		Weave /					2013									2040 No Bu	ild								2040 Build				
		Merge /		Ramp			Mainline			Den	sity		Ramp			Mainline			Densi	ty		Ramp			Mainline			Dens	sity
		Diverge	Ramp	Truck	Mainline	Volume	Truck	1	.os	(pc/n	ni/ln)	Ramp	Truck	Mainline	e Volume	Truck	L	os	(pc/mi,	/In)	Ramp	Truck	Mainline	Volume	Truck	LC	s	(pc/m	ni/ln)
Interchange	Movement	Length	DHV	Percentage	AM	PM	Percentage	AM	PM	AM	PM	DHV	Percentage	AM	PM	Percentage	AM	PM	AM	PM	DHV	Percentage	AM	PM	Percentage	AM	PM	AM	PM
Interstate 24	Southbound Diverge	230	40	0.22	400	310	0.22	Α	A	6.4	5.5	50	0.25	540	420	0.25	A	A	8.0	6.7	50	0.25	540	420	0.25	Α	Α	8.0	6.7
Lovers Lane	Northbound Diverge	220	160	0.1	300	390	0.22	Α	A	5.5	6.4	230	0.14	380	500	0.25	A	A	6.4	7.6	230	0.14	380	500	0.25	Α	Α	6.4	7.6
Lovers Lane	Northbound Merge	1130	60	0.1	230	270	0.17	Α	A	1.1	1.4	90	0.14	250	300	0.21	A	Α	1.6	2.0	90	0.14	250	300	0.21	Α	A	1.6	2.0
Lovers Lane	Southbound Diverge	720	60	0.1	500	460	0.17	Α	A	3.0	2.5	90	0.14	570	520	0.21	A	Α	3.8	3.3	90	0.14	570	520	0.21	A	A	3.8	3.3
Lovers Lane	Southbound Merge	1030	15	0.1	430	340	0.22	Α	A	3.3	2.4	20	0.14	570	450	0.25	A	Α	4.8	3.6	20	0.14	570	450	0.25	A	A	4.8	3.6
US 68B	Northbound Merge	980	200	0.1	520	390	0.16	Α	A	5.9	4.7	290	0.14	480	340	0.2	A	Α	6.4	5.1	290	0.14	480	340	0.2	A	A	6.4	5.1
US 68B	Southbound Diverge	270	250	0.1	340	470	0.16	Α	A	5.3	6.7	370	0.14	260	400	0.2	A	Α	4.6	6.0	370	0.14	260	400	0.2	A	A	4.6	6.0
US 68B	Southbound Merge	1010	170	0.1	390	350	0.17	Α	A	4.3	3.9	250	0.14	410	360	0.21	A	A	5.2	4.8	250	0.14	410	360	0.21	Α	Α	5.2	4.8
US 41A	Northbound Diverge	240	200	0.1	520	390	0.16	Α	A	7.5	6.1	260	0.14	510	370	0.2	A	A	7.4	6.0	260	0.14	510	370	0.2	Α	Α	7.4	6.0
US 41A	Northbound Merge	940	420	0.1	300	380	0.15	Α	A	6.0	6.7	550	0.14	410	510	0.18	A	Α	8.3	9.2	550	0.14	410	510	0.18	A	A	8.3	9.2
US 41A	Southbound Diverge	1890	360	0.1	420	350	0.15	Α	A	*	*	470	0.14	570	470	0.18	A	Α	*	*	470	0.14	570	470	0.18	A	A	*	*
US 41A	Southbound Merge	1480	240	0.1	350	480	0.16	Α	A	1.5	2.7	300	0.14	330	470	0.2	A	Α	2.0	3.3	300	0.14	330	470	0.2	A	A	2.0	3.3
US 41	Northbound Diverge	250	160	0.1	560	640	0.15	Α	A	7.5	6.1	240	0.14	720	820	0.18	A	Α	7.4	6.0	240	0.14	720	820	0.18	A	A	7.4	6.0
US 41	Northbound Merge	780	250	0.1	380	640	0.15	Α	A	6.0	6.7	360	0.14	480	820	0.18	A	Α	8.3	9.2	360	0.14	480	820	0.18	A	A	8.3	9.2
US 41	Southbound Diverge	240	250	0.1	620	370	0.15	Α	A	*	*	370	0.14	790	450	0.18	A	Α	*	*	370	0.14	790	450	0.18	A	A	*	*
US 41	Southbound Merge	800	190	0.1	590	520	0.15	Α	A	1.5	2.7	290	0.14	750	650	0.18	A	Α	2.0	3.3	290	0.14	750	650	0.18	A	A	2.0	3.3
US 68	Northbound Diverge	200	200	0.1	430	690	0.15	Α	A	6.9	9.5	280	0.14	560	900	0.18	A	В	8.3	11.8	280	0.14	560	900	0.18	A	В	8.3	11.8
US 68	Northbound Merge	910	90	0.1	400	690	0.15	Α	A	4.3	7.0	120	0.14	530	900	0.18	A	Α	5.8	9.3	120	0.14	530	900	0.18	A	A	5.8	9.3
US 68	Southbound Diverge	220	110	0.1	700	410	0.15	Α	A	9.5	6.5	150	0.14	900	530	0.18	В	Α	11.6	7.8	150	0.14	900	530	0.18	В	A	11.6	7.8
US 68	Southbound Merge	730	200	0.1	670	420	0.15	Α	A	8.8	6.5	280	0.14	880	540	0.18	В	Α	11.7	8.4	280	0.14	880	540	0.18	В	A	11.7	8.4
KY 1682	Northbound Weave On	260	80	0.1	180	470	0.15	Α	A	3.8	5.5	100	0.14	240	610	0.18	A	Α	5.2	7.6	100	0.14	240	610	0.18	Α	Α	5.2	7.6
KY 1682	Northbound Weave Off	200	310	0.1	100	470	0.13					410	0.14	240	010	0.18					410	0.14	240	010	0.18				
KY 1682	Southbound Weave On	260	320	0.1	200	210	0.15	Α	A	5.0	4.5	420	0.14	400	390	0.18	A	Α	6.7	6.1	420	0.14	400	390	0.18	Α	Α	6.7	6.1
KY 1682	Southbound Weave Off	200	60	0.1	390	310	0.13					80	0.14	430	390	0.18					80	0.14	490	330	0.18				
US 41	Northbound Merge	1030	30	0.2	330	460	0.15	Α	A	2.4	3.6	40	0.23	440	620	0.18	A	Α	3.5	5.2	40	0.23	440	620	0.18	Α	A	3.5	5.2
US 41	Southbound Diverge	250	30	0.2	410	430	0.15	Α	A	6.2	6.4	40	0.23	520	550	0.18	A	A	7.4	7.7	40	0.23	520	550	0.18	Α	Α	7.4	7.7

 $<sup>\</sup>ensuremath{^*}$  - indicates that the calculated density would be negligible for those ramps.

