

APPENDIX

Appendix A : Input data set and Output results of simulation

Scenario 1 : Analysis of Ramp – Weave Section

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1
TRAF SIMULATION MODEL
DEVELOPED FOR
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
TFHRC INTELLIGENT SYSTEMS & TECHNOLOGIES DIVISION
INPUT CARD FILE LIST
1
0SEQ.# :----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
1 :ITRAF 2.0 00
2 : 1
3 : 1 1 15 8 8 7781 7581 2
4 : 900 3
5 : 10 60 4
6 : 5
7 :8001 1 2 0 3 1 19
8 : 2 3 4 10000 3 93 1000 1 9 19
9 : 3 48002 55000 3 1 19
10 : 5 2 3 94861 1 9 19
11 : 3 68004 46491 1 1 19
12 : 7 5 2 30001 1 1 19
13 :8003 7 5 1 1 1 19
14 : 1 2 3 78100 3 1 19
15 :8001 1 1 65 20
16 : 2 3 12265 5400 20
17 : 3 4 1 65 20
18 : 5 2 1 45 20
19 : 3 6 1 45 20
20 : 7 5 1 45 20
21 :8003 7 1 45 20
22 : 1 2 12265 20
23 :8001 1 24300 25
24 : 2 3 44600 6 400 25
25 : 3 480024600 25
26 : 5 2 3 700 25
27 : 3 68004 400 25
28 : 7 5 2 700 25
29 :8003 7 5 700 25
30 : 1 2 34300 25
31 : 2 3 9 40 20 10 2 1 28
32 : 2 3 1 40 20 10 2 2 28
33 : 2 3 2 40 20 10 2 2 28
34 : 2 3 3 40 20 10 2 2 28
35 : 2 3 9 200 20 10 2 3 28
36 : 2 3 1 200 20 10 2 4 28
37 : 2 3 2 200 20 10 2 4 28
38 : 2 3 3 200 20 10 2 4 28
39 : 2 3 9 500 20 10 2 5 28
40 : 2 3 1 500 20 10 2 6 28
41 : 2 3 2 500 20 10 2 6 28
42 : 2 3 3 500 20 10 2 6 28
43 : 2 3 9 980 20 10 2 7 28
44 : 2 3 1 980 20 10 2 8 28
45 : 2 3 2 980 20 10 2 8 28
46 : 2 3 3 980 20 10 2 8 28
47 :8001 14300 20 40 40 50
48 :8003 7 700 50
49 : 1 900 60 17 1 64
50 : 1 2 3 4 5 6 7 8 67
0SEQ.# :----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

```

1 CARD FILE LIST (CONT.)

