imation		
Intermediate speed va	riable,	D = 0.	464	
Space mean speed in r	amp influence are		.0 mph	
Space mean speed in o	uter lanes,	S = 60 0	.3 mph	

0.889

0.917

S = 50.9 mph

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

Phone: Fax: E-mail: ____Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS Agency/Co.:
Date performed:
Analysis time period:
AM Peak
Freeway/Dir of Travel:
I-75 SB Clark Entrance Ramp Junction: Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 3274 vph Free-flow speed on freeway Volume on freeway ____On Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp Volume on ramp 61 vph 775 Length of first accel/decel lane 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	Adjac	cent
Volume, V (vph)	3274		61	Ramp	vph
Peak-hour factor, PHF	0.95		0.95		
Peak 15-min volume, v15	862		16		V
Trucks and buses	17		13		%
Recreational vehicles	0		0		용
Terrain type:	Level		Grade		
Grade	90	o O	3.81	9	90
Length	m	ni	0.13	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
                             3739
Flow rate, vp
                                      68
                                                        pcph
        ____Estimation of V12 Merge Areas_____
             L =
                         (Equation 25-2 or 25-3)
              ΕQ
              P = 0.366 Using Equation 4
              v = v (P) = 1370 pc/h
              12 F FM
             _____Capacity Checks_____
                              Maximum
                                         LOS F?
                    Actual
                    3807
                              9000
                                            No
    FO
                    1438 4600 No
    R12
      Level of Service Determination (if not F)_____
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.8 pc/mi/ln
                  R 12 A
Level of service for ramp-freeway junction areas of influence B
  _____Speed Estimation_____
Intermediate speed variable,
                                 M = 0.252
                                  S
Space mean speed in ramp influence area, S = 51.7 mph
Space mean speed in outer lanes,
                                 S = 52.5  mph
                                  0
```

Space mean speed for all vehicles,

0.922

0.939

S = 52.2 mph

Phone: Fax: E-mail: Merge Analysis_____ CH Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB Junction: Dearborn Entrance Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data______ Type of analysis Merqe Number of lanes in freeway 4 55.0 mph 2812 wph Free-flow speed on freeway Volume on freeway _____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 55.0 mph Volume on ramp 56 vph 400 Length of first accel/decel lane 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 ft Distance to adjacent Ramp _____Conversion to pc/h Under Base Conditions_____ Freeway Ramp Adjacent Junction Components 2812 56 0.95 0.95 740 15 20 25 0 C Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 V 9 Trucks and buses Recreational vehicles Level Level Terrain type:

Grade

Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

o mi

1.5 1.5 1.2 1.2

mi

mi

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 66 3256 Flow rate, vp pcph Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.291 Using Equation 4 v = v (P) = 946 pc/h12 F FM ____Capacity Checks_____ Maximum LOS F? Actual 3322 9000 No FΟ 1012 4600 No V R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.8 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_ Intermediate speed variable, M = 0.288S Space mean speed in ramp influence area, S = 51.3 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

0

S = 52.6 mph

S = 52.2 mph

0.909

0.889

Phone: Fax: E-mail: ______Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Livernois Entrance Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 3086 vph Free-flow speed on freeway Volume on freeway On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 30.0 mph Volume on ramp 122 vph Length of first accel/decel lane ft 375 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 Freeway Ramp Adjacent Junction Components 3086 122 0.95 0.95 812 32 18 0 0 Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 v Trucks and buses 왕 U 0
Level Grade
% 0.60 %
mi 0.11 mi
1.5 1.5
1.2 1.2 Recreational vehicles Terrain type:

용 mi

Grade

Length

Trucks and buses PCE, ET Recreational vehicle PCE, ER

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                              1.00
                                       1.00
                              3541
Flow rate, vp
                                      128
                                                        pcph
            _____Estimation of V12 Merge Areas_
             L =
                         (Equation 25-2 or 25-3)
              ΕO
              P = 0.341 Using Equation 4
              v = v (P) = 1208 pc/h
              12 F FM
              _____Capacity Checks_____
                              Maximum
                    Actual
                                          LOS F?
                     3669
                               9000
                                            No
    FΟ
                     1336
                            4600 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/ln
                  R 12 A
Level of service for ramp-freeway junction areas of influence B
   Speed Estimation_____
                                  M = 0.313
Intermediate speed variable,
                                   S
Space mean speed in ramp influence area, S = 50.9 mph
Space mean speed in outer lanes,
                                  S = 52.6  mph
                                   0
```

Space mean speed for all vehicles,

0.917

1.000

S = 52.0 mph

Phone: Fax: E-mail: Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/13/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Service Dr Ent Ramp N of Grand Junction: Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 3695 vph Free-flow speed on freeway Volume on freeway ____On Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp Volume on ramp 30 vph 590 Length of first accel/decel lane 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____ Freeway Ramp Adjacent Junction Components Ramp 3695 30 0.95 0.95 972 8 15 17 0 0 Level Level Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 V Trucks and buses % Recreational vehicles Terrain type: mi 1.5 1.5 1.2 1.0 Grade % mi 용

Мi

Length

Lengtn Trucks and buses PCE, ET Recreational vehicle PCE, ER

```
Heavy vehicle adjustment, fHV Driver population factor, fP
                             1.00
                                       1.00
                              4181
Flow rate, vp
                                      34
                                                        pcph
             Estimation of V12 Merge Areas
             Г =
                         (Equation 25-2 or 25-3)
              ΕQ
              P = 0.333 Using Equation 4
              v = v (P) = 1393 pc/h
              12 F FM
              _____Capacity Checks____
                              Maximum
                                          LOS F?
                    Actual
                     4215
                               9000
                                            No
    FO
                    1427
                            4600 No
    R12
      Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.9 pc/mi/ln
                      R 12 A
Level of service for ramp-freeway junction areas of influence B
      Speed Estimation_____
                                  M = 0.272
Intermediate speed variable,
                                   S
Space mean speed in ramp influence area, S = 51.5 mph
Space mean speed in outer lanes,
                                  S = 51.8 \quad mph
                                   0
```

Space mean speed for all vehicles,

0.930

0.922

S = 51.7 mph

Phone: Fax: E-mail: Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Springwells Entrance Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data______ Type of analysis Merge Number of lanes in freeway 55.0 mph 2608 wh Free-flow speed on freeway Volume on freeway ____On Ramp Data_____ Right Side of freeway 1 Number of lanes in ramp mph Free-flow speed on ramp 55.0 Volume on ramp 205 vph Length of first accel/decel lane 370 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 Freeway Ramp Adjacent Junction Components Ramp 205 0.95 54 3 Volume, V (vph) 2608 vph Peak-hour factor, PHF 0.95 686 22 Peak 15-min volume, v15 v

22 0

1.5

1.2

0

90

mi

6 mi

1.5 1.2

1.2

U J Level Level

응

용

mi

Trucks and buses

Terrain type:

Grade

Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 Flow rate, vp 3047 219 pcph _____Estimation of V12 Merge Areas L = (Equation 25-2 or 25-3) ΕQ P = 0.265 Using Equation 4 v = v (P) = 809 pc/h12 F FM _____Capacity Checks_____ Actual Maximum LOS F? 9000 3266 No FΟ 1028 4600 No R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.1 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation Intermediate speed variable, M = 0.291S

Space mean speed in ramp influence area, S = 51.2 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.901

0.985

S = 52.8 mph

S = 52.3 mph

0

Phone: Fax: E-mail: СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Clark Exit Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway 4 55.0 mph 3274 vph Free-flow speed on freeway Volume on freeway _____Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp mph 30.0 Volume on ramp 451 vph Length of first accel/decel lane 140 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 3274 451 0.95 0.95 862 119 17 0 Volume, V (vph) vph Peak-hour factor, PHF

0

1.5 1.2

0

1.2

Level Level
0.00 % 0.00 %

0.00 mi 0.00 mi

1.5

V

용

용

용

mi

Peak 15-min volume, v15

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Recreational vehicles

Trucks and buses

Terrain type: Grade

Length

```
Heavy vehicle adjustment, fHV Driver population factor, fP
                           0.922
                                   1.000
                             1.00
                                      1.00
Flow rate, vp
                             3739
                                      475
                                                        pcph
             ___Estimation of V12 Diverge Areas_____
             L =
                         (Equation 25-8 or 25-9)
              ΕO
             P = 0.436 Using Equation 8
              v = v + (v - v) P = 1898 pc/h
              12 R F R FD
             _____Capacity Checks_____
                                          LOS F?
                    Actual
                               Maximum
   v = v
                    3739
                               9000
                                           Νo
    Fi F
                    1898 4400
   V
                                           No
    12
                              9000
   \Delta = \Delta - \Delta
                    3264
                                           No
    FO F R
                    475
                           2000
                                           No
   V
    R
   Level of Service Determination (if not F)
                 D = 4.252 + 0.0086 v - 0.009 L = 19.3 pc/mi/ln
Density,
                                12
Level of service for ramp-freeway junction areas of influence B
  Speed Estimation____
```

D = 0.536

S = 60.3 mph

S

R

0

S = 53.4 mph

Intermediate speed variable,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Space mean speed in ramp influence area, S = 48.0 mph

Phone: Fax: E-mail: _____Diverge Analysis______ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Junction: Dragoon Exit Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway 4 55.0 mph 3086 vph Free-flow speed on freeway Volume on freeway _____Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 mph Free-Flow speed on ramp 30.0 Volume on ramp 249 vph Length of first accel/decel lane 260 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 Freeway Ramp Adjacent Junction Components 3086 249 0.95 0.95 812 66 18 3 Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 v Trucks and buses 용 Recreational vehicles Level Grade
0.00 % -4.00 %
0.00 mi 0.17 mi