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014
Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: Interstate 24

Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 400 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	40	vph
Length of first accel/decel lane	230	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	400	40	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	111	11	V
Trucks and buses	22	22	%
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	

```
Flow rate, vp
                                   493
                                              49
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 493 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                        Actual
                                     Maximum
                                                  LOS F?
    v = v
                        493
                                     4800
                                                   No
     Fi F
    v = v - v
                        444
                                     4800
                                                   No
        F R
     FO
                        49
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 493
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    493
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.302
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.5
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

mph

0.901

1.00

0.901

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: Interstate 24

Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph
Volume on freeway 540 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	50	vph
Length of first accel/decel lane	230	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 Ramp	
Volume, V (vph)	540	50		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	150	14		V
Trucks and buses	25	25		용
Recreational vehicles	0	0		용
Terrain type:	Level	Level		
Grade	0.00 %	0.00	% %	
Length	0.00 mi	0.00	mi mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                   675
                                              63
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 675 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        675
                                     4800
                                                   No
     Fi F
    v = v - v
                        612
                                     4800
                                                   No
        F R
     FO
                        63
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 675
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    675
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 8.0 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.304
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.5
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.889

1.00

0.889

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: Interstate 24

Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 310 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	40	vph
Length of first accel/decel lane	230	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 Ramp
Volume, V (vph)	310	40	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	86	11	V
Trucks and buses	22	22	%
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	

```
Flow rate, vp
                                   382
                                              49
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 382 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        382
                                     4800
                                                   No
     Fi F
    v = v - v
                        333
                                     4800
                                                   No
        F R
     FO
                        49
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 382
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    382
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 5.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.302
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.5
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

mph

0.901

1.00

0.901

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014
Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: Interstate 24

Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

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

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 420

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	420	50	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	117	14	V
Trucks and buses	25	25	%
Recreational vehicles	0	0	8
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
1.00
                                              1.00
Driver population factor, fP
Flow rate, vp
                                   525
                                              63
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 525 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        525
                                     4800
                                                    No
     Fi F
    v = v - v
                        462
                                     4800
                                                    No
        F R
     FO
                        63
                                     2100
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 525
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    525
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 6.7 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.304
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                         S = 61.5
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.889

0.889

Heavy vehicle adjustment, fHV

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: Lovers Ln Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway

70.0 mph Volume on freeway 300 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	160	vph
Length of first accel/decel lane	220	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	300	160	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	83	44	V
Trucks and buses	22	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Flow rate, vp
                                   370
                                              187
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 370 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        370
                                     4800
                                                    No
     Fi F
    v = v - v
                        183
                                     4800
                                                   No
        F R
     FO
                        187
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 370
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    370
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 5.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.315
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.2
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.901

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: Lovers Ln

Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 380

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	380	230	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	106	64	V
Trucks and buses	25	14	%
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	

```
Flow rate, vp
                                   475
                                              273
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 475 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        475
                                     4800
                                                   No
     Fi F
    v = v - v
                        202
                                     4800
                                                   No
        F R
     FO
                        273
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 475
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    475
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.323
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.0
                                                    mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                    mph
```

mph

0.889

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: Lovers Ln

Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2 Free-flow speed on freeway 70

Free-flow speed on freeway 70.0 mph Volume on freeway 390 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	160	vph
Length of first accel/decel lane	220	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 Ramp
Volume, V (vph)	390	160	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	108	44	V
Trucks and buses	22	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Flow rate, vp
                                   481
                                              187
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 481 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        481
                                     4800
                                                   No
     Fi F
    v = v - v
                        294
                                     4800
                                                   No
     FO F R
                        187
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 481
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    481
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
               _____Speed Estimation_____
                                        D = 0.315
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.2
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
Space mean speed for all vehicles,
                                       S = 61.2
                                                    mph
```

0.901

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014
Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: Lovers Ln

Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

FIEEway Data
--------------

Type of analysis Diverge Number of lanes in freeway 2
Free-flow speed on freeway 70.0

Free-flow speed on freeway 70.0 mph Volume on freeway 500 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	230	vph
Length of first accel/decel lane	220	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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	500	230		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	139	64		V
Trucks and buses	25	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00	%	5
Length	0.00 mi	0.00	mi r	ni
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Driver population factor, fP
                                   1.00
                                              1.00
Flow rate, vp
                                   625
                                              273
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 625 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        625
                                     4800
                                                    No
     Fi F
    v = v - v
                        352
                                     4800
                                                   No
        F R
     FO
                        273
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 625
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                 4400
                    625
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 7.6 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.323
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.0
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.889

0.935

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Agency/Co.: QK4
Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: Lovers Lane Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 230 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 60 vph Length of first accel/decel lane 1130 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 230 60 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 64 17 V Trucks and buses 17 10 응

0

1.5

1.2

Level

%

mi

0

Level

1.5

1.2

ે

mi

%

용

шi

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Terrain type:

Grade Length

```
Flow rate, vp
                                   277
                                              70
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 277 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                                     Maximum
                        Actual
                        347
                                     4800
                                                    No
    V
     FΟ
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 277
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                    Violation?
                                 4600
                    347
                                                     No
     R12
           ____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 1.1 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.247
                                         S
Space mean speed in ramp influence area,
                                         S = 63.1
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                         0
```

S = 63.1

mph

0.922

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: Lovers Lane Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 250 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 90 vph 1130 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\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	250	90		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	69	25		v
Trucks and buses	21	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%		%	왕
Length	mi		mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                    307
                                               107
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 307 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         414
                                     4800
                                                    No
    V
     FΟ
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 307
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    414
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 1.6 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.248
                                         S
Space mean speed in ramp influence area,
                                         S = 63.1
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 63.1
                                                     mph
```

0.905

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: Lovers Lane Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 270 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 60 vph Length of first accel/decel lane 1130 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 270 60 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 75 17 V Trucks and buses 17 10 응 Recreational vehicles

0

1.5

1.2

Terrain type:

Grade Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Level

%

mi

0

Level

1.5

1.2

ે

mi

%

용

шi

```
Flow rate, vp
                                   326
                                              70
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 326 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        396
                                     4800
                                                    No
    V
     FΟ
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 326
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    396
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 1.4 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.248
                                         S
Space mean speed in ramp influence area,
                                         S = 63.1
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 63.1

mph

0.922

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014 Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: Lovers Lane Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 300 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 90 vph Length of first accel/decel lane 1130 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\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent	
			Ramp	
Volume, V (vph)	300	90		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	83	25		V
Trucks and buses	21	14		왕
Recreational vehicles	0	0		왕
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		