```

0SEQ.# :-----1-----2-----3-----4-----5-----6-----7-----8
51 : 15 14 13 12 11 10 9 8 7 6 68
52 : 16 16 16 16 3 1 69
53 : 10 20 1 20 70
54 : 1 14 7 150 25 1 71
55 : 2 3 14 2 4 86 1 3 7 1 4 93 74
56 : 0 170
57 : 1 0 16000 195
58 : 2 6000 11000 195
59 : 3 7000 11000 195
60 : 4 12500 11000 195
61 : 5 3000 2000 195
62 : 6 10500 7500 195
63 :8001 0 14000 195
64 :8002 15500 11000 195
65 :8003 1000 9500 195
66 :8004 11500 4500 195
67 : 7 0 2000 195
68 : 1 210
0SEQ.# :-----1-----2-----3-----4-----5-----6-----7-----8

```

OUTPUT RESULTS

1 TRAF SIMULATION MODEL
DEVELOPED FOR
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
TFHRC INTELLIGENT SYSTEMS & TECHNOLOGIES DIVISION
0 ITRAF 2.0

1 FRESIM LINK CHARACTERISTICS

FRESIM TURNING MOVEMENTS

----- MAIN-LINE TRAFFIC ----- ----- EXITING TRAFFIC -----

LINK	DOWNSTREAM NODE NO. OF THE MAIN-LINE RECEIVING LINK	DOWNSTREAM NODE PERCENTAGE	DOWNSTREAM NODE NO. OF THE OFF-RAMP	PERCENTAGE
-----	-----	-----	-----	-----
(8001, 1)	2	100		
(2, 3)	4	92	6	8
(3, 4)	8002	100		
(5, 2)	3	100		
(3, 6)	8004	100		
(7, 5)	2	100		
(8003, 7)	5	100		
(1, 2)	3	100		

1

FRESIM SURVEILLANCE

LINK	LANE ID NO.	DETECTOR LOCATION		DIST. SEPARATING LOOP STATION NO.		COUPLED PAIR OF SHORT LOOPS	DETECTOR TYPE
				LENGTH	NO.		
(2, 3)	9	40	20	1	10	DWSTR. COUPLED PAIR	
	9	30	20	1	10	UPSTR. COUPLED PAIR	
	1	40	20	2	10	DWSTR. COUPLED PAIR	
	1	30	20	2	10	UPSTR. COUPLED PAIR	
	2	40	20	2	10	DWSTR. COUPLED PAIR	
	2	30	20	2	10	UPSTR. COUPLED PAIR	
	3	40	20	2	10	DWSTR. COUPLED PAIR	
	3	30	20	2	10	UPSTR. COUPLED PAIR	
	9	200	20	3	10	DWSTR. COUPLED PAIR	
	9	190	20	3	10	UPSTR. COUPLED PAIR	
	1	200	20	4	10	DWSTR. COUPLED PAIR	
	1	190	20	4	10	UPSTR. COUPLED PAIR	
	2	200	20	4	10	DWSTR. COUPLED PAIR	
	2	190	20	4	10	UPSTR. COUPLED PAIR	
	3	200	20	4	10	DWSTR. COUPLED PAIR	
	3	190	20	4	10	UPSTR. COUPLED PAIR	
	9	500	20	5	10	DWSTR. COUPLED PAIR	
	9	490	20	5	10	UPSTR. COUPLED PAIR	
	1	500	20	6	10	DWSTR. COUPLED PAIR	
	1	490	20	6	10	UPSTR. COUPLED PAIR	
	2	500	20	6	10	DWSTR. COUPLED PAIR	
	2	490	20	6	10	UPSTR. COUPLED PAIR	
	3	500	20	6	10	DWSTR. COUPLED PAIR	
	3	490	20	6	10	UPSTR. COUPLED PAIR	
	9	980	20	7	10	DWSTR. COUPLED PAIR	
	9	970	20	7	10	UPSTR. COUPLED PAIR	
	1	980	20	8	10	DWSTR. COUPLED PAIR	
	1	970	20	8	10	UPSTR. COUPLED PAIR	
	2	980	20	8	10	DWSTR. COUPLED PAIR	
	2	970	20	8	10	UPSTR. COUPLED PAIR	
	3	980	20	8	10	DWSTR. COUPLED PAIR	
	3	970	20	8	10	UPSTR. COUPLED PAIR	

1

FRESIM LINK VOLUME

LINK	FLOW RATE (VEH/HOUR)	PERCENT TRUCKS	PERCENT CARPOOL
(8001, 1)	4300		
(8003, 7)	700		

1

FRESIM LANE ALIGNMENT TABLE

LINK	TYPE	DISTANCE FROM UPST. NODE (FT)	UPSTREAM FEEDING LANE NUMBER											REASON CODE		
			1	2	3	4	5	6	7	8	9	10	11			
(2, 3)	F	1000.0	1	2	3	-	-	-	-	-	-	-	-	-	-	4
(2, 3)	F	1000.0	-	-	-	-	-	-	-	-	1	-	-	-	-	2
(5, 2)	R	9486.0	9	-	-	-	-	-	-	-	-	-	-	-	-	1

THE
ADD
LANE
1

LINK TYPE REASON CODES
 CODES 1 : ALIGNMENT AT THE ON-RAMP GORE. ENTRIES IN THE TABLEAU
 R : RAMP INDICATE THE MAINLINE FREEWAY LANES WHICH RECEIVES
 F : FREEWAY TRAFFIC FROM THE UPSTREAM ON-RAMP LANES
 2 : ALIGNMENT AT THE OFF-RAMP GORE. ENTRIES IN THE TABLEAU
 INDICATE THE OFF-RAMP LANES WHICH RECEIVE THE TRAFFIC
 FROM THE UPSTREAM MAINLINE FREEWAY LANES
 3 : ALIGNMENT DUE TO A LANE ADD OR DROP. ENTRIES IN
 THE TABLEAU INDICATE THE LANES DOWNSTREAM OF THE LANE
 OR DROP WHICH RECEIVE THE TRAFFIC FROM THE UPSTREAM
 4 : ALIGNMENT AT LINK BOUNDARY. ENTRIES IN THE TABLEAU
 INDICATE THE DOWNSTREAM LANES WHICH RECEIVE THE TRAFFIC
 FROM THE UPSTREAM LANES

TABLE OF FREEWAY WARNING SIGNS

WARNING SIGN OBJECTIVE
 DISTANCE BETWEEN ----- DISTANCE BETWEEN THRU EXITING
 THE WARNING SIGN LINK LINK THE WARNING SIGN TRAFFIC TRAFFIC
 TYPE OF WARNING SIGN AND UPSTREAM OFFRAMP CONTAINING WITH AND ITS
 VACATES MOVES TO
 WARNING SIGN LINK NODE (FT) NODE INCIDENT LANE DROP OBJECTIVE (FT) LANE(S)
 LANE(S)

WARNING SIGN	LINK	NODE (FT)	NODE	INCIDENT	LANE DROP	OBJECTIVE (FT)	LANE(S)
OFFRAMP	(1, 2)	3410.0	3			5400.0	1
OFFRAMP	(2, 3)	1.0	3			999.0	9 9

FRESIM ORIGIN - DESTINATION TRIP TABLE

FOR EACH ORIGIN NODE, TABLE PROVIDES LISTING OF PAIRS OF DATA : DESTINATION/ FRACTION OF
 ENTRY VOLUME TRAVELING TO DESTINATION

ORIGIN NODE (8003)	3/ .140	4/ .860
ORIGIN NODE (8001)	3/ .070	4/ .930

1 INITIALIZATION STATISTICS

TIME INTERVAL NUMBER	SUBNETWORK TYPE	PRIOR CONTENT (VEHICLES)	CURRENT CONTENT (VEHICLES)	CURRENT CONTENT DIFFERENCE	PERCENT
1	FRESIM	0	82	10000	
2	FRESIM	82	166	102	
3	FRESIM	166	228	37	
4	FRESIM	228	246	7	
5	FRESIM	246	254	3	

CUMULATIVE FRESIM STATISTICS AT TIME 8 15 0

LINK STATISTICS

VEHICLES LANE SPEED LINK	CURR	AVG	VEH-	VEH-	TOTAL MOVE	DELAY	VOLUME	DENSITY

LINK	IN	OUT	CHNG	CONT	CONT	MILES	MIN	TIME	TIME	TIME	M/T	TOTAL	DELAY	VEH/LN/HR
VEH/LN-MILE	MILE/HR	TYPE												
(2, 3)	1253	1244	301	19	16.3	236.5	243.6	11.7	10.5	1.2	.90	1.03	.10	1250. 21.5 58.24 FRWY
(3, 4)	1125	1133	286	78	78.0	1176.4	1168.1	62.1	58.0	4.1	.93	.99	.07	1507. 24.9 60.43 FRWY

		SECONDS/VEHICLE				VEH-MILE								
SPEED	LINK	VEHICLES	LANE	CURR	AVG	VEH-	VEH-	TOTAL	MOVE	DELAY	VOLUME	DENSITY		
LINK	IN	OUT	CHNG	CONT	CONT	MILES	MIN	TIME	TIME	TIME	M/T	TOTAL	DELAY	VEH/LN/HR
VEH/LN-MILE	MILE/HR	TYPE												
(5, 2)	175	176	0	31	30.1	313.0	450.7	155.2	144.3	10.9	.93	1.44	.10	698. 16.7 41.67 RAMP
(3, 6)	119	121	0	11	9.7	105.9	145.4	72.6	69.8	2.8	.96	1.37	.05	481. 11.0 43.69 RAMP
(7, 5)	175	175	0	9	9.1	100.0	136.1	46.4	45.7	.7	.98	1.36	.02	705. 16.0 44.08 RAMP
(1, 2)	1075	1077	771	102	104.6	1594.5	1568.0	87.3	82.4	4.9	.94	.98	.05	1439. 23.6 61.02 FRWY

NETWORK STATISTICS

VEHICLE-MILES = 3526.2, VEHICLE-MINUTES = 3711.8, MOVING/TOTAL TRIP TIME = .938,
 AVERAGE CONTENT = 247.7, CURRENT CONTENT = 250.0, SPEED(MPH) = 57.00,
 TOTAL DELAY (VEH-MIN) = 228.28, TRAVEL TIME (MIN)/VEH-MILE = 1.05, DELAY TIME (MIN)/ VEH-MILE = .06

FRESIM CUMULATIVE VALUES OF FUEL CONSUMPTION

LINK	LINK TYPE	GALLONS							FUEL CONSUMPTION M.P.G.						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7
VEHICLE TYPE-		1	2	3	4	5	6	7	1	2	3	4	5	6	7
(2, 3) FRWY		4.32	8.16	.00	.00	.00	.00	.00	.00	14.25	21.53	.00	.00	.00	.00
(3, 4) FRWY		16.89	32.99	.00	.00	.00	.00	.00	.00	18.64	26.15	.00	.00	.00	.00
(5, 2) RAMP		2.26	6.65	.00	.00	.00	.00	.00	.00	30.07	36.91	.00	.00	.00	.00
(3, 6) RAMP		.74	2.40	.00	.00	.00	.00	.00	.00	28.25	35.45	.00	.00	.00	.00
(7, 5) RAMP		.80	2.32	.00	.00	.00	.00	.00	.00	26.43	33.95	.00	.00	.00	.00
(1, 2) FRWY		23.18	46.29	.00	.00	.00	.00	.00	.00	18.15	25.33	.00	.00	.00	.00
SUBNETWORK-		48.20	98.81	.00	.00	.00	.00	.00	.00	18.82	26.51	.00	.00	.00	.00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

FRESIM CUMULATIVE VALUES OF EMISSION

LINK	LINK TYPE	VEHICLE EMISSIONS (GRAMS/ MILE)						
		HC						
VEHICLE TYPE-		1	2	3	4	5	6	7
(2, 3) FRWY		.21	.23	.00	.00	.00	.00	.00
(3, 4) FRWY		.12	.12	.00	.00	.00	.00	.00
(5, 2) RAMP		.00	.00	.00	.00	.00	.00	.00
(3, 6) RAMP		.02	.02	.00	.00	.00	.00	.00
(7, 5) RAMP		.03	.02	.00	.00	.00	.00	.00
(1, 2) FRWY		.12	.13	.00	.00	.00	.00	.00
SUBNETWORK-		.11	.11	.00	.00	.00	.00	.00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

FRESIM CUMULATIVE VALUES OF EMISSION

LINK	LINK TYPE	VEHICLE EMISSIONS (GRAMS/ MILE)						
		CO						
VEHICLE TYPE-		1	2	3	4	5	6	7

(2, 3) FRWY	14.75	16.25	.00	.00	.00	.00	.00
(3, 4) FRWY	6.26	6.24	.00	.00	.00	.00	.00
(5, 2) RAMP	.68	.70	.00	.00	.00	.00	.00
(3, 6) RAMP	1.56	1.87	.00	.00	.00	.00	.00
(7, 5) RAMP	2.75	2.29	.00	.00	.00	.00	.00
(1, 2) FRWY	7.00	7.79	.00	.00	.00	.00	.00
SUBNETWORK-	6.57	6.82	.00	.00	.00	.00	.00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

1

FRESIM CUMULATIVE VALUES OF EMISSION

LINK	LINK TYPE	VEHICLE EMISSIONS (GRAMS/ MILE)						
		NO						
VEHICLE TYPE-		1	2	3	4	5	6	7
(2, 3) FRWY		.99	.95	.00	.00	.00	.00	.00
(3, 4) FRWY		.73	.72	.00	.00	.00	.00	.00
(5, 2) RAMP		.11	.11	.00	.00	.00	.00	.00
(3, 6) RAMP		.18	.18	.00	.00	.00	.00	.00
(7, 5) RAMP		.21	.19	.00	.00	.00	.00	.00
(1, 2) FRWY		.78	.77	.00	.00	.00	.00	.00
SUBNETWORK-		.70	.67	.00	.00	.00	.00	.00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

1

POINT PROCESSING OUTPUT

EVALUATION PERIOD BEGINNING TIME = 1 (SECONDS)
 EVALUATION PERIOD ENDING TIME = 900 (SECONDS)
 NEGATIVE VALUE MEANS NO INFORMATION

OCCUPANCY		DISTANCE FROM LOOP			LANE UPST. NODE LENGTH STATION		DETECTOR TYPE	MEAN VOLUME	MEAN SPEED	MEAN HEADWAY	RATE
LINK	ID NO.	(FT)	(FT)	NO.				(VPH)	(MPH)	(SEC)	
(2, 3)	9	40.00	20.0	1			COUPLED PAIR OF SHORT LOOPS	532	42.258	6.688	11.401
(2, 3)	1	40.00	20.0	2			COUPLED PAIR OF SHORT LOOPS	892	57.674	4.033	6.141
(2, 3)	2	40.00	20.0	2			COUPLED PAIR OF SHORT LOOPS	1840	59.878	1.958	10.471
(2, 3)	3	40.00	20.0	2			COUPLED PAIR OF SHORT LOOPS	1640	60.091	2.194	9.144
(2, 3)	9	200.00	20.0	3			COUPLED PAIR OF SHORT LOOPS	524	54.201	6.820	3.223
(2, 3)	1	200.00	20.0	4			COUPLED PAIR OF SHORT LOOPS	1028	54.381	3.497	6.498
(2, 3)	2	200.00	20.0	4			COUPLED PAIR OF SHORT LOOPS	1804	59.148	1.996	10.150
(2, 3)	3	200.00	20.0	4			COUPLED PAIR OF SHORT LOOPS	1648	60.338	2.187	9.199
(2, 3)	9	500.00	20.0	5			COUPLED PAIR OF SHORT LOOPS	512	58.589	7.006	2.895
(2, 3)	1	500.00	20.0	6			COUPLED PAIR OF SHORT LOOPS	1096	57.519	3.268	6.455
(2, 3)	2	500.00	20.0	6			COUPLED PAIR OF SHORT LOOPS	1720	59.488	2.093	9.676
(2, 3)	3	500.00	20.0	6			COUPLED PAIR OF SHORT LOOPS	1656	59.843	2.167	9.268
(2, 3)	9	980.00	20.0	7			COUPLED PAIR OF SHORT LOOPS	0	-1.000	-1.000	.000
(2, 3)	1	980.00	20.0	8			COUPLED PAIR OF SHORT LOOPS	1172	60.253	3.071	6.777
(2, 3)	2	980.00	20.0	8			COUPLED PAIR OF SHORT LOOPS	1660	59.629	2.172	9.529
(2, 3)	3	980.00	20.0	8			COUPLED PAIR OF SHORT LOOPS	1660	60.352	2.165	9.288

TOTAL CPU TIME FOR SIMULATION = 46.36 SECONDS
 TOTAL CPU TIME FOR THIS RUN = 46.36 SECONDS
 0LAST CASE PROCESSED

Scenario 2 : A Constrained Operation

VERSION 1.03
 RELEASE DATE MAR 1997
 TRAF SIMULATION MODEL

1

DEVELOPED FOR

U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 TFHRC INTELLIGENT SYSTEMS & TECHNOLOGIES DIVISION

1

INPUT CARD FILE LIST

0SEQ.# :-----1-----2-----3-----4-----5-----6-----7-----8