9 mi

1.5 1.2

1.2

1.5 1.2

Terrain type: Grade

Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                            0.917
                              1.00
                                       1.00
                              3541
Flow rate, vp
                                       266
                                                         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 = 1694 pc/h
              12 R F R FD
              _____Capacity Checks_____
                                Maximum
                                          LOS F?
                     Actual
                                9000
    v = v
                     3541
                                             No
    Fi F
                    1694 4400
                                             No
    12
                              9000
    \Delta = \Delta - \Delta
                    3275
                                             No
    FO F R
                     266
                           2000
                                             No
    R
      Level of Service Determination (if not F)
                  D = 4.252 + 0.0086 v - 0.009 L = 16.5 pc/mi/ln
Density,
                                  12
Level of service for ramp-freeway junction areas of influence B
Speed Estimation_____
                                   D = 0.517
Intermediate speed variable,
Space mean speed in ramp influence area, S = 48.3 mph
                                    R
Space mean speed in outer lanes,
                                  S = 60.3 \quad mph
Space mean speed for all vehicles,
                             S = 53.9 \quad mph
```

0.985

Phone: E-mail: Fax:

_____Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: AM Peak
Freeway/Dir of Travel: I-75 SB

Junction:

Springwells Exit Ramp

Jurisdiction:

Analysis Year:

2035 (PAO)

Description: Detroit River International Crossing Project

F.	re	ew	ау	Data	Э
----	----	----	----	------	---

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2608	vph

Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	600	vph
Length of first accel/decel lane	535	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_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2608	600	- V	.bp
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	686	158	V	•
Trucks and buses	22	0	ଚ	
Recreational vehicles	0	0	%	
Terrain type:	Level	Grade		
Grade	0.00 %	-1.20	}	
Length	0.00 mi	0.13 n	ni mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

1.000 Heavy vehicle adjustment, fHV 0.901 Driver population factor, fP 1.00 1.00 3047 1.00 Flow rate, vp 632 pcph Estimation of V12 Diverge Areas L = (Equation 25-8 or 25-9) EO P = 0.436 Using Equation 8 v = v + (v - v) P = 1685 pc/h12 R F R FD _____Capacity Checks_____ Actual LOS F? Maximum 3047 9000 v = vNo Fi F 1685 4400 No 12 9000 $\Delta = \Delta - \Delta$ 2415 No FO F R 2000 632 No R Level of Service Determination (if not F)_____ D = 4.252 + 0.0086 v - 0.009 L = 13.9 pc/mi/lnDensity, Level of service for ramp-freeway junction areas of influence B Speed Estimation_____ D = 0.550Intermediate speed variable,

Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

 $S = 47.9 \quad mph$

S = 60.3 mph

R

0

S = 52.7 mph

PTG

26777 Central Park Blvd Southfield, MI 48076

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

E-mail: catherine.hartner@parsons.com

_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: Midday Peak

Analysis time period: Midday F Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp to Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis

Number of lanes in freeway

Free-flow speed on freeway

Volume on freeway

Diverge

3

Free-flow speed on freeway

55.0

mph

2561

vph

_____Off Ramp Data_____

Side of freeway

Number of lanes in ramp

Free-Flow speed on ramp

Volume on ramp

Length of first accel/decel lane

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)	2561	495		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	674	130		V
Trucks and buses	19	25		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00	\$	
Length	0.00 mi	. 0.00 t	ni m	i
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustm Driver population fac Flow rate, vp		1.00	0.889 1.00 586	pcph
	Estimation of	of V12 Diverge	Areas	
L EQ		quation 25-8 or	25-9)	
	= 0.659 Us:	ing Equation 5		
v 12	= v + (v - v) R F R		c/h	
	Capac:	ity Checks		
	Actual	Maximum	LOS F?	
v = v Fi F	2952	6750	No	
v 12	2146	4400	No	
v = v - v FO F R	2366	6750	No	
v R	586	2000	No	
Leve	l of Service Det	termination (if	not F)	
Density,			9 L = 15.6	pc/mi/ln
Level of service for	R ramp-freeway jur		D influence B	
	Speed Es	stimation		
Intermediate speed va	riable,	D = 0 S	. 481	
Space mean speed in r	amp influence a	_	8.8 mph	
Space mean speed in o	uter lanes,		0.3 mph	

Space mean speed for all vehicles,

S = 51.4 mph

Phone: Fax: E-mail: Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB
Junction: Junction: Clark Entrance Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 55.0 2693 Free-flow speed on freeway mph Volume on freeway vph _____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 mph Free-flow speed on ramp 55.0 Volume on ramp 161 vph Length of first accel/decel lane 775 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____ Freeway Ramp Adjacent Junction Components Ramp 2693 161 0.95 0.95 709 42 25 12 0 0 Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 V Trucks and buses 응 Recreational vehicles 0 ULevel Grade % 3.81 %. Terrain type: Grade 왕 mi 0.13 mi тi Length

1.5 1.5 1.2 1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 Flow rate, vp 3189 180 pcph _____Estimation of V12 Merge Areas L = (Equation 25-2 or 25-3) ΕQ P = 0.352 Using Equation 4 v = v (P) = 1124 pc/h12 F FM ____Capacity Checks_____ Actual Maximum LOS F? 3369 9000 NoFΟ 1304 4600 V No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.7 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B Speed Estimation Intermediate speed variable, M = 0.250S Space mean speed in ramp influence area, S = 51.7 mph R Space mean speed in outer lanes, S = 53.1 mph

Space mean speed for all vehicles,

0

S = 52.6 mph

0.889

0.943

Phone: E-mail:

Fax:

_____Merge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB

Junction:

Dearborn Entrance Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

Freewav	Data

Type of analysis Number of lanes in freeway	Merge 4		
Free-flow speed on freeway	55.0	mph	
Volume on freeway	3025	vph	

_____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	34	vph
Length of first accel/decel lane	400	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)	3025	34	-	vph
Peak-hour factor, PHF	0.95	0.95		-
Peak 15-min volume, v15	796	9		v
Trucks and buses	25	25		8
Recreational vehicles	0	0 .		8
Terrain type:	Level	Level		
Grade	90		%	o o
Length	mi		mi r	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 Flow rate, vp 3582 40 pcph _____Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.294 Using Equation 4 v = v (P) = 1053 pc/h12 F FM _____Capacity Checks_____ Maximum LOS F? Actual 3622 9000 NoFO 1093 4600 No R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.5 pc/mi/lnR 12 Level of service for ramp-freeway junction areas of influence B Speed Estimation Intermediate speed variable, M = 0.289S Space mean speed in ramp influence area, S = 51.2 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

R

0

S = 52.2 mph

S = 51.9 mph

0.889

0.889

Phone: Fax: E-mail: Merge Analysis_____ Analyst: СН Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB
Junction: Livernois Entrance Ramp Junction: Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 2828 vph Free-flow speed on freeway Volume on freeway _____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 mph vph Free-flow speed on ramp 30.0 Volume on ramp 303 Length of first accel/decel lane ft 375 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_____ Freeway Ramp Adjacent Junction Components 2828 303 0.95 0.95 744 80 25 25 0 0 Level Grade % 0.60 % Ramp vph Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 v Trucks and buses 용 Recreational vehicles

mi 0.11 mi 1.5 1.5 1.2 1.2

용

mi

Terrain type: Grade

Length

Trucks and buses PCE, ET Recreational vehicle PCE, ER Heavy vehicle adjustment, fHV 0.889
Driver population factor, fP 1.00 1.00 Flow rate, vp 3349 359 pcph _____Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.312 Using Equation 4 FMv = v (P) = 1046 pc/h12 F FM _____Capacity Checks_____ Maximum Actual LOS F? 9000 3708 NoFΟ 4600 No 1405 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 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, M = 0.314S Space mean speed in ramp influence area, S = 50.9 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.889

S = 52.7 mph

S = 52.0 mph

0

Phone: Fax: E-mail: Merge Analysis СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: Off Peak
Freeway/Dir of Travel: I-75 SB
Junction: Service Dr Ent Ramp N of Grand Junction: Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 2977 vph Free-flow speed on freeway Volume on freeway On Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp Volume on ramp 43 vph 590 Length of first accel/decel lane 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_____ Freeway Ramp Adjacent Junction Components 2977 43 0.95 0.95 783 11 25 16 0 0 Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 v Trucks and buses 용 Recreational vehicles 용 O Level Level % mi Terrain type: » mi 응 Grade тi Length Trucks and buses PCE, ET
Recreational vehicle PCE, ER 1.5 1.5 1.2 1.2

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 3525 Flow rate, vp 49 pcph Estimation of V12 Merge Areas_____ L = (Equation 25-2 or 25-3) ΕQ P = 0.331 Using Equation 4 v = v (P) = 1168 pc/h12 F FM _____Capacity Checks_____ Maximum Actual LOS F? 3574 9000 NoFO 1217 4600 No V R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.2 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B Speed Estimation_____ Intermediate speed variable, M = 0.269S Space mean speed in ramp influence area, S = 51.5 mph R Space mean speed in outer lanes, S = 52.6 mph

Space mean speed for all vehicles,

0

 $S = 52.2 \quad mph$

0.889

0.926

Phone: Fax: E-mail: Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB
Junction: Junction: Springwells Entrance Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 2719 vph Free-flow speed on freeway Volume on freeway _____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 55.0 mph Volume on ramp 306 vph Length of first accel/decel lane 370 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_____ Freeway Ramp Adjacent Junction Components Ramp 306 0.95 81 12 Volume, V (vph) 2719 vph 0.95 Peak-hour factor, PHF Peak 15-min volume, v15 716 V 25 Trucks and buses 왕 Recreational vehicles 0 0 응 Level Level Terrain type: Grade ° mi 9 응 Length Мi Мi

1.5 1.2

1.2

1.5 1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 Flow rate, vp 3220 341 pcph Estimation of V12 Merge Areas____ L = (Equation 25-2 or 25-3) ΕQ P = 0.250 Using Equation 4 FMv = v (P) = 806 pc/h12 F FM _____Capacity Checks_____ Actual Maximum LOS F? 3561 9000 NoFO 4600 No 1147 R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.9 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B Speed Estimation Intermediate speed variable, M = 0.293S Space mean speed in ramp influence area, S = 51.2 mph R Space mean speed in outer lanes, $S = 52.5 \quad mph$

Space mean speed for all vehicles,

0

S = 52.0 mph

0.889

0.943

Phone: E-mail:

Fax:

_____Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB

Junction:

Clark Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PA0)

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	2693 vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	328	vph
Length of first accel/decel lane	140	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)	2693	328	V	ph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	709	86	V	
Trucks and buses	25	3	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		