```
Flow rate, vp
                                    368
                                               107
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 368 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         475
                                      4800
                                                    No
    V
     FΟ
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 368
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    475
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 2.0 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.248
                                         S
Space mean speed in ramp influence area,
                                         S = 63.1
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 63.1
                                                     mph
```

0.905

1.00

0.935

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: Lovers Ln Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 500 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	60	vph
Length of first accel/decel lane	720	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 Ramp
Volume, V (vph)	500	60	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	139	17	V
Trucks and buses	17	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
1.00
Driver population factor, fP
                                              1.00
Flow rate, vp
                                   603
                                              70
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 603 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        603
                                     4800
                                                    No
     Fi F
    v = v - v
                        533
                                     4800
                                                    No
        F R
     FO
                        70
                                     2100
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 603
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    603
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 3.0 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.304
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                         S = 61.5
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.922

0.952

Heavy vehicle adjustment, fHV

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: Lovers Ln

Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

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

Type of an	alysis	Diverge
Number of	lanes in freeway	2

Free-flow speed on freeway 70.0 mph Volume on freeway 570 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	90	vph
Length of first accel/decel lane	720	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 Ramp	
Volume, V (vph)	570	90		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	158	25		V
Trucks and buses	21	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00	% %	5
Length	0.00 m	0.00	mi n	ni
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                   700
                                              107
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 700 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        700
                                     4800
                                                   No
     Fi F
    v = v - v
                        593
                                     4800
                                                   No
        F R
     FO
                        107
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 700
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    700
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 3.8 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.308
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.4
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.905

1.00

0.935 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: Lovers Ln

Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 460

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	460	60		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	128	17		V
Trucks and buses	17	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00	%	%
Length	0.00 mi	0.00	mi ı	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
1.00
Driver population factor, fP
                                              1.00
Flow rate, vp
                                   555
                                              70
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 555 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        555
                                     4800
                                                    No
     Fi F
    v = v - v
                        485
                                     4800
                                                   No
        F R
     FO
                        70
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 555
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    555
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 2.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.304
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.5
                                                     mph
                                         R
```

S = N/A

S = 61.5

mph

mph

0.922

0.952

Heavy vehicle adjustment, fHV

Space mean speed in outer lanes,

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: Lovers Ln

Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 520 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	90	vph
Length of first accel/decel lane	720	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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	520	90	-	vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	144	25		v
Trucks and buses	21	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00	% %	
Length	0.00 mi	0.00	mi m	i
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                   638
                                              107
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 638 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        638
                                     4800
                                                    No
     Fi F
    v = v - v
                        531
                                     4800
                                                   No
        F R
     FO
                        107
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 638
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                 4400
                    638
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 3.3 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.308
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                         S = 61.4
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
Space mean speed for all vehicles,
                                        S = 61.4
                                                     mph
```

0.905

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Agency/Co.: QK4
Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: Lovers Lane Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 430 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 15 vph 1030 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 430 15 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 119 4 V Trucks and buses 22 10 응 Recreational vehicles

0

1.5

1.2

Terrain type:

Grade Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

0

1.5

1.2

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mi

Level Level

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mi

%

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```
530
Flow rate, vp
                                               18
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 530 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        548
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 530
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    548
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 3.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.256
                                         S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.8

mph

0.901

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Agency/Co.: QK4
Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: Lovers Lane Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 570 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 20 vph 1030 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 570 20 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 158 6 V

25

0

1.5

1.2

Level

%

mi

14

0

Level

1.5

1.2

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Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
713
Flow rate, vp
                                               24
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 713 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                                     Maximum
                        Actual
                        737
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 713
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                    Violation?
                                 4600
                    737
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 4.8 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.257
                                         S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                         0
```

S = 62.8

mph

0.889

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: Lovers Lane Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 340 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 15 vph 1030 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 340 15 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 94 4 V

22

0

1.5

1.2

10

Level Level

%

mi

0

1.5

1.2

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Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
419
Flow rate, vp
                                               18
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 419 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                                     Maximum
                        Actual
                         437
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 419
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    437
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 2.4 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.255
                                         S
Space mean speed in ramp influence area,
                                         S = 62.9
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.9
                                                     mph
```

0.901

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: Lovers Lane Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 450 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 20 vph 1030 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 450 20 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 125 6 V

25

0

1.5

1.2

Level

%

mi

14

0

Level

1.5

1.2

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mi

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%

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Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
563
Flow rate, vp
                                               24
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 563 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                                     Maximum
                        Actual
                         587
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 563
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    587
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 3.6 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.256
                                         S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
```

0

S = 62.8

mph

0.889

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 68B Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 520 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 200 vph Length of first accel/decel lane 980 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)	520	200	_	vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	144	56		V
Trucks and buses	16	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	۶	5	용
Length	mi	r	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
624
Flow rate, vp
                                               233
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 624 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
                        857
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 624
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                    Violation?
                                 4600
                    857
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 5.9 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.262
                                         S
Space mean speed in ramp influence area,
                                         S = 62.7
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.7

mph

0.926

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 68B Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 480 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 290 vph Length of first accel/decel lane 980 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	5
Volume, V (vph)	480	290		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	133	81		V
Trucks and buses	20	14		%
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		

```
Flow rate, vp
                                    587
                                               345
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 587 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         932
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 587
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    932
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.4 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.262
                                         S
Space mean speed in ramp influence area,
                                         S = 62.7
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.7

mph

0.909

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 68B Analysis Year:
Description Jurisdiction: KYTC 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 390 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 200 Volume on ramp vph 980 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 390 200 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 108 56 V Trucks and buses 16 10 응

0

1.5

1.2

Level

%

mi

0

Level

1.5

1.2

ે

mi

%

용

шi

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Terrain type:

Grade Length

```
468
Flow rate, vp
                                               233
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 468
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                                     Maximum
                         Actual
                         701
                                      4800
                                                    No
    V
     FO
    v or v
                         0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 468
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    701
                                                     No
     R12
            _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 4.7 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.260
                                          S
Space mean speed in ramp influence area,
                                         S = 62.7
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.7
                                                     mph
```

0.926

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 68B KYTC Jurisdiction: Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 340 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 290 Volume on ramp vph 980 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 340 290 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 94 81 V

20

1.5

1.2

Level

%

mi

0

14

0

Level

1.5

1.2

ે

mi

응

%

용

шi

Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Flow rate, vp
                                    416
                                               345
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 416 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         761
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 416
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    761
                                                     No
     R12
           ____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 5.1 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.261
                                         S
Space mean speed in ramp influence area,
                                         S = 62.7
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.7
                                                     mph
```