```

1 :ITRAF 2.0                                00
2 :                                          1
3 :      1  1      15                        8 8      7781  7581  2
4 : 900                                          3
5 :              10  60                      4
6 :                                          5
7 :8001  1  2      0 2                        1          19
8 :  2  3  4 10000 2 93 1000                1 9          19
9 :  3  48002 55000 2                        1          19
10 :  5  2  3 94861 1                        9          19
11 :  3  68004 46491 1                       1          19
12 :  7  5  2 30001 1                        1          19
13 :8003  7  5      1 1                      1          19
14 :  1  2  3 78100 2                        1          19
15 :8001  1              12265                20
16 :  2  3              12265      5400      20
17 :  3  4              12265                20
18 :  5  2              12245                20
19 :  3  6              12245                20
20 :  7  5              1  45                20
21 :8003  7              1  45                20
22 :  1  2              12265                20
23 :8001  1  22483                            25
24 :  2  3  42284  6 993                       25
25 :  3  480022284                             25
26 :  5  2  3 794                             25
27 :  3  68004 400                             25
28 :  7  5  2 794                             25
29 :8003  7  5 794                             25
30 :  1  2  32483                             25
31 :  2  3  9  40  20  10  2  1                28
32 :  2  3  1  40  20  10  2  2                28
33 :  2  3  2  40  20  10  2  2                28
34 :  2  3  9  200  20  10  2  7               28
35 :  2  3  1  200  20  10  2  8               28
36 :  2  3  2  200  20  10  2  8               28
37 :  2  3  9  500  20  10  2  3               28
38 :  2  3  1  500  20  10  2  4               28
39 :  2  3  2  500  20  10  2  4               28
40 :  2  3  9  970  20  10  2  5               28
41 :  2  3  1  970  20  10  2  6               28
42 :  2  3  2  970  20  10  2  6               28
43 :8001  12483  10                            50
44 :8003  7  794  10                            50
45 :      1  900  60                            64
46 :  1  2  3  4  5  6  7  8                    67
47 : 15 14 13 12 11 10  9  8  7  6            68
48 : 16 16 16 16  3  1                          69
49 : 10 20  1  20                              70
50 :  1 14  7 150  25                          1          71
0SEQ.# :-----1-----2-----3-----4-----5-----6-----7-----8

```

1

INPUT CARD FILE LIST (CONT.)

0SEQ.#	1	2	3	4	5	6	7	8		
51 :	2	4	100	1	3	40	1	4	60	74
52 :	0									170
53 :	1	0	16000							195
54 :	2	6000	11000							195
55 :	3	7000	11000							195
56 :	4	12500	11000							195
57 :	5	3000	2000							195
58 :	6	10500	7500							195
59 :	8001	0	14000							195
60 :	8002	15500	11000							195
61 :	8003	1000	9500							195
62 :	8004	11500	4500							195
63 :	7	0	2000							195
64 :	1									210

OUTPUT RESULTS

TRAF SIMULATION MODEL
DEVELOPED FOR

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
TFHRC INTELLIGENT SYSTEMS & TECHNOLOGIES DIVISION

1 FRESIM LINK CHARACTERISTICS

FRESIM TURNING MOVEMENTS

----- MAIN-LINE TRAFFIC ----- ----- EXITING TRAFFIC -----

LINK	DOWNSTREAM NODE NO. OF THE MAIN-LINE RECEIVING LINK	PERCENTAGE	DOWNSTREAM NODE NO. OF THE OFF-RAMP	PERCENTAGE
(8001, 1)	2	100		
(2, 3)	4	70	6	30
(3, 4)	8002	100		
(5, 2)	3	100		
(3, 6)	8004	100		
(7, 5)	2	100		
(8003, 7)	5	100		
(1, 2)	3	100		

FRESIM LINK VOLUME

LINK	FLOW RATE (VEH/HOUR)	PERCENT TRUCKS	PERCENT CARPOOL
(8001, 1)	2483	10	
(8003, 7)	794	10	

FRESIM OFF-LINE INCIDENT DETECTION AND/OR MOE ESTIMATION DATA

----- DETECTOR OPERATION DATA -----

DETECTOR MODE	POLLING FREQUENCY (NO./SEC)	INC. DET. EVALUATION FREQUENCY (SEC)	RE-EVALUATION FREQUENCY (SEC)	AVERAGE TIME PERIOD (FEET)	VEHICLE LENGTH
ANALOG		900	60	17	

NOTE: POINT PROCESSING IS DESIRED.

----- DETECTOR STATIONS USED -----

LINK	STATION NO.
(2, 3)	1
(2, 3)	2
(2, 3)	3
(2, 3)	4
(2, 3)	5
(2, 3)	6
(2, 3)	7

VEHICLE TYPE	LENGTH (FEET)	MAXIMUM JERK (FT/SEC^3)	MAX. DECELERATION (FT/SEC^2)	CARS	TRUCKS	PERCENT OF FLEET BUSES	CARPOOLS	PERF. TABLE
1	17	.700	-15.0	25	0	0	0	1

1

FRESIM LANE ALIGNMENT TABLE

LINK	TYPE	DISTANCE FROM UPST. NODE (FT)	UPSTREAM FEEDING LANE NUMBER											REASON CODE	
			1	2	3	4	5	6	7	8	9	10	11		
(2, 3)	F	1000.0	1	2	-	-	-	-	-	-	-	-	-	-	4
(2, 3)	F	1000.0	-	-	-	-	-	-	-	1	-	-	-	-	2
(5, 2)	R	9486.0	9	-	-	-	-	-	-	-	-	-	-	-	1

TABLE OF FREEWAY WARNING SIGNS

WARNING SIGN TYPE	LINK	NODE (FT)	NODE	INCIDENT LANE	LANE DROP	WARNING SIGN OBJECTIVE	
						DISTANCE BETWEEN THE WARNING SIGN AND UPSTREAM	DISTANCE BETWEEN THE WARNING SIGN AND TRAFFIC EXITING
OFFRAMP	(1, 2)	3410.0	3			5400.0	1
OFFRAMP	(2, 3)	1.0	3			999.0	9

FRESIM ORIGIN - DESTINATION TRIP TABLE

FOR EACH ORIGIN NODE, TABLE PROVIDES LISTING OF PAIRS OF DATA : DESTINATION/ FRACTION OF ENTRY VOLUME TRAVELING TO DESTINATION

ORIGIN NODE (8003) 3/ .000 4/ 1.000
 ORIGIN NODE (8001) 3/ .400 4/ .600

1 INITIALIZATION STATISTICS

TIME INTERVAL NUMBER	SUBNETWORK TYPE	PRIOR CONTENT (VEHICLES)	CURRENT CONTENT (VEHICLES)	PERCENT DIFFERENCE
1	FRESIM	0	54	10000
2	FRESIM	54	108	100
3	FRESIM	108	154	42
4	FRESIM	154	166	7
5	FRESIM	166	179	7 EQUILIBRIUM ATTAINED

ALL EXISTING SUBNETWORKS REACHED EQUILIBRIUM
 CUMULATIVE FRESIM STATISTICS AT TIME 8 15 0

LINK STATISTICS

SPEED LINK	LINK	IN	OUT	CHNG	AVG	VEH-CONT	VEH-MILES	VEH-MIN	TOTAL TIME	MOVE TIME	DELAY TIME	M/T	TOTAL DELAY	VOLUME	DENSITY	FRWY	
																	VEH/LN-MILE
(2, 3)	818	819	545	13	12.2	155.5	183.3	13.4	10.7	2.7	.80	1.18	.24	1096.	21.5	50.89	FRWY
(3, 4)	563	565	190	36	38.9	583.1	583.6	62.5	58.0	4.5	.93	1.00	.07	1121.	18.7	59.95	FRWY
(5, 2)	198	199	0	34	34.3	356.3	514.1	155.5	143.9	11.6	.93	1.44	.11	794.	19.1	41.58	RAMP
(3, 6)	256	254	0	25	21.6	225.5	324.3	76.0	71.0	5.0	.93	1.44	.09	1026.	24.6	41.72	RAMP
(7, 5)	198	198	0	11	10.3	113.2	154.8	46.6	45.6	1.0	.98	1.37	.03	798.	18.2	43.85	RAMP
(1, 2)	620	619	420	59	60.3	918.8	904.2	87.3	82.8	4.5	.95	.98	.05	1244.	20.4	60.97	FRWY

NETWORK STATISTICS

VEHICLE-MILES = 2352.4, VEHICLE-MINUTES = 2664.3, MOVING/TOTAL TRIP TIME = .929,

AVERAGE CONTENT = 177.8, CURRENT CONTENT = 178.0, SPEED(MPH) = 52.98,

TOTAL DELAY (VEH-MIN) = 189.31, TRAVEL TIME (MIN)/VEH-MILE = 1.13, DELAY TIME (MIN)/ VEH-MILE = .08

FRESIM CUMULATIVE VALUES OF FUEL CONSUMPTION