```
Heavy vehicle adjustment, fHV 0.889
Driver population factor, fP 1.00
                                       1.00
Flow rate, vp
                              3189
                                       350
                                                         pcph
             Estimation of V12 Diverge Areas
              L =
                          (Equation 25-8 or 25-9)
              EQ
              P = 0.436 Using Equation 8
              v = v + (v - v) P = 1588 pc/h
              12 R F R FD
              _____Capacity Checks_____
                                           LOS F?
                     Actual
                                Maximum
    v = v
                     3189
                                9000
                                            No
    Fi F
                    1588 4400
    V.
                                            No
    12
                              9000
    v = v - v
                    2839
                                            No
    FO F R
                     350
                            2000
                                            No
    V
    R
  Level of Service Determination (if not F)
                  D = 4.252 + 0.0086 v - 0.009 L = 16.6 pc/mi/ln
Density,
Level of service for ramp-freeway junction areas of influence B
  _____Speed Estimation_____
Intermediate speed variable,
                                   D = 0.525
Space mean speed in ramp influence area,
                                  S = 48.2  mph
                                   R
                                  s = 60.3 \quad mph
Space mean speed in outer lanes,
```

Space mean speed for all vehicles,

0

S = 53.6 mph

0.985

Phone: Fax: E-mail: _____Diverge Analysis_____ CH Analyst: Agency/Co.: PARSONS Agency/Co.:

Date performed:

Analysis time period:

Freeway/Dir of Travel:

Midday Peak

Freeway/Dir of Travel:

1-75 SB Junction: Dragoon Exit Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway 55.0 2828 Free-flow speed on freeway mph Volume on freeway vph _____Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 mph Free-Flow speed on ramp 30.0 vph Volume on ramp 26 260 Length of first accel/decel lane 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 2828 26 0.95 0.95 744 7 25 25 Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 25 V Trucks and buses o U 0
Level Grade
0.00 % -4.00 %
0.00 mi 0.17 mi
1.5 1.5
1.2 1.2 Recreational vehicles 엉

용 mi

Terrain type: Grade

Length

Trucks and buses PCE, ET Recreational vehicle PCE, ER

```
Heavy vehicle adjustment, fHV 0.889
Driver population factor, fP 1.00
                                      1.00
Flow rate, vp
                             3349
                                      31
                                                        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 = 1478 pc/h
              12 R F R FD
              _____Capacity Checks_____
                              Maximum LOS F?
                    Actual
3349
                               9000
    v = v
                                            No
    Fi F
                   1478 4400 No
    12
                             9000
                    3318
                                           No
    \Delta = \Delta - \Delta
    FO F R
                           2000
                    31
                                       No
    R
    Level of Service Determination (if not F)______
                 D = 4.252 + 0.0086 v - 0.009 L = 14.6 pc/mi/ln
Density,
Level of service for ramp-freeway junction areas of influence B
_____Speed Estimation_____
Intermediate speed variable,
                                 D = 0.496
                                  S
Space mean speed in ramp influence area, S = 48.6 mph
                                  R
                                 S = 60.3  mph
Space mean speed in outer lanes,
```

Space mean speed for all vehicles,

0.889

S = 54.5 mph

Phone: E-mail:

Fax:

_____Diverge Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-75 SB

Junction: Springwells Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

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

Diverge	
4	
55.0	mph
2719	vph
	4 55.0

____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	411	vph
Length of first accel/decel lane	535	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_____

Junction Components	Freeway	Ramp	Adjacent
			Ramp
Volume, V (vph)	2719	411	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	716	108	V
Trucks and buses	25	12	96
Recreational vehicles	0	0	96
Terrain type:	Level	Grade	
Grade	0.00 %	-1.20 %	8
Length	0.00 mi	0.13 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
                                      0.943
                             1.00
                                       1.00
                              3220
                                       459
Flow rate, vp
                                                        pcph
             Estimation of V12 Diverge Areas
             r =
                         (Equation 25-8 or 25-9)
              ΕQ
              P = 0.436 Using Equation 8
              v = v + (v - v) P = 1663 pc/h
              12 R F R FD
              _____Capacity Checks_____
                    Actual
                              Maximum
                                          LOS F?
                     3220
                               9000
                                            No
    Fi F
                    1663 4400
                                            No
    V
    12
                              9000
    \nabla = \Delta - \Delta
                    2761
                                           No
    FO F R
                     459
                              2000
                                           No
    R
      Level of Service Determination (if not F)_____
                  D = 4.252 + 0.0086 v - 0.009 L = 13.7 pc/mi/ln
Density,
                                 12
Level of service for ramp-freeway junction areas of influence B
_____Speed Estimation_____
Intermediate speed variable,
                                   D = 0.534
```

Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

S = 48.1 mph

S = 60.3 mph

R

 $S = 53.3 \qquad mph$

PTG

26777 Central Park Blvd Southfield, MI 48076

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

E-mail: catherine.hartner@parsons.com

_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction: Exit Ramp to Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 No Build

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	4893	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	972	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)	4893	972	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	1288	256	V
Trucks and buses	9	19	%
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	

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.957 1.00 5382	0.913 1.00 1120		pcph
	_Estimation of	V12 Diverge	Areas		
L = EQ	(Equ	uation 25-8 o	r 25-9)	
	0.574 Usir	ng Equation	5		
v = v	+ (v - v) I R F R	P = 3566 FD	pc/h		
	Capacit	cy Checks			
v = v Fi F	Actual 5382	Maximum 6750		LOS F?	
v 12	3566	4400		No	
v = v - v FO F R	4262	6750		No	
v R	1120	2000		No	
Level of	Service Dete	ermination (i	f not	F)	
	= 4.252 + 0.0				pc/mi/ln
Level of service for ramp	R p-freeway jund		D of infl		
	Speed Est	cimation			
Intermediate speed variab	ole,	D =	0.529		
Space mean speed in ramp	influence are		48.1	mph	
Space mean speed in outer	lanes,	S = 0	57.2	mph	
Space mean speed for all	vehicles,	S =	50.8	mph	

Phone: Fax: E-mail: Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB Junction: Clark Entrance Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 5354 vph Free-flow speed on freeway Volume on freeway On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 55.0 mph Volume on ramp 530 vph Length of first accel/decel lane 775 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_____ Freeway Ramp Adjacent Junction Components Ramp 5354 530 0.95 0.95 1409 139 12 2 0 0 Level Grade % 3.81 % mi 0.13 mi Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 v Trucks and buses 응 Recreational vehicles

1.5 1.5 1.2 1.2

용

mi

Terrain type:

Grade

Length

Trucks and buses PCE, ET Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 5974 563 Flow rate, vp. pcph Estimation of V12 Merge Areas L = (Equation 25-2 or 25-3) ΕQ P = 0.305 Using Equation 4 v = v (P) = 1819 pc/h12 F FM _____Capacity Checks_____ Maximum LOS F? Actual 6537 9000 NoFO2382 4600 No v R12 Level of Service Determination (if not F) Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.9 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ M = 0.278Intermediate speed variable, S Space mean speed in ramp influence area, S = 51.4 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

0.943

0.990

S = 49.3 mph

S = 50.1 mph

0

Phone: Fax: E-mail: _______Merge Analysis_____ СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Dearborn Entrance Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project ______Freeway Data_____ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 55.0 mph 6313 vph Volume on freeway vph ____On Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp Volume on ramp 71 vph Length of first accel/decel lane 400 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 Freeway Ramp Adjacent Junction Components 6313 71 0.95 0.95 1661 19 Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 V Trucks and buses 응 0 Recreational vehicles 0 왕 Level Level Terrain type: ő mi % Grade 용 Length mi тi Trucks and buses PCE, ET 1.5 1.5 1.2 1.2

Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV Driver population factor, fP 1.00 1.00 6978 Flow rate, vp 76 pcph Estimation of V12 Merge Areas L = (Equation 25-2 or 25-3) ΕQ P = 0.289 Using Equation 4 v = v (P) = 2019 pc/h12 F FM ____Capacity Checks____ Maximum LOS F? Actual 7054 9000 V Νo FΟ 2095 4600 No V R12 Level of Service Determination (if not F)_____ Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.3 pc/mi/lnR 12 A Level of service for ramp-freeway junction areas of influence B _____Speed Estimation_____ Intermediate speed variable, M = 0.309

Space mean speed in ramp influence area, S = 51.0 mph

Space mean speed in outer lanes,

Space mean speed for all vehicles,

S

R

0

S = 47.4 mph

S = 48.4 mph

0.952

0.985

Phone: Fax: E-mail: Merge Analysis_____ CH Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Livernois Entrance Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 55.0 mph 5814 vph Free-flow speed on freeway Volume on freeway ____On Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 mph Free-flow speed on ramp 30.0 Volume on ramp 254 vph Length of first accel/decel lane 375 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 Freeway Ramp Adjacent Junction Components 5814 254 0.95 0.95 1530 67 11 23 0 Ramp Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 V Trucks and buses કૃ 0 Level Grade % 0.60 % Recreational vehicles 응 Terrain type:

1.5 1.2

양 mi

mi 0.11 mi

1.5 1.2

1.2

Grade

Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

pcph

	Estimation o	f V12 Merge Are	eas	
L = EQ	(Eq	uation 25-2 or	25-3)	
	0.320 Usi	ng Equation 4		
v = 12	$ \begin{array}{ccc} F & FM \end{array} = 20 $	66 pc/h		
	Capaci	ty Checks		
	Actual	Maximum	LOS F?	
V	6755		No	
FO V	2364	4600	No	
R12	2004	4000	110	
Level	of Service Det	ermination (if	not F)	
	R	12	A	-
Level of service for r	amp-freeway jun	ction areas of	influence	С
	Speed Es	timation		
Intermediate speed var	riable,	M = 0 S	.340	
Space mean speed in ra	mp influence ar		0.6 mph	
Space mean speed in ou	iter lanes,		8.9 mph	
Space mean speed for a	all vehicles,	ŭ	9.5 mph	

Phone: Fax: E-mail: Merge Analysis CH Analyst: Agency/Co:: PARSONS
Date performed: 8/16/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Service Dr Ent Ramp N of Grand Junction: Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 5562 vph Free-flow speed on freeway Volume on freeway _____On Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp 238 vph Volume on ramp 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_____ Freeway Ramp Adjacent Junction Components Ramp 5562 238 0.95 0.95 1464 63 11 11 0 0 Volume, V (vph) vph Peak-hour factor, PHF Peak 15-min volume, v15 V Trucks and buses 응 Recreational vehicles U J Level Level % Terrain type: б mi % mi

1.5 1.5 1.2 1.2

용 mi

Grade

Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Heavy vehicle adjustment, fHV 0.948 0.948
Driver population factor, fP 1.00 1.00
Flow rate, vp 6177 264

pcph

	Estimation of	V12 Merge Area	as			
	= (Equa	ation 25-2 or 2	25-3)			
Р	= 0.304 Using	g Equation 4				
V	= v (P) = 1880 2 F FM) pc/h				
	Capacity	y Checks				
V FO	Actual 6441	Maximum 9000	LOS F? No			
v R12	2144	4600	No			
Let	vel of Service Dete	rmination (if	not F)			
R	Density, D = $5.475 + 0.00734$ v + 0.0078 v - 0.00627 L = 18.4 pc/mi/ln R R 12 A Level of service for ramp-freeway junction areas of influence B					
	Speed Est	imation				
Intermediate speed v	variable,	M = 0.	289			
Space mean speed in	ramp influence are		.2 mph			
Space mean speed in	outer lanes,	S = 49	.1 mph			
Space mean speed for	all vehicles,	S = 49	.8 mph			

Phone: Fax: E-mail: Merge Analysis СН Analyst: Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB Junction: Springwells Entrance Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Merge Number of lanes in freeway 4 55.0 mph 5810 wph Free-flow speed on freeway Volume on freeway _____On Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 Free-flow speed on ramp 55.0 mph Volume on ramp 502 vph Length of first accel/decel lane 370 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_____ Freeway Ramp Adjacent Junction Components Ramp 502 502 0.95 1529 11 0 Volume, V (vph) vph Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 V Trucks and buses 용

Level Level

1.5 1.5 1.2 1.2

ő mi

тi

용

mi

Recreational vehicles

Trucks and buses PCE, ET Recreational vehicle PCE, ER

Terrain type:

Grade

Length

```
Heavy vehicle adjustment, fHV Driver population factor, fP
                              1.00
                                        1.00
Flow rate, vp
                                       536
                              6452
                                                          pcph
        _____Estimation of V12 Merge Areas
              L =
                          (Equation 25-2 or 25-3)
              ΕQ
              P = 0.226 Using Equation 4
              FM
              v = v (P) = 1457 pc/h
               12 F FM
              _____Capacity Checks_____
                     Actual
                               Maximum
                                            LOS F?
                     6988
                                9000
                                             No
    FΟ
                     1993
                             4600
    V
                                             No
    R12
       Level of Service Determination (if not F)
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.5 pc/mi/ln
                      R 12
Level of service for ramp-freeway junction areas of influence B
_____Speed Estimation_____
Intermediate speed variable,
                                  M = 0.309
                                   S
Space mean speed in ramp influence area, S = 51.0 mph
                                   R
Space mean speed in outer lanes,
                                   S = 47.3 \quad mph
```

Space mean speed for all vehicles,

0

S = 48.3 mph

0.948

0.985

Phone: Fax: E-mail: _____Diverge Analysis______ Analyst: СН Agency/Co.: PARSONS
Date performed: 8/16/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB
Junction: Junction: Clark Exit Ramp Jurisdiction: Analysis Year: 2035 (PA0) Description: Detroit River International Crossing Project _____Freeway Data_____ Diverge Type of analysis Number of lanes in freeway Free-flow speed on freeway 55.0 5354 mph Volume on freeway vph ____Off Ramp Data_____ Side of freeway Right Number of lanes in ramp 1 mph Free-Flow speed on ramp 30.0 Volume on ramp 447 vph Length of first accel/decel lane 140 ft Length of second accel/decel lane ft

Conversion	to	pc/h	Under	Base	Conditions	
		_				

_____Adjacent Ramp Data (if one exists)

No

vph

ft

Does adjacent ramp exist?

Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp

Volume on adjacent ramp

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5354	447	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	1409	118	v
Trucks and buses	12	4	୍
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	

```
Heavy vehicle adjustment, fHV
Driver population factor, fP
                            0.943
                                      0.980
                              1.00
                                       1.00
                              5974
                                       480
Flow rate, vp
                                                         pcph
             Estimation of V12 Diverge Areas____
              L =
                         (Equation 25-8 or 25-9)
              EQ
              P = 0.436 Using Equation 8
              v = v + (v - v) P = 2875 pc/h
              12 R F R FD
             ____Capacity Checks_____
                    Actual
                                Maximum
                                           LOS F?
   v = v
                     5974
                                9000
                                            No
    Fi F
                   2875 4400
   V
                                            No
    12
   \Delta = \Delta - \Delta
                    5494
                              9000
                                            No
    FO F R
                     480
                            2000
    V
                                            Nο
      Level of Service Determination (if not F)
Density,
                  D = 4.252 + 0.0086 v - 0.009 L = 27.7 pc/mi/ln
                                 12
Level of service for ramp-freeway junction areas of influence C
_____Speed Estimation_____
Intermediate speed variable,
                                   D = 0.536
                                   S
```

S = 48.0 mph

S = 58.2 mph

R

0

S = 52.8 mph

Space mean speed in ramp influence area,

Space mean speed in outer lanes,

Space mean speed for all vehicles,

Phone: Fax: E-mail: ____Diverge Analysis_____ СН Analyst: Agency/Co.: PARSONS Agency/Co.:

Date performed:

Analysis time period:

Freeway/Dir of Travel:

PARSONS
8/16/2007

PM Peak
Freeway/Dir of Travel:

I-75 SB Junction: Dragoon Exit Ramp Jurisdiction: Analysis Year: 2035 (PAO) Description: Detroit River International Crossing Project _____Freeway Data_____ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 55.0 5814 mph Volume on freeway vph ____Off Ramp Data_____ Right Side of freeway Number of lanes in ramp 1 mph Free-Flow speed on ramp 30.0 Volume on ramp 70 vph Length of first accel/decel lane 260 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	Adjacen Ramp	t
Volume, V (vph)	5814	70	ı	vph
Peak-hour factor, PHF	0.95	0.95		•
Peak 15-min volume, v15	1530	18		v
Trucks and buses	11	25		9
Recreational vehicles	0	0		ૄ
Terrain type:	Level	Grade		
Grade	0.00 %	-4.00	90	용
Length	0.00 m:	i 0.17	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

pcph

	Estimation of	V12 Diverge An	ceas	
L =	(Equ	uation 25-8 or 2	25-9)	
EQ P = FD	0.436 Usir	ng Equation 8		
v = 12	v + (v - v) I R F R	P = 2862 pc/ FD	/h	
	Capacit	cy Checks		
v = v Fi F	Actual 6457	Maximum 9000	LOS F? No	
v 12	2862	4400	No	
v = v - v FO F R	6374	9000	No	
v R	83	2000	No	
Level	of Service Dete	ermination (if m	not F)	
Density, Level of service for ra	R		D	pc/mi/ln
		timation		
Intermediate speed vari	lable,	D = 0.5	500	
Space mean speed in ran	np influence are	· -	.5 mph	
Space mean speed in out	ter lanes,		.2 mph	
Space mean speed for all	ll vehicles,	S = 53	.0 mph	

Fax:

_____Diverge Analysis______

Analyst: CH

Agency/Co.: PARSONS Date performed: 8/16/2007
Analysis time period: PM Peak
Freeway/Dir of Travel: I-75 SB

Junction:

Springwells Exit Ramp

Jurisdiction:

Analysis Year: 2035 (PAO)

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	5810	vph

____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	257	vph
Length of first accel/decel lane	535	ft
Length of second accel/decel lane		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)	5810		257		vph
Peak-hour factor, PHF	0.95		0.95		•
Peak 15-min volume, v15	1529		68		V
Trucks and buses	11		19		00
Recreational vehicles	0		0		ଚ
Terrain type:	Level		Grade		
Grade	0.00	응	-1.20	용	୧ -
Length	0.00	mi	0.13	шi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

Driver population Flow rate, vp	factor, fP		1.00 6452	1.00 296		pcph
	Est	imation of '	V12 Diverge	Areas_		
	L = EQ	(Equa	tion 25-8 o	r 25-9)		
		436 Using	Equation	8		
		(v - v) P F R F		pc/h		
		Capacity	Checks			·
v = v Fi F		ctual 452	Maximum 9000		LOS F?	
v 12	2	980	4400		No	
v = v - v FO F R	6	156	9000		No	
V R	2	96	2000		No	
	Level of Se	rvice Deter	mination (i	f not I	f)	
Density,	D = 4 R	.252 + 0.00		09 L D	= 25.1	pc/mi/ln
Level of service	for ramp-fr	eeway junct	ion areas o	f influ	lence C	
		_Speed Esti	mation		- 	
Intermediate spee	d variable,		D =	0.520		
Space mean speed	in ramp inf	luence area		48.2	mph	
Space mean speed	in outer la	nes,		57.5	mph	

S = 52.8 mph

Heavy vehicle adjustment, fHV 0.948 0.913

Space mean speed for all vehicles,

PTG

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_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: AM Peak
Freeway/Dir of Travel: I-96 EB