0.909

1.00

0.935

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014
Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 68B Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 340 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	250	vph
Length of first accel/decel lane	270	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	340	250	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	94	69	V
Trucks and buses	16	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
1.00
Driver population factor, fP
                                              1.00
Flow rate, vp
                                   408
                                              292
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 408 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        408
                                     4800
                                                   No
     Fi F
    v = v - v
                        116
                                     4800
                                                   No
        F R
     FO
                        292
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 408
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    408
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 5.3 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.324
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.9
                                                    mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                    mph
```

S = 60.9

mph

0.926

0.952

Heavy vehicle adjustment, fHV

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 68B Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway 70.0

mph Volume on freeway 260 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	370	vph
Length of first accel/decel lane	270	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	260	370	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	72	103	v
Trucks and buses	20	14	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   318
                                              440
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 318 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        318
                                     4800
                                                   No
     Fi F
    v = v - v
                        -122
                                     4800
                                                   No
     FO F R
                        440
                                     2100
                                                   No
    V
    R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 318
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    318
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 4.6 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
               _____Speed Estimation_____
                                        D = 0.338
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.5
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
Space mean speed for all vehicles,
                                       S = 60.5
                                                    mph
```

0.909

1.00

0.935

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014
Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 68B Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 470 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	250	vph
Length of first accel/decel lane	270	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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	470	250	vp	h
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	131	69	V	
Trucks and buses	16	10	%	
Recreational vehicles	0	0	%	
Terrain type:	Level	Level		
Grade	0.00 %	0.00	8	
Length	0.00 mi	0.00	ni mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
1.00
Driver population factor, fP
                                              1.00
Flow rate, vp
                                   564
                                              292
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 564 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        564
                                     4800
                                                    No
     Fi F
    v = v - v
                        272
                                     4800
                                                   No
        F R
     FO
                        292
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 564
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    564
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.7 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.324
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.9
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 60.9

mph

0.926

0.952

Heavy vehicle adjustment, fHV

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014
Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 68B Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 400 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	370	vph
Length of first accel/decel lane	270	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	400	370	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	111	103	V
Trucks and buses	20	14	%
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	

```
Flow rate, vp
                                   489
                                              440
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 489 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        489
                                     4800
                                                   No
     Fi F
    v = v - v
                        49
                                     4800
                                                   No
        F R
     FO
                        440
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 489
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    489
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.0 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
               _____Speed Estimation_____
                                        D = 0.338
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.5
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
Space mean speed for all vehicles,
                                       S = 60.5
                                                    mph
```

0.909

1.00

0.935

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 68B Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 390 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 170 vph 1010 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	
			Ramp	
Volume, V (vph)	390	170		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	108	47		V
Trucks and buses	17	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%		%	%
Length	mi		mi n	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
470
Flow rate, vp
                                               198
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 470 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                      Maximum
                         668
                                      4800
                                                    No
    V
     FO
    v or v
                             pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 470
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    668
                                                     No
     R12
            _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 4.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation___
Intermediate speed variable,
                                         M = 0.258
                                          S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.8
                                                     mph
```

0.922

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 68B Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 410 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 250 vph Length of first accel/decel lane 1010 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)	410	250	_	vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	114	69		V
Trucks and buses	21	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	9		%
Length	mi	n	ii	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
503
Flow rate, vp
                                               297
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 503 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         800
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 503
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    800
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 5.2 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.259
                                         S
Space mean speed in ramp influence area,
                                         S = 62.7
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.7

mph

0.905

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 68B Analysis Year:
Description Jurisdiction: KYTC 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 350 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 170 Volume on ramp vph 1010 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 350 170 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 97 47 V

17

0

1.5

1.2

Level

%

mi

10

0

Level

1.5

1.2

ે

mi

응

%

용

шi

Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Flow rate, vp
                                    422
                                               198
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 422
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         620
                                      4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 422
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    620
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 3.9 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.258
                                         S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.8
                                                     mph
```

0.922

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 68B Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 360 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 250 vph 1010 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	
		Ramp	
360	250		vph
0.90	0.90		
100	69		V
21	14		%
0	0		%
Level	Level		
%		%	%
mi		mi	mi
1.5	1.5		
1.2	1.2		
	360 0.90 100 21 0 Level % mi	360 250 0.90 0.90 100 69 21 14 0 0 Level Level % mi 1.5 1.5	Ramp  360 250 0.90 0.90 100 69 21 14 0 0 Level Level % % mi mi 1.5 1.5

```
Flow rate, vp
                                   442
                                               297
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 442
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        739
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 442
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    739
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 4.8 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.258
                                         S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.8

mph

0.905

1.00

0.935

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 520 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	200	vph
Length of first accel/decel lane	240	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 Ramp
Volume, V (vph)	520	200	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	144	56	V
Trucks and buses	16	10	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   624
                                              233
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 624 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        624
                                     4800
                                                    No
     Fi F
    v = v - v
                        391
                                     4800
                                                   No
        F R
     FO
                        233
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
    v or v
               > 1.5 v / 2
                                     No
Is
     3
          av34
                      12
If yes, v = 624
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    624
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.319
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.1
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 61.1

mph

0.926

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

4/10/2014

Date performed: Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: Jurisdiction: US 41A KYTC

Analysis Year:

2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway

70.0 mph Volume on freeway 510 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	240	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

Junction Components	Freeway	Ramp	Adjacent
Maluma M (suph)	E10	260	Ramp
Volume, V (vph)	510	260	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	142	72	v
Trucks and buses	20	14	8
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Flow rate, vp
                                   623
                                              309
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 623 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        623
                                     4800
                                                   No
     Fi F
    v = v - v
                        314
                                     4800
                                                   No
        F R
     FO
                        309
                                     2100
                                                   No
    V
    R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 623
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    623
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.326
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.9
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 60.9

mph

0.909

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 390 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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	390	200	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	108	56	V
Trucks and buses	16	10	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   468
                                              233
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 468 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        468
                                     4800
                                                   No
     Fi F
    v = v - v
                        235
                                     4800
                                                   No
        F R
     FO
                        233
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 468
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    468
                                                    No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.1 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.319
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.1
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 61.1

mph

0.926

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

4/10/2014

Date performed: Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 370 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	240	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	370	260	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	103	72	V
Trucks and buses	20	14	%
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	