LINK	LINK TYPE	FUEL CONSUMPTION													
		GALLONS							M.P.G.						
VEHICLE TYPE-		1	2	3	4	5	6	7	1	2	3	4	5	6	7
(2, 3)	FRWY	2.83	5.89	1.55	1.36	1.65	.14	.00	11.38	18.06	2.62	4.59	3.57	4.01	.00
(3, 4)	FRWY	6.88	15.97	7.18	5.67	5.34	.40	.00	17.14	24.52	2.83	4.97	4.42	5.17	.00
(5, 2)	RAMP	1.92	6.77	2.46	1.87	1.91	.25	.00	29.99	37.05	5.64	10.03	7.26	7.25	.00
(3, 6)	RAMP	1.84	4.67	.53	1.04	1.23	.11	.00	25.65	34.19	5.61	7.30	5.99	7.94	.00

(7, 5) RAMP .64 2.40 .74 .67 .60 .08 .00 27.32 33.66 5.34 9.32 6.65 7.05 .00
 (1, 2) FRWY 11.07 24.88 5.73 6.29 6.03 .84 .00 17.95 25.41 3.29 5.80 4.95 4.35 .00
 SUBNETWORK- 25.19 60.57 18.20 16.91 16.75 1.82 .00 18.71 26.76 3.52 6.13 5.05 5.23
 .00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

FRESIM CUMULATIVE VALUES OF EMISSION

LINK	LINK TYPE	VEHICLE EMISSIONS (GRAMS/ MILE)						
		HC						
VEHICLE TYPE-		1	2	3	4	5	6	7
(2, 3) FRWY		.31	.35	14.08	9.60	8.73	7.19	.00
(3, 4) FRWY		.14	.15	12.91	10.15	8.29	6.67	.00
(5, 2) RAMP		.00	.00	5.07	4.79	4.84	4.86	.00
(3, 6) RAMP		.03	.03	5.15	6.22	5.41	4.55	.00
(7, 5) RAMP		.02	.03	5.49	5.17	5.33	4.95	.00
(1, 2) FRWY		.13	.13	10.76	9.08	8.55	9.11	.00
SUBNETWORK-		.12	.11	9.84	8.18	7.45	7.00	.00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

1

FRESIM CUMULATIVE VALUES OF EMISSION

LINK	LINK TYPE	VEHICLE EMISSIONS (GRAMS/ MILE)						
		CO						
VEHICLE TYPE-		1	2	3	4	5	6	7
(2, 3) FRWY		23.84	27.54	265.79	163.97	145.70	116.58	.00
(3, 4) FRWY		8.66	9.15	242.38	177.96	137.52	105.38	.00
(5, 2) RAMP		.69	.65	74.31	68.86	69.70	69.83	.00
(3, 6) RAMP		2.66	2.57	76.88	95.72	80.65	66.08	.00
(7, 5) RAMP		2.21	2.61	83.39	75.94	78.99	71.20	.00
(1, 2) FRWY		7.53	7.64	196.42	157.25	145.70	157.81	.00
SUBNETWORK-		7.40	7.48	176.41	137.89	122.16	113.84	.00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

1

FRESIM CUMULATIVE VALUES OF EMISSION

LINK	LINK TYPE	VEHICLE EMISSIONS (GRAMS/ MILE)						
		NO						
VEHICLE TYPE-		1	2	3	4	5	6	7
(2, 3) FRWY		1.23	1.19	33.72	25.82	24.16	19.94	.00
(3, 4) FRWY		.85	.80	31.61	27.05	23.36	18.74	.00
(5, 2) RAMP		.11	.11	11.50	10.53	10.73	11.08	.00
(3, 6) RAMP		.22	.21	11.63	15.53	12.85	10.43	.00
(7, 5) RAMP		.19	.20	13.01	12.19	12.75	11.39	.00
(1, 2) FRWY		.80	.77	27.26	24.47	23.46	24.52	.00
SUBNETWORK-		.68	.62	24.03	21.34	19.97	18.39	.00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

OCCUPANCY	LINK	ID NO.	DISTANCE		STATION	DETECTOR TYPE	MEAN VOLUME (VPH)	MEAN SPEED (MPH)	MEAN HEADWAY (SEC)	RATE
			FROM LOOP (FT)	LOOP LENGTH (FT)						
	(2, 3)	9	40.00	20.0	1	COUPLED PAIR OF SHORT LOOPS	756	39.611	4.749	9.958
	(2, 3)	1	40.00	20.0	2	COUPLED PAIR OF SHORT LOOPS	1052	55.427	3.417	9.871
	(2, 3)	2	40.00	20.0	2	COUPLED PAIR OF SHORT LOOPS	1312	59.653	2.744	8.027
	(2, 3)	9	500.00	20.0	3	COUPLED PAIR OF SHORT LOOPS	972	52.064	3.695	7.520
	(2, 3)	1	500.00	20.0	4	COUPLED PAIR OF SHORT LOOPS	976	51.335	3.656	7.387
	(2, 3)	2	500.00	20.0	4	COUPLED PAIR OF SHORT LOOPS	1316	58.240	2.730	8.353
	(2, 3)	9	970.00	20.0	5	COUPLED PAIR OF SHORT LOOPS	1028	47.264	3.506	8.736
	(2, 3)	1	970.00	20.0	6	COUPLED PAIR OF SHORT LOOPS	932	50.911	3.844	7.822
	(2, 3)	2	970.00	20.0	6	COUPLED PAIR OF SHORT LOOPS	1304	57.704	2.748	8.480
	(2, 3)	9	200.00	20.0	7	COUPLED PAIR OF SHORT LOOPS	976	50.816	3.701	7.153
	(2, 3)	1	200.00	20.0	8	COUPLED PAIR OF SHORT LOOPS	972	49.954	3.690	7.603
	(2, 3)	2	200.00	20.0	8	COUPLED PAIR OF SHORT LOOPS	1304	60.017	2.761	8.365

TOTAL CPU TIME FOR SIMULATION = 36.53 SECONDS

Scenario 3: A Multiple Weaving area

TRAF SIMULATION MODEL

DEVELOPED FOR

U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 TFHRC INTELLIGENT SYSTEMS & TECHNOLOGIES DIVISION

INPUT CARD FILE LIST

1
 1-----2-----3-----4-----5-----6-----7-----8
 0SEQ.# :-----

```

1 :ITRAF 2.0                                00
2 :                                          1
3 :          1  1      15                    8 8      7781  7581  2
4 : 900                                          3
5 :          10  60                            4
6 :                                          5
7 :8001  1  2      0 2                        1          19
8 :  1  2  4 35000 2                          1          19
9 :  4  6  7 15000 2 93 1500101  500          1 9        19
10 :  6  78004 15000 2                          1          19
11 :  6  88005 20001 2                          1          19
12 :8002  3  2      1 1                        1          19
13 :  3  2  4 22011 1                          9          19
14 :8003  5  4      1 1                        1          19
15 :  5  4  6 11181 1                          10         19
16 :  2  4  6 10000 2 93 1000                  1          19
17 :8001  1          1  65                      20
18 :  1  2          12265                       20
19 :  4  6          12265                       20
20 :  6  7          12265                       20
21 :  6  8          12245                       20
22 :8002  3          12245                       20
23 :  3  2          12245                       20
24 :8003  5          12245                       20
25 :  5  4          12245                       20
26 :  2  4          12265                       20
27 :8001  1  21900                             25
28 :  1  2  41900                              25
29 :  4  6  71600  81300                       25
30 :  6  780041600                             25
31 :  6  880051300                             25
32 :8002  3  2  600                            25
33 :  3  2  4  600                             25
34 :8003  5  4  400                             25
35 :  5  4  6  400                             25
36 :  2  4  62500                              25
37 :  2  4  9  30  20  10  2  1                28
38 :  2  4  1  30  20  10  2  2                28
39 :  2  4  2  30  20  10  2  2                28
40 :  2  4  9  200  20  10  2  3                28
41 :  2  4  1  200  20  10  2  4                28
42 :  2  4  2  200  20  10  2  4                28
43 :  2  4  9  950  20  10  2  5                28
44 :  2  4  1  950  20  10  2  6                28
45 :  2  4  2  950  20  10  2  6                28
46 :  4  6  10  30  20  10  2  7                28
47 :  4  6  9  30  20  10  2  8                28
48 :  4  6  1  30  20  10  2  8                28
49 :  4  6  2  30  20  10  2  8                28
50 :  4  6  10  200  20  10  2  9                28
0SEQ.# :-----1-----2-----3-----4-----5-----6-----7-----8
    
```

1

CARD FILE LIST (CONT.)