Junction: Exit Ramp to Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

______Freeway Data______

Type of analysis

Number of lanes in freeway

Free-flow speed on freeway

Volume on freeway

Diverge

2

mph

1120

wph

_____Off Ramp Data_____

Side of freeway Right

Number of lanes in ramp 1

Free-Flow speed on ramp 35.0 mph

Volume on ramp 349 vph

Length of first accel/decel lane 770 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)	1120	349	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	295	92	V
Trucks and buses	25	18	%
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	

```
Driver population factor, fP
                               1.00
                                         1.00
                               1326
Flow rate, vp
                                         400
                                                           pcph
              _____Estimation of V12 Diverge Areas____
              L =
                           (Equation 25-8 or 25-9)
               ΕQ
              P = 1.000 Using Equation 0
               FD
              v = v + (v - v) P = 1326 pc/h
               12 R F R FD
               _____Capacity Checks_____
                                            LOS F?
                                 Maximum
                      Actual
    v = v
                      1326
                                 4500
                                              No
    Fi F
                      1326
                                 4400
                                             No
    V
    12
                      926
    v = v - v
                                 4500
                                              No
    FO F R
                      400
                                 2000
                                              No
    R
      ______Level of Service Determination (if not F)______
                  D = 4.252 + 0.0086 v - 0.009 L = 8.7 pc/mi/ln
Density,
Level of service for ramp-freeway junction areas of influence A
  _____Speed Estimation______
Intermediate speed variable,
                                    D = 0.464
                                     S
                                   S = 49.0
Space mean speed in ramp influence area,
                                               mph
                                     R
Space mean speed in outer lanes,
                                   S = N/A mph
                                    0
```

S = 49.0

mph

0.889

0.917

Heavy vehicle adjustment, fHV

Space mean speed for all vehicles,

PTG

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_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08

Date performed: 11/17/08
Analysis time period: Midday Peak
Freeway/Dir of Travel: I-96 EB

Junction: Exit Ramp to Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 55.0

Free-flow speed on freeway 55.0 mph Volume on freeway 909 vph

_____Off Ramp Data_____

Side of freeway

Number of lanes in ramp

Free-Flow speed on ramp

Volume on ramp

Length of first accel/decel lane

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)	909	495	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	239	130	V
Trucks and buses	25	25	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00	%
Length	0.00 m	L 0.00 r	ni mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.889 1.00 1076	0.889 1.00 586		pcph
	_Estimation of	E V12 Diverge	e Areas		
L = EO	(Equ	uation 25-8 d	or 25-9)	
~	1.000 Usir	ng Equation	0		
v = v	+ (v - v) I R F R		pc/h		
	Capacit	cy Checks			
v = v	Actual 1076	Maximum 4500		LOS F?	
Fi F V 12	1076	4400		No	
v = v - v FO F R	490	4500		No	
v R	586	2000		No	
Level o	f Service Dete	ermination (:	if not 1	F)	
	= 4.252 + 0.0	0086 v - 0.0			pc/mi/ln
Level of service for ram					
	Speed Est	cimation			
Intermediate speed varia	ble,	D =	0.481		
Space mean speed in ramp	influence are		48.8	mph	
Space mean speed in oute	r lanes,		N/A	mph	

Space mean speed for all vehicles,

S = 48.8

mph

PTG

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_____Diverge Analysis______

Analyst: CH
Agency/Co.: PARSONS
Date performed: 11/17/08
Analysis time period: PM Peak
Freeway/Dir of Travel: I-96 EB

Junction: Exit Ramp to Ambassador

Jurisdiction: MDOT

Analysis Year: 2035 No Build

Description: Detroit River International Crossing Project

_____Freeway Data______

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 55.0 mph
Volume on freeway 1864 vph

_____Off Ramp Data_____

Side of freeway

Number of lanes in ramp

Free-Flow speed on ramp

Volume on ramp

Length of first accel/decel lane

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)	1864	972	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	491	256	V
Trucks and buses	15	19	%
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	

Heavy vehicle adjustme Driver population fact Flow rate, vp		1.00 1	.913 .00 120	pcph
	Estimation c	of V12 Diverge A	reas	
L = EQ	= (Ec	quation 25-8 or	25-9)	
P = FD	= 1.000 Usi	ng Equation 0		
	= v + (v - v) R F R	P = 2109 pc FD	/h	
	Capaci	ty Checks		
v = v Fi F	Actual 2109	Maximum 4500	LOS F? No	
v 12	2109	4400	No	
v = v - v FO F R	989	4500	No	
v R	1120	2000	No	
Leve	l of Service Det	ermination (if	not F)	
Density,			L = 15.5	pc/mi/ln
Level of service for a	R camp-freeway jur	= =	D influence B	
	Speed Es	stimation		
Intermediate speed var	riable,	D = 0.	529	
Space mean speed in ra	amp influence ar		.1 mph	
Space mean speed in or	iter lanes,	S = N	M/A mph	
Space mean speed for a	all vehicles,	S = 48	.1 mph	

Fax:

Operational Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: AM Peak
Freeway/Dir of Travel: I-75 NB

Weaving Location: From Clark Ent. to Grand Exit

Jurisdiction:

Analysis Year: 2035 (PA0)

Description: Detroit River International Crossing Project

_____Inputs_____

Freeway free-flow speed, SFF	55	mph
Weaving number of lanes, N	5	
Weaving segment length, L	1251	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	А	
Volume ratio, VR	0.10	
Weaving ratio, R	0.43	

____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	4957	80	216	297	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	1304	21	57	78	V
Trucks and buses	12	3	25	19	양
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	0.943	0.985	0.889	0.913	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	5530	85	255	342	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	0.61	0.25
Weaving and non-weaving speeds, Si	42.90	50.91
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	50.02	mph
Weaving segment density, D	24.84	pc/mi/ln
Level of service, LOS	С	
Capacity of base condition, cb	9641	pc/h
Capacity as a 15-minute flow rate, c	9095	pc/h
Capacity as a full-hour volume, ch	8640	pc/h

_____Limitations on Weaving Segments_____

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	597	2800	a
Average flow rate (pcphpl)	1242	2250	b
Volume ratio, VR	0.10	0.20	С
Weaving ratio, R	0.43	N/A	d
Weaving length (ft)	1251	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.
- 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
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (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
- 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.

Fax:

_____Operational Analysis_____

Analyst: СН

Agency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15/2007
Analysis Time Period: Midday Peak Freeway/Dir of Travel: I-75 NB

Weaving Location: From Clark Ent. to Grand Exit

Jurisdiction:

Analysis Year:

2035 (PAO)

Description: Detroit River International Crossing Project

_____Inputs_____ Freeway free-flow speed, SFF 55 mph Weaving number of lanes, N 5 Weaving segment length, L 1251 ft Terrain type Level Grade Length mi Weaving type Α Volume ratio, VR 0.30 Weaving ratio, R 0.34

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2095	40	595	314	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	551	11	157	83	V
Trucks and buses	25	0	25	22	્રે
Recreational vehicles	0	0	0	0	9
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	0.901	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2480	42	704	366	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	1.22	0.14
Weaving and non-weaving speeds, Si	35.28	54.49
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

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

Type of operation is

1.86

Constrained

______Weaving Segment Speed, Density, Level of Service and Capacity_____

Weaving segment speed, S	46.89	mph
Weaving segment density, D	15.32	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	9061	pc/h
Capacity as a 15-minute flow rate, c	8054	pc/h
Capacity as a full-hour volume, ch	7651	pc/h

Limitations on Weaving Segments_____

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	1070	2800	а
Average flow rate (pcphpl)	718	2250	b
Volume ratio, VR	0.30	0.20	С
Weaving ratio, R	0.34	N/A	d
Weaving length (ft)	1251	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.