```
Flow rate, vp
                                   452
                                              309
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 452 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        452
                                     4800
                                                    No
     Fi F
    v = v - v
                        143
                                     4800
                                                   No
        F R
     FO
                        309
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 452
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                 4400
                    452
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 6.0 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
               _____Speed Estimation_____
                                         D = 0.326
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.9
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
Space mean speed for all vehicles,
                                        S = 60.9
                                                     mph
```

0.909

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 300 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 420 vph Length of first accel/decel lane 940 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	
		Ramp	
300	420		vph
0.90	0.90		
83	117		V
15	10		%
0	0		%
Level	Level		
%	%	Ş	5
mi	m	i r	ni
1.5	1.5		
1.2	1.2		
	300 0.90 83 15 0 Level % mi	300 420 0.90 0.90 83 117 15 10 0 0 Level Level % % mi m	Ramp 300 420 0.90 0.90 83 117 15 10 0 0 Level Level % % % mi mi mi r 1.5 1.5

```
358
Flow rate, vp
                                               490
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 358 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         848
                                     4800
                                                    No
    V
     FΟ
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 358
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    848
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.0 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.264
                                         S
Space mean speed in ramp influence area,
                                         S = 62.6
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.6
                                                     mph
```

0.930

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Agency/Co.: QK4
Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 410 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 550 Volume on ramp vph Length of first accel/decel lane 940 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 550 410 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 114 153 V

18

0

1.5

1.2

Level

%

mi

14

0

Level

1.5

1.2

ે

mi

응

%

용

шi

Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
497
                                               654
Flow rate, vp
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 497 pc/h
                 12 F FM
                   _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         1151
                                     4800
                                                    No
    V
     FΟ
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 497
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    1151
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.268
                                         S
                                         S = 62.5
Space mean speed in ramp influence area,
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.5
                                                     mph
```

0.917

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 380 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 420 Volume on ramp vph Length of first accel/decel lane 940 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 380 420 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 106 117 V Trucks and buses 15 10 응

0

1.5

1.2

Level

%

mi

0

Level

1.5

1.2

ે

mi

%

용

шi

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Terrain type:

Grade Length

```
454
Flow rate, vp
                                               490
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 454 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         944
                                     4800
                                                    No
    V
     FΟ
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 454
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    944
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.7 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.265
                                         S
Space mean speed in ramp influence area,
                                         S = 62.6
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.6
                                                     mph
```

0.930

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 510 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 550 vph Length of first accel/decel lane 940 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)	510	550		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	142	153		v
Trucks and buses	18	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	9	í	%
Length	mi	n	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                    618
                                               654
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 618 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         1272
                                     4800
                                                    No
    V
     FO
    v or v
                        0 pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 618
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    1272
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 9.2 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.269
                                         S
                                         S = 62.5
Space mean speed in ramp influence area,
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.5
                                                     mph
```

0.917

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41 Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2 Free-flow speed on freeway 70

Free-flow speed on freeway 70.0 mph Volume on freeway 560 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	160	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? No

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	560	160	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	156	44	V
Trucks and buses	15	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Flow rate, vp
                                   669
                                              187
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 669 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        669
                                     4800
                                                   No
     Fi F
    v = v - v
                        482
                                     4800
                                                   No
        F R
     FO
                        187
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 669
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    669
                                                    No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.8 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.445
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.5
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

mph

0.930

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014
Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41 Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 720

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	240	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	720	240	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	200	67	V
Trucks and buses	18	14	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   872
                                              285
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 872 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        872
                                     4800
                                                    No
     Fi F
    v = v - v
                        587
                                     4800
                                                   No
        F R
     FO
                        285
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 872
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    872
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 9.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.454
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.3
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.917

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014
Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41 Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 640

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	640	160	vph
Peak-hour factor, PHF	0.90	0.90	_
Peak 15-min volume, v15	178	44	V
Trucks and buses	15	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Flow rate, vp
                                   764
                                              187
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 764 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        764
                                     4800
                                                   No
     Fi F
    v = v - v
                        577
                                     4800
                                                   No
        F R
     FO
                        187
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 764
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    764
                                                    No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 8.6 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.445
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.5
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

mph

0.930

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41 Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge
Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 820 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	240	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	820	240	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	228	67	V
Trucks and buses	18	14	%
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	

```
Flow rate, vp
                                   993
                                              285
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 993 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        993
                                     4800
                                                    No
     Fi F
    v = v - v
                        708
                                     4800
                                                    No
        F R
     FO
                        285
                                     2000
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 993
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    993
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 10.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence B
                _____Speed Estimation_____
                                         D = 0.454
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.3
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.917

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41 Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 380 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 250 vph Length of first accel/decel lane 780 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)	380	250	Ramp	vph
Peak-hour factor, PHF	0.90	0.90		_
Peak 15-min volume, v15	106	69		V
Trucks and buses	15	10		%
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		

```
454
Flow rate, vp
                                               292
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 454 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                                     Maximum
                        Actual
                        746
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                    (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 454
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    746
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.275
                                         S
Space mean speed in ramp influence area,
                                         S = 62.3
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                         0
```

S = 62.3

mph

0.930

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41 Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 480 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 360 vph Length of first accel/decel lane 780 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)	480	360	vph
Peak-hour factor, PHF	0.90	0.90	_
Peak 15-min volume, v15	133	100	V
Trucks and buses	18	14	%
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	

```
Flow rate, vp
                                   581
                                               428
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 581
                                     pc/h
                 12 F FM
                   _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        1009
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                    (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 581
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                    1009
                                 4600
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.277
                                         S
Space mean speed in ramp influence area,
                                         S = 62.2
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.2

mph

0.917

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41 Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 640 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 250 vph Length of first accel/decel lane 780 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)	640	250	-	vph
Peak-hour factor, PHF	0.90	0.90		_
Peak 15-min volume, v15	178	69		V
Trucks and buses	15	10		%
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		

```
764
Flow rate, vp
                                               292
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 764 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        1056
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 764
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    1056
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.7 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.278
                                         S
Space mean speed in ramp influence area,
                                         S = 62.2
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.2

mph

0.930

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 68 Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 430 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	200	vph
Length of first accel/decel lane	200	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 Ramp	
Volume, V (vph)	430	200	-	vph
Peak-hour factor, PHF	0.90	0.90		_
Peak 15-min volume, v15	119	56		V
Trucks and buses	15	10		용
Recreational vehicles	0	0		용
Terrain type:	Level	Level		
Grade	0.00 %	0.00	% %	
Length	0.00 mi	0.00	mi mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                   514
                                              233
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 514 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        514
                                     4800
                                                   No
     Fi F
    v = v - v
                        281
                                     4800
                                                   No
        F R
     FO
                        233
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
    v or v
               > 1.5 v /2
                                     No
Is
     3
          av34
                      12
If yes, v = 514
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    514
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.9 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.449
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.4
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

mph

0.930

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 68 Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2 Free-flow speed on freeway 70