```

0SEQ.# :-----1-----2-----3-----4-----5-----6-----7-----8
51 :   4   6   9 200 20 10  2 10                               28
52 :   4   6   1 200 20 10  2 10                               28
53 :   4   6   2 200 20 10  2 10                               28
54 :   4   6   9 940 20 10  2 11                               28
55 :   4   6   1 940 20 10  2 12                               28
56 :   4   6   2 940 20 10  2 12                               28
57 :   4   6  91440 20 10  2 13                               28
58 :   4   6  11440 20 10  2 14                               28
59 :   4   6  21440 20 10  2 14                               28
60 :8001  11900                                               50
61 :8002   3 600                                               50
62 :8003   5 400                                               50
63 :      1 900 60                                           17 1 64
64 :   1  2  3  4  5  6  7  8  91011121314                    67
65 :  15  14  13  12  11  10  9  8  7  6                      68
66 :  16  16  16  16  3  1                                     69
67 :  10  20  1  20                                           70
68 :   1  7  48  1  6  52  2  7  65  2  6  35  4  7  75  4  6  25  74
69 :   0                                                                 170
70 :8001   4500  10500                                         195
71 :   1   5500  10500                                         195
72 :   2   9000  10500                                         195
73 :   3   7000  9500                                           195
74 :   4  10000  10500                                         195
75 :   5   9500  9500                                           195
76 :   6  11500  10500                                         195
77 :   7  13000  10500                                         195
78 :   8  13000  9500                                           195
79 :8002   5000  6500                                           195
80 :8003   9000  6000                                           195
81 :8004  16500  13000                                         195
82 :8005  16500  7000                                           195
83 :   1                                                                 210
0SEQ.# :-----1-----2-----3-----4-----5-----6-----7-----8

```

OUTPUT RESULTS

1

TRAF SIMULATION MODEL

DEVELOPED FOR

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
TFHRC INTELLIGENT SYSTEMS & TECHNOLOGIES DIVISION

0 ITRAF 2.0
0

VALUE RUN PARAMETERS AND OPTIONS

```

0 0 RUN IDENTIFICATION NUMBER
0 1 RUN TYPE CODE = ( 1, 2, 3) TO RUN (SIMULATION, ASSIGNMENT, BOTH)
    (-1,-2,-3) TO CHECK (SIMULATION, ASSIGNMENT, BOTH) ONLY

0 1 FRESIM OFFLINE INCIDENT DETECTION CODE = (0, 1) IF OFFLINE INCIDENT DETECTION
    (IS NOT, IS) BEING PERFORMED
0

```

FRESIM ENVIRONMENTAL OPTIONS