HCS+: Freeway Weaving Release 5.2

Phone: E-mail: Fax:

_____Operational Analysis______

СН Analyst:

Agency/Co.: Agency/Co.: PARSONS
Date Performed: 8/15/2007 Analysis Time Period: PM Peak Freeway/Dir of Travel: I-75 NB

Weaving Location: From Clark Ent. to Grand Exit

Jurisdiction:

Analysis Year: 2035 (PAO)

Description: Detroit River International Crossing Project

_____Inputs_____

	_	
Freeway free-flow speed, SF	F 55	mph
Weaving number of lanes, N	5	
Weaving segment length, L	1251	ft
Terrain type	Level	•
Grade		%
Length		mi
Weaving type	A	
Volume ratio, VR	0.29	
Weaving ratio, R	0.39	

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving	Ī	
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2812	48	669	442	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	740	13	176	116	V
Trucks and buses	12	0	25	15	ે
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	0.943	1.000	0.889	0.930	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	3137	50	792	500	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	1.49	0.18
Weaving and non-weaving speeds, Si	33.10	53.12
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 45.23 mph Weaving segment density, D 19.81 pc/mi/ln Level of service, LOS Capacity of base condition, cb 9061 pc/h Capacity as a 15-minute flow rate, c 8548 pc/h Capacity as a full-hour volume, ch 8121 pc/h

_____Limitations on Weaving Segments_____

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	1292	2800	а
Average flow rate (pcphpl)	895	2250	b
Volume ratio, VR	0.29	0.20	С
Weaving ratio, R	0.39	N/A	d
Weaving length (ft)	1251	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.
- 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 cases.
- 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 h. 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.

Fax:

_____Operational Analysis_____

Analyst: CH
Agency/Co.: PARSONS
Date Performed: 8/16/2007
Analysis Time Period: AM Peak Freeway/Dir of Travel: I-75 SB

Weaving Location: From Amb. Ent. to Clark Exit

Jurisdiction:

Analysis Year: 2035 (PA0)

Description: Detroit River International Crossing Project

nputs		
The same flow and GPT	r.r	1-
Freeway free-flow speed, SFF	55	mph
Weaving number of lanes, N	5	
Weaving segment length, L	1316	ft
Terrain type	Level	
Grade		<u>o</u>
Length		mi
Weaving type	A	
Volume ratio, VR	0.28	
Weaving ratio, R	0.38	

_____Conversion to pc/h Under Base Conditions_____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2631	178	451	643	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	692	47	119	169	v
Trucks and buses	15	3	0	25	90
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	0.930	0.985	1.000	0.889	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2977	190	474	761	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	1.38	0.17
Weaving and non-weaving speeds, Si	33.87	53.60
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)

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

Type of operation is

1.85

Constrained

______Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	46.07	mph
Weaving segment density, D	19.11	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	9129	pc/h
Capacity as a 15-minute flow rate, c	8492	pc/h
Capacity as a full-hour volume, ch	8067	pc/h

_____Limitations on Weaving Segments_____

		If Max Exce	eded See Note
	Analyzed	Maximum	Note
Weaving flow rate, Vw	1235	2800	a
Average flow rate (pcphpl)	880	2250	b
Volume ratio, VR	0.28	0.20	С
Weaving ratio, R	0.38	N/A	d
Weaving length (ft)	1316	2500	е
Motog			

- 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.

Fax:

_____Operational Analysis_____

Analyst: СН

Agency/Co.: PARSONS
Date Performed: 8/16/2007
Analysis Time Period: Midday Peak
Freeway/Dir of Travel: I-75 SB
Weaving Location:

Weaving Location: From Amb. Ent. to Clark Exit

Jurisdiction:

2035 (PA0) Analysis Year:

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		9
Length		mi
Weaving type	A	
Volume ratio, VR	0.24	
Weaving ratio, R	0.40	

_____Conversion to pc/h Under Base Conditions____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	2253	131	328	440	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	593	34	86	116	v
Trucks and buses	25	0	3	25	90
Recreational vehicles	0	0	0	0	96
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	0.985	0.889	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2668	137	350	521	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	1.08	0.11
Weaving and non-weaving speeds, Si	36.67	55.39
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 1.64 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	49.41	mph
Weaving segment density, D	14.88	pc/mi/ln
Level of service, LOS	В	
Capacity of base condition, cb	9129	pc/h
Capacity as a 15-minute flow rate, c	8115	pc/h
Capacity as a full-hour volume, ch	7709	pc/h

_____Limitations on Weaving Segments_____

	If Max Exceeded See Note		
	Analyzed	Maximum	Note
Weaving flow rate, Vw	871	2800	a
Average flow rate (pcphpl)	735	2250	b
Volume ratio, VR	0.24	0.20	С
Weaving ratio, R	0.40	N/A	d
Weaving length (ft)	1316	2500	е
Motoc.			

- 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.
- Three-lane Type A segments do not operate well at volume ratios greater d. 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 cases.
- f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (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 cases.
- 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
- 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.

Fax:

Operational Analysis_____

Analyst: CH

Agency/Co.: PARSONS
Date Performed: 8/16/2007
Analysis Time Period: PM Peak
Freeway/Dir of Travel: I-75 SB

Weaving Location: From Amb. Ent. to Clark Exit

Jurisdiction:

Analysis Year: 2035 (PAO)

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		8
Length		mi
Weaving type	A	
Volume ratio, VR	0.19	
Weaving ratio, R	0.38	

_____Conversion to pc/h Under Base Conditions____

	Non-Weaving		Weaving		
	V	V	V	V	
	A-C	B-D	A-D	B-C	
Volume, V	4683	172	447	670	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	1232	45	118	176	v
Trucks and buses	10	0	4	25	8
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	0.952	1.000	0.980	0.889	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	5175	181	479	793	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	1.76	0.21
Weaving and non-weaving speeds, Si	31.31	52.14
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7) 1.53
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 Weaving segment density, D		mph pc/mi/ln
	20.07	bc/mr/ Tu
Level of service, LOS	D	
Capacity of base condition, cb	9176	pc/h
Capacity as a 15-minute flow rate, c	8739	pc/h
Capacity as a full-hour volume, ch	8302	pc/h

Limitations on Weaving Segments______

		If Max Exceeded See Not		
	Analyzed	Maximum	Note	
Weaving flow rate, Vw	1272	2800	a	
Average flow rate (pcphpl)	1325	2250	b	
Volume ratio, VR	0.19	0.20	С	
Weaving ratio, R	0.38	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.
- 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.