Free-flow speed on freeway 70.0 mph Volume on freeway 560 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	280	vph
Length of first accel/decel lane	200	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	560	280	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	156	78	V
Trucks and buses	18	14	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	8
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Flow rate, vp
                                   678
                                              333
                                                                  pcph
                  _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 678 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        678
                                     4800
                                                    No
     Fi F
    v = v - v
                        345
                                     4800
                                                    No
        F R
     FO
                        333
                                     2000
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 678
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    678
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 8.3 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.458
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                         S = 57.2
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.917

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 68 Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 690

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	690	200	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	192	56	V
Trucks and buses	15	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
1.00
Driver population factor, fP
                                              1.00
Flow rate, vp
                                   824
                                              233
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 824 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        824
                                     4800
                                                    No
     Fi F
    v = v - v
                        591
                                     4800
                                                   No
        F R
     FO
                        233
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 824
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    824
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 9.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.449
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.4
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.930

0.952

Heavy vehicle adjustment, fHV

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 68 Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 900 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	280	vph
Length of first accel/decel lane	200	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	900	280	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	250	78	V
Trucks and buses	18	14	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
1.00
                                              1.00
Driver population factor, fP
                                   1090
Flow rate, vp
                                              333
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 1090 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        1090
                                     4800
                                                    No
     Fi F
    v = v - v
                        757
                                     4800
                                                    No
        F R
     FO
                        333
                                     2000
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
                > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 1090
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    1090
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 11.8 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence B
                _____Speed Estimation_____
                                         D = 0.458
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.2
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

mph

0.917

0.935

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 68 Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 400 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 90 vph Length of first accel/decel lane 910 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)	400	90		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	111	25		V
Trucks and buses	15	10		%
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		

```
478
Flow rate, vp
                                               105
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 478 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                                      Maximum
                        Actual
                         583
                                      4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 478
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    583
                                                     No
     R12
            _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 4.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.264
                                          S
Space mean speed in ramp influence area,
                                         S = 62.6
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.6
                                                     mph
```

0.930

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 68 Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 530 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 120 vph 910 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 Ramp
Volume, V (vph)	530	120	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	147	33	V
Trucks and buses	18	14	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	왕	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
642
Flow rate, vp
                                               143
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 642
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         785
                                      4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 642
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    785
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 5.8 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.266
                                         S
Space mean speed in ramp influence area,
                                         S = 62.6
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.6
                                                     mph
```

0.917

1.00

0.935

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 68 Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 690 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 90 vph Length of first accel/decel lane 910 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)	690	90		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	192	25		V
Trucks and buses	15	10		%
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		

```
824
Flow rate, vp
                                               105
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 824 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         929
                                      4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 824
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    929
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 7.0 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.267
                                         S
Space mean speed in ramp influence area,
                                         S = 62.5
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.5
                                                     mph
```

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 68 Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 900 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 120 vph 910 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 Ramp	
Volume, V (vph)	900	120		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	250	33		v
Trucks and buses	18	14		8
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		

```
1090
Flow rate, vp
                                               143
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 1090 pc/h
                 12 F FM
                   _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        1233
                                     4800
                                                    No
    V
     FO
    v or v
                        0 pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v / 2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 1090
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    1233
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 9.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.271
                                         S
Space mean speed in ramp influence area,
                                         S = 62.4
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.4
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 68 Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 700 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	110	vph
Length of first accel/decel lane	220	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)	700	110	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	194	31	V
Trucks and buses	15	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Flow rate, vp
                                   836
                                              128
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 836 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        836
                                     4800
                                                   No
     Fi F
    v = v - v
                        708
                                     4800
                                                   No
        F R
     FO
                        128
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 836
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    836
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 9.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.440
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.7
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 57.7

mph

0.930

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 68 Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 900

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	150	vph
Length of first accel/decel lane	220	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)	900	150	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	250	42	V
Trucks and buses	18	14	%
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	

```
1090
Flow rate, vp
                                              178
                                                                   pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 1090 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        1090
                                     4800
                                                    No
     Fi F
    v = v - v
                        912
                                     4800
                                                    No
        F R
     FO
                        178
                                     2000
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
                > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 1090
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                 Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    1090
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 11.6 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence B
                _____Speed Estimation_____
                                         D = 0.444
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                         S = 57.6
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 57.6

mph

0.917

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 68 Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2 Free-flow speed on freeway 70.

Free-flow speed on freeway 70.0 mph Volume on freeway 410 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	110	vph
Length of first accel/decel lane	220	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)	410	110	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	114	31	V
Trucks and buses	15	10	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   490
                                              128
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 490 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        490
                                     4800
                                                   No
     Fi F
    v = v - v
                        362
                                     4800
                                                   No
        F R
     FO
                        128
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 490
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                    Actual
                                4400
                    490
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 6.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.440
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.7
                                                    mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                    mph
```