```

-----
0 FUEL/EMISSION RATE TABLES ARE NOT PRINTED
0 SIMULATION: PERFORMED ENVIRONMENTAL MEASURES: CALCULATED
  RATE TABLES: EMBEDDED TRAJECTORY FILE:

```

NOT WRITTEN

0 0 INPUT UNITS CODE = (0,1) IF INPUT IS IN (ENGLISH, METRIC) UNITS
 0 0 OUTPUT UNITS CODE = (0,1,2,3) IF OUTPUT IS IN (SAME AS INPUT, ENGLISH, METRIC, BOTH)

UNITS

0 800 CLOCK TIME AT START OF SIMULATION (HHMM)
 0 7581 RANDOM NUMBER SEED
 900 DURATION (SEC) OF TIME PERIOD NO. 1
 0 60 LENGTH OF A TIME INTERVAL, SECONDS
 0 10 FRESIM TIME STEP DURATION IN TENTHS-OF-A-SECOND
 0 15 MAXIMUM INITIALIZATION TIME, NUMBER OF TIME INTERVALS
 0 0 NUMBER OF TIME INTERVALS BETWEEN SUCCESSIVE STANDARD OUTPUTS
 0 0 TIME INTERMEDIATE OUTPUT WILL BEGIN AT INTERVALS OF 0 SECS. FOR 0 SECS. FOR

MICROSCOPIC MODELS

1*****

TIME PERIOD 1 - FRESIM DATA

FRESIM TURNING MOVEMENTS

----- MAIN-LINE TRAFFIC ----- EXITING TRAFFIC -----

LINK	DOWNSTREAM NODE NO. OF THE MAIN-LINE		DOWNSTREAM NODE	
	RECEIVING LINK	PERCENTAGE	NO. OF THE OFF-RAMP	PERCENTAGE
(8001, 1)	2	100		
(1, 2)	4	100		
(4, 6)	7	55	8	45
(6, 7)	8004	100		
(6, 8)	8005	100		
(8002, 3)	2	100		
(3, 2)	4	100		
(8003, 5)	4	100		
(5, 4)	6	100		
(2, 4)	6	100		

1

FRESIM SURVEILLANCE

LINK	LANE ID NO.	DETECTOR LOCATION	DIST. SEPARATING		COUPLED PAIR OF SHORT LOOPS	DETECTOR TYPE
			LOOP LENGTH	STATION NO.		
(4, 6)	10	30 20	7	10	DWSTR. COUPLED PAIR	
	10	20 20	7	10	UPSTR. COUPLED PAIR	
	9	30 20	8	10	DWSTR. COUPLED PAIR	
	9	20 20	8	10	UPSTR. COUPLED PAIR	
	1	30 20	8	10	DWSTR. COUPLED PAIR	
	1	20 20	8	10	UPSTR. COUPLED PAIR	
	2	30 20	8	10	DWSTR. COUPLED PAIR	
	2	20 20	8	10	UPSTR. COUPLED PAIR	
	10	200 20	9	10	DWSTR. COUPLED PAIR	
	10	190 20	9	10	UPSTR. COUPLED PAIR	
	9	200 20	10	10	DWSTR. COUPLED PAIR	
	9	190 20	10	10	UPSTR. COUPLED PAIR	
	1	200 20	10	10	DWSTR. COUPLED PAIR	
	1	190 20	10	10	UPSTR. COUPLED PAIR	
	2	200 20	10	10	DWSTR. COUPLED PAIR	
	2	190 20	10	10	UPSTR. COUPLED PAIR	
	9	940 20	11	10	DWSTR. COUPLED PAIR	
	9	930 20	11	10	UPSTR. COUPLED PAIR	
	1	940 20	12	10	DWSTR. COUPLED PAIR	
	1	930 20	12	10	UPSTR. COUPLED PAIR	
2	940 20	12	10	DWSTR. COUPLED PAIR		

DETECTOR	DIST. SEPARATING						TYPE
	LANE	DETECTOR	LOOP	STATION	COUPLED PAIR OF		
	LINK	ID NO.	LOCATION	LENGTH	NO.	SHORT LOOPS	
	2	930	20	12	10	UPSTR. COUPLED PAIR	
	9	1440	20	13	10	DWSTR. COUPLED PAIR	
	9	1430	20	13	10	UPSTR. COUPLED PAIR	
	1	1440	20	14	10	DWSTR. COUPLED PAIR	
	1	1430	20	14	10	UPSTR. COUPLED PAIR	
	2	1440	20	14	10	DWSTR. COUPLED PAIR	
	2	1430	20	14	10	UPSTR. COUPLED PAIR	
(2, 4)	9	30	20	1	10	DWSTR. COUPLED PAIR	
	9	20	20	1	10	UPSTR. COUPLED PAIR	
	1	30	20	2	10	DWSTR. COUPLED PAIR	
	1	20	20	2	10	UPSTR. COUPLED PAIR	
	2	30	20	2	10	DWSTR. COUPLED PAIR	
	2	20	20	2	10	UPSTR. COUPLED PAIR	
	9	200	20	3	10	DWSTR. COUPLED PAIR	
	9	190	20	3	10	UPSTR. COUPLED PAIR	
	1	200	20	4	10	DWSTR. COUPLED PAIR	
	1	190	20	4	10	UPSTR. COUPLED PAIR	
	2	200	20	4	10	DWSTR. COUPLED PAIR	
	2	190	20	4	10	UPSTR. COUPLED PAIR	
	9	950	20	5	10	DWSTR. COUPLED PAIR	
	9	940	20	5	10	UPSTR. COUPLED PAIR	
	1	950	20	6	10	DWSTR. COUPLED PAIR	
	1	940	20	6	10	UPSTR. COUPLED PAIR	
	2	950	20	6	10	DWSTR. COUPLED PAIR	

1

FRESIM SURVEILLANCE

LINK	DIST. SEPARATING						DETECTOR TYPE
	LANE ID NO.	DETECTOR LOCATION	LOOP LENGTH	STATION NO.	COUPLED PAIR OF SHORT LOOPS		
(2, 4)	2	940	20	6	10	UPSTR. COUPLED PAIR	

1

FRESIM LINK VOLUME

LINK	FLOW RATE (VEH/HOUR)	PERCENT TRUCKS	PERCENT CARPOOL
(8001, 1)	1900		
(8002, 3)	600		
(8003, 5)	400		

TABLE OF EMBEDDED DATA CHANGES

DRIVER TYPE: 1 2 3 4 5 6 7 8 9 10
 ZFOLK ARRAY: 15 14 13 12 11 10 9 8 7 6

ZFRICT ARRAY: 16 16 16 16

LAG TO ACCELERATION (ZLAGAC): 3 LAG TO DECELERATION (ZLAGDC): 1
 AMOUNT OF TIME TO COMPLETE A LANE CHANGE (ZHIETA): 10
 MINIMUM SEPARATION FOR VEHICLE GENERATION (ZMNHDY): 20
 PERCENT OF DRIVERS DESIRING TO YLD THE RIGHT-OF-WAY (ZPDYLD): 20

1

FRESIM LANE ALIGNMENT TABLE

LINK	LINK TYPE	DISTANCE FROM UPST. NODE (FT)	UPSTREAM FEEDING LANE NUMBER											REASON CODE		
			1	2	3	4	5	6	7	8	9	10	11			
(4, 6)	F	1500.0	1	2	-	-	-	-	-	-	-	-	-	-	-	4
(4, 6)	F	1500.0	2	-	-	-	-	-	-	1	-	-	-	-	-	2
(5, 4)	R	1118.0	10	-	-	-	-	-	-	-	-	-	-	-	-	1
(3, 2)	R	2201.0	9	-	-	-	-	-	-	-	-	-	-	-	-	1

THE LINK TYPE REASON CODES
 R : RAMP 1 : ALIGNMENT AT THE ON-RAMP GORE. ENTRIES IN THE TABLEAU INDICATE THE MAINLINE FREEWAY LANES WHICH RECEIVES TRAFFIC FROM THE UPSTREAM ON-RAMP LANES
 F : FREEWAY 2 : ALIGNMENT AT THE OFF-RAMP GORE. ENTRIES IN THE TABLEAU INDICATE THE OFF-RAMP LANES WHICH RECEIVE THE TRAFFIC FROM THE UPSTREAM MAINLINE FREEWAY LANES
 ADD 3 : ALIGNMENT DUE TO A LANE ADD OR DROP. ENTRIES IN THE TABLEAU INDICATE THE LANES DOWNSTREAM OF THE LANE OR DROP WHICH RECEIVE THE TRAFFIC FROM THE UPSTREAM
 LANE 4 : ALIGNMENT AT LINK BOUNDARY. ENTRIES IN THE TABLEAU INDICATE THE DOWNSTREAM LANES WHICH RECEIVE THE TRAFFIC FROM THE UPSTREAM LANES

WARNING SIGN OBJECTIVE

TYPE OF WARNING SIGN VACATES MOVES TO WARNING SIGN LINK	DISTANCE BETWEEN THE WARNING SIGN AND UPSTREAM NODE (FT)	LINK NODE	DISTANCE BETWEEN LINK OFFRAMP AND UPSTREAM NODE (FT)	THRU TRAFFIC CONTAINING WITH OBJECTIVE (FT)	EXITING TRAFFIC AND ITS LANE(S)
OFFRAMP (1, 2)	3500.0	6	2500.0	1	
OFFRAMP (2, 4)	1.0	6	2499.0	9 1, 9	
OFFRAMP (4, 6)	1.0	6	1499.0	9 1, 9	

1

SPEED LINK	VEHICLES IN LINK	LANE OUT CHNG	CURR CONT	AVG CONT	VEH- MILES	VEH-MIN/ SECONDS/VEHICLE				TOTAL MOVE DELAY	VOLUME	DENSITY
						VEH- MIN	VEH- TIME	VEH- TIME	VEH- M/T			
LINK	IN	OUT	CHNG	CONT	MILES	MIN	TIME	TIME	M/T	TOTAL DELAY	VEH/LN/HR	
VEH/LN-MILE	MILE/HR	TYPE										

(1, 2) 474 473 558 20 20.0 315.4 300.2 37.9 36.7 1.1 .97 .95 .03 953. 15.1 63.05 FRWY
 (4, 6) 721 722 312 14 13.7 205.6 205.9 17.1 15.7 1.4 .92 1.00 .08 966. 16.1 59.92 FRWY
 (6, 7) 400 401 35 6 7.3 113.5 109.8 16.5 15.7 .8 .95 .97 .05 800. 12.9 62.03 FRWY
 (6, 8) 322 324 28 7 10.8 122.5 161.8 30.0 29.5 .5 .98 1.32 .02 648. 14.3 45.42 RAMP
 (3, 2) 150 149 0 7 5.7 63.1 85.0 33.7 33.5 .2 .99 1.35 .01 606. 13.6 44.51 RAMP
 (5, 4) 99 99 0 2 1.9 21.2 28.5 17.1 16.9 .2 .99 1.35 .01 400. 9.0 44.53 RAMP
 (2, 4) 622 622 589 8 8.1 117.8 120.6 11.6 10.5 1.1 .90 1.02 .10 830. 14.2 58.59 FRWY

NETWORK STATISTICS

VEHICLE-MILES = 959.0, VEHICLE-MINUTES = 1011.8, MOVING/TOTAL TRIP TIME = .955,

AVERAGE CONTENT = 67.5, CURRENT CONTENT = 64.0, SPEED(MPH) = 56.87,