S = 57.7

mph

0.930

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 68 Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 530 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	150	vph
Length of first accel/decel lane	220	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)	530	150	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	147	42	V
Trucks and buses	18	14	%
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	

```
Flow rate, vp
                                   642
                                              178
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 642 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        642
                                     4800
                                                   No
     Fi F
    v = v - v
                        464
                                     4800
                                                   No
        F R
     FO
                        178
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
    v or v
               > 1.5 v / 2
                                     No
Is
     3
          av34
                      12
If yes, v = 642
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    642
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.8 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.444
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.6
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
Space mean speed for all vehicles,
                                        S = 57.6
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 68 Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 670 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 200 vph Length of first accel/decel lane 730 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)	670	200		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	186	56		V
Trucks and buses	15	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	왕	9	Ś	%
Length	mi	r	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
800
Flow rate, vp
                                               233
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 800 pc/h
                 12 F FM
                   _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        1033
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                    (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 800
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    1033
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.8 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.281
                                         S
Space mean speed in ramp influence area,
                                         S = 62.1
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.1

mph

0.930

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: Fax: E-mail: \_\_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 68 Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 880 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 280 vph Length of first accel/decel lane 730 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)	880	280		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	244	78		V
Trucks and buses	18	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%		0	왕
Length	mi	1	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
1066
Flow rate, vp
                                               333
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 1066 pc/h
                 12 F FM
                   _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         1399
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v / 2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 1066
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    1399
                                                     No
     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/ln
Level of service for ramp-freeway junction areas of influence B
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.286
                                         S
Space mean speed in ramp influence area,
                                         S = 62.0
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.0
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 68 Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 420 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 200 vph Length of first accel/decel lane 730 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)	420	200		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	117	56		V
Trucks and buses	15	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	9	i	왕
Length	mi	n	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                    502
                                               233
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 502
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         735
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 502
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    735
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.5 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.278
                                         S
Space mean speed in ramp influence area,
                                         S = 62.2
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.2

mph

0.930

1.00

0.952 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 68 KYTC Jurisdiction: Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 540 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 280 Volume on ramp vph 730 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 540 280 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 150 78 V

18

0

1.5

1.2

Level

%

mi

14

0

Level

1.5

1.2

ે

mi

응

%

용

шi

Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
654
Flow rate, vp
                                               333
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 654 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                                     Maximum
                        Actual
                         987
                                      4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 654
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    987
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.4 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation___
Intermediate speed variable,
                                         M = 0.280
                                         S
Space mean speed in ramp influence area,
                                         S = 62.1
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.1
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

Phone: E-mail:

\_\_\_\_\_Operational Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date Performed: 4/10/2014

Analysis Time Period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Weaving Location: KY 1682

Analysis Year: 2013 Existing

Description: Edward T Breathitt Pkwy Interstate 69 Upgrade

\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type	Freeway		
Weaving configuration	One-Sided	l	
Number of lanes, N	3	ln	
Weaving segment length, LS	300	ft	
Freeway free-flow speed, FFS	70	mi/h	
Minimum segment speed, SMIN	15	mi/h	
Freeway maximum capacity, cIFL	2200*	pc/h/ln	
Terrain type	Level		
Grade	0.00	%	
Length	0.00	mi	

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume	Compone	nts		
	VFF	VRF	VFR	VRR	
Volume, V	180	80	310	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	50	22	86	0	
Trucks and buses	15	10	10	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.930	0.952	0.952	1.000	0
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	215	93	362	0	pc/h

Volume ratio, VR 0.679

Configuration	Characterist	cics	
Number of maneuver lanes, NWL	2	ln	
Interchange density, ID	0.3	int/mi	
Minimum RF lane changes, LCRF	1	lc/pc	
Minimum FR lane changes, LCFR	1	lc/pc	
Minimum RR lane changes, LCRR		lc/pc	
Minimum weaving lane changes, LCMIN	455	lc/h	
Weaving lane changes, LCW	455	lc/h	
Non-weaving vehicle index, INW	2		
Non-weaving lane change, LCNW	0	lc/h	
Total lane changes, LCALL	455	lc/h	

\_\_\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_\_

Weaving intensity factor, W

Average non-weaving speed, SN	W	65.7	mi/h	
Weaving Segment Spee	d, Density,	Level of	Service and Ca	apacity
Weaving segment speed, S		59.4	mi/h	
Weaving segment density, D		3.8	pc/mi/ln	
Level of service, LOS		A		
Weaving segment v/c ratio		0.190		
Weaving segment flow rate, v		624	veh/h	
Weaving segment capacity, cW		3288	veh/h	
Limita	tions on We	aving Segm	nents	
If limit reached, see note.				
Min	imum	Maximum	Actual	Note
Weaving length (ft)	300	9994	300	a,b
		Maximum	Analvzed	

2200\*

Maximum

1.00

mi/h

1458

Analyzed

0.190

d

# Notes:

v/c ratio

Average weaving speed, SW

Density-based capacty,

cIWL (pc/h/ln)

- a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.
- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Fax:

Phone: E-mail:

\_\_\_\_\_\_Operational Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date Performed: 4/10/2014

Analysis Time Period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Weaving Location: KY 1682

Analysis Year: 2040 No Build

Description: Edward T Breathitt Pkwy Interstate 69 Upgrade

\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	300	ft