TOTAL DELAY (VEH-MIN) = 45.79, TRAVEL TIME (MIN)/VEH-MILE = 1.06, DELAY TIME (MIN)/ VEH-MILE = .05

FRESIM CUMULATIVE VALUES OF FUEL CONSUMPTION

LINK	LINK TYPE	GALLONS							FUEL CONSUMPTION M.P.G.						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7
VEHICLE TYPE-															
(1, 2) FRWY		3.89	10.80	.00	.00	.00	.00	.00	16.74	23.27	.00	.00	.00	.00	.00
(4, 6) FRWY		3.61	7.39	.00	.00	.00	.00	.00	12.78	21.62	.00	.00	.00	.00	.00
(6, 7) FRWY		1.59	4.19	.00	.00	.00	.00	.00	14.79	21.63	.00	.00	.00	.00	.00
(6, 8) RAMP		1.17	2.58	.00	.00	.00	.00	.00	26.26	35.57	.00	.00	.00	.00	.00
(3, 2) RAMP		.58	1.49	.00	.00	.00	.00	.00	25.34	32.60	.00	.00	.00	.00	.00
(5, 4) RAMP		.24	.54	.00	.00	.00	.00	.00	22.77	29.46	.00	.00	.00	.00	.00
(2, 4) FRWY		2.33	4.98	.00	.00	.00	.00	.00	10.99	18.48	.00	.00	.00	.00	.00
SUBNETWORK-		13.41	31.97	.00	.00	.00	.00	.00	15.76	23.46	.00	.00	.00	.00	.00

VEHICLE TYPES 1, 2 = AUTO, VEHICLE TYPES 3, 4, 5, 6 = TRUCK, VEHICLE TYPE 7 = TRANSIT BUS

1

EVALUATION PERIOD ENDING TIME = 900 (SECONDS)
 NEGATIVE VALUE MEANS NO INFORMATION

OCCUPANCY LINK	ID NO.	DISTANCE		NO.	DETECTOR TYPE	MEAN VOLUME (VPH)	MEAN SPEED (MPH)	MEAN HEADWAY (SEC)	RATE
		FROM LANE UPST.	LOOP NODE LENGTH (FT)						
(2, 4)	9	30.00	20.0	1	COUPLED PAIR OF SHORT LOOPS	456	41.398	7.618	13.071
(2, 4)	1	30.00	20.0	2	COUPLED PAIR OF SHORT LOOPS	344	60.582	10.559	1.868
(2, 4)	2	30.00	20.0	2	COUPLED PAIR OF SHORT LOOPS	1464	58.848	2.458	9.927
(2, 4)	9	200.00	20.0	3	COUPLED PAIR OF SHORT LOOPS	152	50.884	21.538	3.627
(2, 4)	1	200.00	20.0	4	COUPLED PAIR OF SHORT LOOPS	1288	54.423	2.793	8.099
(2, 4)	2	200.00	20.0	4	COUPLED PAIR OF SHORT LOOPS	1040	61.764	3.455	5.676
(2, 4)	9	950.00	20.0	5	COUPLED PAIR OF SHORT LOOPS	156	61.657	22.972	1.990
(2, 4)	1	950.00	20.0	6	COUPLED PAIR OF SHORT LOOPS	1356	60.658	2.639	7.583
(2, 4)	2	950.00	20.0	6	COUPLED PAIR OF SHORT LOOPS	968	62.364	3.690	5.280
(4, 6)	10	30.00	20.0	7	COUPLED PAIR OF SHORT LOOPS	148	44.390	23.055	27.717
(4, 6)	9	30.00	20.0	8	COUPLED PAIR OF SHORT LOOPS	256	58.436	13.853	1.597
(4, 6)	1	30.00	20.0	8	COUPLED PAIR OF SHORT LOOPS	1364	61.079	2.630	7.530
(4, 6)	2	30.00	20.0	8	COUPLED PAIR OF SHORT LOOPS	976	62.547	3.664	5.314
(4, 6)	10	200.00	20.0	9	COUPLED PAIR OF SHORT LOOPS	20	38.462	121.762	.157
(4, 6)	9	200.00	20.0	10	COUPLED PAIR OF SHORT LOOPS	408	54.396	8.714	4.176
(4, 6)	1	200.00	20.0	10	COUPLED PAIR OF SHORT LOOPS	1476	60.053	2.436	8.340
(4, 6)	2	200.00	20.0	10	COUPLED PAIR OF SHORT LOOPS	976	61.943	3.671	5.302
(4, 6)	9	940.00	20.0	11	COUPLED PAIR OF SHORT LOOPS	520	64.200	6.899	2.733
(4, 6)	1	940.00	20.0	12	COUPLED PAIR OF SHORT LOOPS	1396	60.821	2.574	7.771
(4, 6)	2	940.00	20.0	12	COUPLED PAIR OF SHORT LOOPS	976	62.493	3.687	5.485
(4, 6)	9	1440.00	20.0	13	COUPLED PAIR OF SHORT LOOPS	592	63.426	5.974	3.213
(4, 6)	1	1440.00	20.0	14	COUPLED PAIR OF SHORT LOOPS	1372	59.581	2.616	8.637
(4, 6)	2	1440.00	20.0	14	COUPLED PAIR OF SHORT LOOPS	904	59.803	3.946	5.373

Scenario 4 : Analysis Of a major Weaving Area

VERSION 1.03
 RELEASE DATE MAR 1997
 TRAF SIMULATION MODEL

1

DEVELOPED FOR

U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 TFHRC INTELLIGENT SYSTEMS & TECHNOLOGIES DIVISION

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INPUT CARD FILE LIST

0	1	2	3	4	5	6	7	8
1	:	I	T	R	A	F	2	.0
2	:							
3	:	1	1	15	7981	1	8	8
4	:	900				7781	7581	
5	:			60				
6	:					1		
7	:	8003	6	3	1	2		
8	:	6	3	2	68001	2		
9	:	8001	1	3	0	2		
10	:	1	3	2	60000	2		
11	:	3	2	4	5000	2	93	500103
12	:	2	4	10	10000	3	93	1000
13	:	4	108007	31620	3			
14	:	4	88004	33541	2			
15	:	8003	6		12265			
16	:	6	3		12265			
17	:	8001	1		12265			
18	:	1	3		12265			
19	:	3	2		12265			
20	:	2	4		12265	2500		
21	:	4	10		12265			
22	:	4	8		12265			
23	:	8003	6	32700				
24	:	6	3	22700				
25	:	8001	1	32900				
26	:	1	3	22900				
27	:	3	2	45600				
28	:	2	4	103300	82300			
29	:	4	108007	33300				
30	:	4	88004	2300				
31	:	3	2	10	30	20	10	2
32	:	3	2	9	30	20	10	2
33	:	3	2	1	30	20	10	2
34	:	3	2	2	30	20	10	2
35	:	3	2	10	460	20	10	2
36	:	3	2	9	460	20	10	2
37	:	3	2	1	460	20	10	2
38	:	3	2	2	460	20	10	2
39	:	2	4	9	30	20	10	2
40	:	2	4	1	30	20	10	2
41	:	2	4	2	30	20	10	2
42	:	2	4	3	30	20	10	2
43	:	2	4	9	200	20	10	2
44	:	2	4	1	200	20	10	2
45	:	2	4	2	200	20	10	2
46	:	2	4	3	200	20	10	2
47	:	2	4	9	500	20	10	2
48	:	2	4	1	500	20	10	2
49	:	2	4	2	500	20	10	2
50	:	2	4	3	500	20	10	2

INPUT CARD FILE LIST (CONT.)

1		
0SEQ.#	:---+---1---+---2---+---3---+---4---+---5---+---6---+---7---+---8	
51 :	2 4 9 940 20 10 2 11	28
52 :	2 4 1 940 20 10 2 12	28
53 :	2 4 2 940 20 10 2 12	28
54 :	2 4 3 940 20 10 2 12	28
55 :	8003 62700 7	50
56 :	8001 12900 7	50
57 :	1 900 60	64
58 :	1 2 3 4 5 6 7 8 9 10 11 12	67
59 :	15 14 13 12 11 10 9 8 7 6	68
60 :	16 16 16 16 3 1	69
61 :	10 20 1 20	70
62 :	1 10 73 1 4 27 3 10 45 3 4 55	74
63 :	0	170
64 :	8003 3500 2000	195
65 :	8004 15500 6500	195
66 :	6 4500 3500	195
67 :	8 13500 7500	195
68 :	8007 16500 12000	195
69 :	3 9000 9000	195
70 :	8001 1500 9000	195
71 :	10 13500 10000	195
72 :	1 2500 9000	195
73 :	2 9500 9000	195
74 :	4 10500 9000	195
75 :	1	210
0SEQ.#	:---+---1---+---2---+---3---+---4---+---5---+---6---+---7---+---8	

OUTPUT RESULTS

1 TRAF SIMULATION MODEL

DEVELOPED FOR

U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 TFHRC INTELLIGENT SYSTEMS & TECHNOLOGIES DIVISION

1 FRESIM LINK CHARACTERISTICS

----- AUXILIARY LANE -----
 FRESIM TURNING MOVEMENTS

----- MAIN-LINE TRAFFIC ----- ----- EXITING TRAFFIC -----

LINK	DOWNSTREAM NODE NO. OF THE MAIN-LINE RECEIVING LINK	PERCENTAGE	DOWNSTREAM NODE NO. OF THE OFF-RAMP	PERCENTAGE
-----	-----	-----	-----	-----
(8003, 6)	3	100		
(6, 3)	2	100		
(8001, 1)	3	100		
(1, 3)	2	100		
(3, 2)	4	100		
(2, 4)	10	59	8	41
(4, 10)	8007	100		
(4, 8)	8004	100		

FRESIM LINK VOLUME

LINK	FLOW RATE (VEH/HOUR)	PERCENT TRUCKS	PERCENT CARPOOL
(8003, 6)	2700	7	
(8001, 1)	2900	7	

1

FRESIM OFF-LINE INCIDENT DETECTION AND/OR MOE ESTIMATION DATA

----- DETECTOR OPERATION DATA -----

DETECTOR MODE	POLLING FREQUENCY (NO./SEC)	INC. DET. EVALUATION FREQUENCY (SEC)	RE-EVALUATION FREQUENCY (SEC)	AVERAGE TIME PERIOD (FEET)	AVERAGE VEHICLE LENGTH
ANALOG		900	60	17	

NOTE: POINT PROCESSING IS DESIRED.

----- DETECTOR STATIONS USED -----

LINK	STATION NO.
(3, 2)	1
(3, 2)	2
(3, 2)	3
(3, 2)	4
(2, 4)	5
(2, 4)	6
(2, 4)	7
(2, 4)	8
(2, 4)	9
(2, 4)	10
(2, 4)	11

1

TABLE OF EMBEDDED DATA CHANGES

DRIVER TYPE: 1 2 3 4 5 6 7 8 9 10
 ZFOLK ARRAY: 15 14 13 12 11 10 9 8 7 6

ZFRICT ARRAY: 16 16 16 16

LAG TO ACCELERATION (ZLAGAC): 3 LAG TO DECELERATION (ZLAGDC): 1

AMOUNT OF TIME TO COMPLETE A LANE CHANGE (ZHIETA): 10

MINIMUM SEPARATION FOR VEHICLE GENERATION (ZMNHDI): 20

PERCENT OF DRIVERS DESIRING TO YLD THE RIGHT-OF-WAY (ZPDYLD): 20

1

FRESIM LANE ALIGNMENT TABLE

LINK	TYPE	DISTANCE FROM UPST. NODE (FT)	UPSTREAM FEEDING LANE NUMBER											REASON CODE		
			1	2	3	4	5	6	7	8	9	10	11			
(2, 4)	F	1000.0	1	2	3	-	-	-	-	-	-	-	-	-	-	4
(2, 4)	F	1000.0	2	-	-	-	-	-	-	-	1	-	-	-	-	2
(3, 2)	F	500.0	2	3	-	-	-	-	-	-	1	9	-	-	-	4
(6, 3)	R	6800.0	10	9	-	-	-	-	-	-	-	-	-	-	-	1

TABLE OF FREEWAY WARNING SIGNS

WARNING SIGN OBJECTIVE							
TYPE OF WARNING SIGN	LINK	DISTANCE BETWEEN THE WARNING SIGN AND UPSTREAM NODE (FT)	LINK NODE	LINK INCIDENT	DISTANCE BETWEEN THE WARNING SIGN AND OFFRAMP LANE DROP (FT)	THRU TRAFFIC WITH	EXITING TRAFFIC AND ITS
OFFRAMP	(1, 3)	5000.0	4		2500.0		1
OFFRAMP	(3, 2)	1.0	4		1499.0	10	9,10

FRESIM ORIGIN - DESTINATION TRIP TABLE

FOR EACH ORIGIN NODE, TABLE PROVIDES LISTING OF PAIRS OF DATA : DESTINATION/ FRACTION OF ENTRY VOLUME TRAVELING TO DESTINATION

ORIGIN NODE (8003)	4/ .550	10/ .450
ORIGIN NODE (8001)	4/ .270	10/ .730

INITIALIZATION STATISTICS

TIME INTERVAL NUMBER	SUBNETWORK TYPE	PRIOR CONTENT (VEHICLES)	CURRENT CONTENT (VEHICLES)	PERCENT DIFFERENCE
1	FRESIM	0	93	10000
2	FRESIM	93	184	97
3	FRESIM	184	204	10
4	FRESIM	204	201	1 EQUILIBRIUM ATTAINED

CUMULATIVE FRESIM STATISTICS AT TIME 8 15 0

LINK STATISTICS

LINK	VEHICLES LN-MILE	LANE IN OUT CHNG MILE/HR	CURR CONT TYPE	AVG CONT	VEH- MILES	VEH-MIN/ SECONDS/VEHICLE		VEH-MILE		TOTAL MOVE DELAY	VOLUME	DENSITY					
						MIN	TIME	TIME	M/T								
(6, 3)	675	674	174	55	56.7	871.8	850.1	75.3	71.8	3.6	.95	.98	.05	1355.	22.0	61.53	RAMP
(1, 3)	724	722	634	56	54.2	824.0	811.8	67.2	63.5	3.7	.94	.99	.05	1452.	23.8	60.90	FRWY

(3, 2) 1396 1400 229 8 9.4 132.6 141.1 6.0 5.3 .8 .87 1.06 .14 1402. 24.9 56.37 FRWY
 (2, 4) 1400 1406 443 19 25.4 265.7 380.1 16.3 11.0 5.2 .68 1.43 .46 1404. 33.5 41.94 FRWY
 (4, 10) 837 837 172 32 33.2 500.6 497.3 35.7 33.4 2.3 .94 .99 .06 1116. 18.5 60.40 FRWY
 (4, 8) 569 570 85 23 24.8 362.2 371.6 39.1 35.4 3.7 .91 1.03 .10 1142. 19.5 58.48 RAMP

NETWORK STATISTICS

POINT PROCESSING OUTPUT

EVALUATION PERIOD BEGINNING TIME = 1 (SECONDS)
 EVALUATION PERIOD ENDING TIME = 900 (SECONDS)
 NEGATIVE VALUE MEANS NO INFORMATION

OCCUPANCY		DISTANCE		STATION	DETECTOR TYPE	MEAN VOLUME (VPH)	MEAN SPEED (MPH)	MEAN HEADWAY (SEC)	RATE
LINK	ID NO.	FROM (FT)	LOOP (FT)						
(3, 2)	10	30.00	20.0	1	COUPLED PAIR OF SHORT LOOPS	1312	58.638	2.742	8.298
(3, 2)	9	30.00	20.0	1	COUPLED PAIR OF SHORT LOOPS	1392	56.819	2.582	8.591
(3, 2)	1	30.00	20.0	2	COUPLED PAIR OF SHORT LOOPS	1096	58.505	3.260	8.068
(3, 2)	2	30.00	20.0	2	COUPLED PAIR OF SHORT LOOPS	1736	58.890	2.062	10.332
(3, 2)	10	460.00	20.0	3	COUPLED PAIR OF SHORT LOOPS	1196	55.689	3.008	7.765
(3, 2)	9	460.00	20.0	3	COUPLED PAIR OF SHORT LOOPS	1676	49.166	2.150	12.797
(3, 2)	1	460.00	20.0	4	COUPLED PAIR OF SHORT LOOPS	1088	58.094	3.301	6.880
(3, 2)	2	460.00	20.0	4	COUPLED PAIR OF SHORT LOOPS	1636	59.191	2.200	9.679
(2, 4)	9	30.00	20.0	5	COUPLED PAIR OF SHORT LOOPS	1224	53.868	2.940	8.343
(2, 4)	1	30.00	20.0	6	COUPLED PAIR OF SHORT LOOPS	1640	48.161	2.194	13.773
(2, 4)	2	30.00	20.0	6	COUPLED PAIR OF SHORT LOOPS	1084	56.575	3.317	7.273
(2, 4)	3	30.00	20.0	6	COUPLED PAIR OF SHORT LOOPS	1624	59.102	2.216	9.694
(2, 4)	9	200.00	20.0	7	COUPLED PAIR OF SHORT LOOPS	1180	49.763	3.046	9.282
(2, 4)	1	200.00	20.0	8	COUPLED PAIR OF SHORT LOOPS	1672	44.474	2.150	16.628
(2, 4)	2	200.00	20.0	8	COUPLED PAIR OF SHORT LOOPS	1128	53.801	3.182	8.358
(2, 4)	3	200.00	20.0	8	COUPLED PAIR OF SHORT LOOPS	1600	59.137	2.247	9.651
(2, 4)	9	500.00	20.0	9	COUPLED PAIR OF SHORT LOOPS	1232	42.089	2.902	11.998
(2, 4)	1	500.00	20.0	10	COUPLED PAIR OF SHORT LOOPS	1568	39.113	2.296	19.550
(2, 4)	2	500.00	20.0	10	COUPLED PAIR OF SHORT LOOPS	1180	46.521	3.045	11.735
(2, 4)	3	500.00	20.0	10	COUPLED PAIR OF SHORT LOOPS	1612	57.800	2.233	10.013
(2, 4)	9	940.00	20.0	11	COUPLED PAIR OF SHORT LOOPS	1252	44.945	2.870	10.261
(2, 4)	1	940.00	20.0	12	COUPLED PAIR OF SHORT LOOPS	1664	42.333	2.162	15.277
(2, 4)	2	940.00	20.0	12	COUPLED PAIR OF SHORT LOOPS	1120	49.544	3.209	8.574
(2, 4)	3	940.00	20.0	12	COUPLED PAIR OF SHORT LOOPS	1572	61.681	2.286	9.572

TOTAL CPU TIME FOR SIMULATION = 43.45 SECONDS
 TOTAL CPU TIME FOR THIS RUN = 43.45 SECONDS
 0LAST CASE PROCESSED

APPENDIX B : TABULATED OUTPUT DATA

i) Warning sign distance and No of vehicles being reassigned for each scenarios

Warning Sign Distance	Scenario 1	Scenario 2	Scenario 3	Scenario 4
2500	127	95	101	40
5400	120	87	109	60
7000	110	78	115	46
9000	120	70	120	33

ii) Freeflow speed and No of vehicles being reassigned for each scenarios

Free Flow Speed	Scenario 1	Scenario 2	Scenario 3	Scenario 4
65	120	95	101	40
60	125	78	112	46
55	105	54	100	42

iii) Maneuver Time and No of vehicles being reassigned for each scenarios

Maneuver Time	Scenario 1	Scenario 2	Scenario 3	Scenario 4
3.5	150	65	101	50
3	120	72	106	40
2.5	109	115	111	64
2	99	89	73	65
1.5	86	72	61	61
1	58	45	39	38

iv) Sensitivity Parameter and No of vehicles being reassigned for each scenarios

Sensitivity Parameter	Scenario 1	Scenario 2	Scenario 3	Scenario 4
0.5	101	123	110	108
1	120	72	101	40
1.5	130	43	82	25
1.8	115	27	70	12
2	111	12	60	10

v) percentage driver yielding and No of vehicles being reassigned for each scenarios

% driver Yielding	Scenario 1	Scenario 2	Scenario 3	Scenario 4
20	120	72	101	40
40	125	77	103	46
60	130	80	105	65
80	136	85	114	78
100	138	95	119	90

v) Lag to acc/Lag to dec and No of vehicles being reassigned for each scenarios

Lag to Acc/Lag to Dec	Scenario 1	Scenario 2	Scenario 3	Scenario 4
0.3	120	24	101	40
0.2	110	22	96	46
0.1	106	19	94	55

vi) Volume Distribution and No of vehicles being reassigned for each scenarios

Vehicle Distribution in Lane 1	Scenario 1	Scenario 2	Scenario 3	Scenario 4
10	117	38	96	56
20	110	50	103	52
30	129	72	101	42
50	126	35	100	40
70	109	26	92	52