Freeway free-flow speed, FFS	70	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	2200*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume	Compone	ents		
	VFF	VRF	VFR	VRR	
Volume, V	240	100	410	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	67	28	114	0	
Trucks and buses	18	14	14	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.917	0.935	0.935	1.000	)
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	291	119	487	0	pc/h

Volume ratio, VR 0.676

Configuration	Characteristi	CS
Number of maneuver lanes, NWL	2	ln
Interchange density, ID	0.3	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	606	lc/h
Weaving lane changes, LCW	606	lc/h
Non-weaving vehicle index, INW	3	
Non-weaving lane change, LCNW	0	lc/h
Total lane changes, LCALL	606	lc/h

\_\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_

Weaving intensity factor, W

Average non-weaving spee	ed, SNW	64.2	mı/h		
Weaving Segment	Speed, Dens:	ity, Level of Se	ervice and Cap	pacity	
Weaving segment speed, S		57.3	mi/h		
Weaving segment density,	D	5.2	pc/mi/ln		
Level of service, LOS		A			
Weaving segment v/c rati	.0	0.253			
Weaving segment flow rat	ce, v	823	veh/h		
Weaving segment capacity	3259	veh/h			
I	imitations or	n Weaving Segmer	nts		
If limit reached, see no		5 5			
	Minimum	Maximum	Actual	Note	
Weaving length (ft)	300	9950	300	a,b	
		Maximum	Analyzed		
Density-based capacty,		2200*	1462	С	

mi/h

Analyzed

0.253

d

#### Notes:

v/c ratio

cIWL (pc/h/ln)

Average weaving speed, SW

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

Maximum

- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Fax:

Phone: E-mail:

\_\_\_\_\_\_Operational Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date Performed: 4/10/2014

Analysis Time Period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Weaving Location: KY 1682

Analysis Year: 2013 Existing

Description: Edward T Breathitt Pkwy Interstate 69 Upgrade

\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type	Freeway		
Weaving configuration	One-Sided		
Number of lanes, N	3	ln	
Weaving segment length, LS	300	ft	
Freeway free-flow speed, FFS	70	mi/h	
Minimum segment speed, SMIN	15	mi/h	
Freeway maximum capacity, cIFL	2200*	pc/h/ln	
Terrain type	Level		
Grade	0.00	%	
Length	0.00	mi	

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume	Compone	nts		
	VFF	VRF	VFR	VRR	
Volume, V	470	80	310	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	131	22	86	0	
Trucks and buses	15	10	10	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.930	0.952	0.952	1.00	0
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	561	93	362	0	pc/h

Volume ratio, VR 0.448

Configuration	Characteristic	cs
Number of maneuver lanes, NWL	2	ln
Interchange density, ID	0.3	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	455	lc/h
Weaving lane changes, LCW	455	lc/h
Non-weaving vehicle index, INW	5	
Non-weaving lane change, LCNW	0	lc/h
Total lane changes, LCALL	455	lc/h

\_\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_

Weaving intensity factor, W

Average non-weaving spee	ea, SNW	65.1	m1/n		
Weaving Segment	Speed, Densi	ity, Level of Se	rvice and Car	pacity	
Weaving segment speed, S		61.1	mi/h		
Weaving segment density,	D	5.5	pc/mi/ln		
Level of service, LOS		A	_		
Weaving segment v/c rati	.0	0.203			
Weaving segment flow rat	e, v	946	veh/h		
Weaving segment capacity	, cW	4660	veh/h		
т	imitations or	n Weaving Segmen	t a		
If limit reached, see no		i weaving beginen	.05		
	Minimum	Maximum	Actual	Note	
Weaving length (ft)	300	7223	300	a,b	
3 3 7 , 7		Maximum	Analyzed	•	
Density-based capacty,		2200*	1670	С	

mi/h

Analyzed

0.203

d

#### Notes:

v/c ratio

Average weaving speed, SW

Density-based capacty,

cIWL (pc/h/ln)

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

Maximum

- Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Fax:

Phone: E-mail:

\_\_\_\_\_\_Operational Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date Performed: 4/10/2014

Analysis Time Period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Weaving Location: KY 1682

Analysis Year: 2040 No Build

Description: Edward T Breathitt Pkwy Interstate 69 Upgrade

\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	300	ft
Freeway free-flow speed, FFS	70	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	2200*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	610	100	410	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	169	28	114	0	
Trucks and buses	18	14	14	0	용
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	0.917	0.935	0.935	1.000	)
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	739	119	487	0	pc/h

Volume ratio, VR 0.451

Configuration	Characterist	cics	
Number of maneuver lanes, NWL	2	ln	
Interchange density, ID	0.3	int/mi	
Minimum RF lane changes, LCRF	1	lc/pc	
Minimum FR lane changes, LCFR	1	lc/pc	
Minimum RR lane changes, LCRR		lc/pc	
Minimum weaving lane changes, LCMIN	606	lc/h	
Weaving lane changes, LCW	606	lc/h	
Non-weaving vehicle index, INW	7		
Non-weaving lane change, LCNW	0	lc/h	
Total lane changes, LCALL	606	lc/h	

\_\_\_\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_

Weaving intensity factor, W

Average non-weaving speed, SNW	63.5	mi/n	
Weaving Segment Speed, Density	, Level of	Service and Capacity	
Weaving segment speed, S	59.1	mi/h	
Weaving segment density, D	7.6	pc/mi/ln	
Level of service, LOS	A		
Weaving segment v/c ratio	0.269		
Weaving segment flow rate, v	1234	veh/h	
Weaving segment capacity, cW	4591	veh/h	
Limitations on W	eaving Segm	ents	
If limit reached, see note.			
Minimum	Maximum	Actual Note	
Weaving length (ft) 300	7254	300 a,b	

mi/h

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	7254	300	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		2200*	1668	С
		Maximum	Analyzed	
v/c ratio		1.00	0.269	d

#### Notes:

Average weaving speed, SW

- a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.
- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Fax:

Phone: E-mail:

\_\_\_\_\_\_Operational Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date Performed: 4/10/2014

Analysis Time Period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Weaving Location: KY 1682

Analysis Year: 2013 Existing

Description: Edward T Breathitt Pkwy Interstate 69 Upgrade

\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	300	ft
Freeway free-flow speed, FFS	70	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	2200*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

Volume Components				
VFF	VRF	VFR	VRR	
390	320	60	0	veh/h
0.90	0.90	0.90	0.94	
108	89	17	0	
15	10	10	0	%
0	0	0	0	%
1.5	1.5	1.5	1.5	
1.2	1.2	1.2	1.2	
0.930	0.952	0.952	1.000	)
1.00	1.00	1.00	1.00	
466	373	70	0	pc/h
	VFF 390 0.90 108 15 0 1.5 1.2 0.930 1.00	VFF VRF  390 320 0.90 0.90 108 89 15 10 0 0 1.5 1.5 1.2 1.2 0.930 0.952 1.00 1.00	VFF VRF VFR  390 320 60  0.90 0.90 0.90  108 89 17  15 10 10  0 0 0  1.5 1.5 1.5 1.5  1.2 1.2 1.2  0.930 0.952 0.952  1.00 1.00	VFF         VRF         VFR         VRR           390         320         60         0           0.90         0.90         0.90         0.94           108         89         17         0           15         10         10         0           0         0         0         0           1.5         1.5         1.5         1.5           1.2         1.2         1.2         1.2           0.930         0.952         0.952         1.00           1.00         1.00         1.00         1.00

Volume ratio, VR 0.487

Configuration	Characteristics	
Number of maneuver lanes, NWL	2	ln
Interchange density, ID	0.3	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	443	lc/h
Weaving lane changes, LCW	443	lc/h
Non-weaving vehicle index, INW	4	
Non-weaving lane change, LCNW	0	lc/h
Total lane changes, LCALL	443	lc/h

\_\_\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_\_

Weaving intensity factor, W

Average non-weaving spee	a, SNW	65.4	m1/n		
Weaving Segment	Speed, Dens:	ity, Level of Se	rvice and Car	pacity	
Weaving segment speed, S		61.0	mi/h		
Weaving segment density,	D	5.0	pc/mi/ln		
Level of service, LOS		A			
Weaving segment v/c rati	.0	0.185			
Weaving segment flow rat	e, v	846	veh/h		
Weaving segment capacity	, cW	4563	veh/h		
I	imitations or	n Weaving Segmen	ıts		
If limit reached, see no		J 12 13 1			
	Minimum	Maximum	Actual	Note	
Weaving length (ft)	300	7679	300	a,b	
		Maximum	Analyzed		
Density-based capacty,		2200*	1635	C	

mi/h

Analyzed

0.185

d

#### Notes:

v/c ratio

cIWL (pc/h/ln)

Average weaving speed, SW

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

Maximum

- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Phone: Fax: E-mail:

\_\_\_\_\_\_Operational Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date Performed: 4/10/2014

Analysis Time Period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Weaving Location: KY 1682

Analysis Year: 2040 No Build

Description: Edward T Breathitt Pkwy Interstate 69 Upgrade

\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	300	ft
Freeway free-flow speed, FFS	70	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	2200*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume	Compone	ents		
	VFF	VRF	VFR	VRR	
Volume, V	490	420	80	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	136	117	22	0	
Trucks and buses	18	14	14	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.917	0.935	0.935	1.000	)
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	593	499	95	0	pc/h

Volume ratio, VR 0.500

Configuration	Characteris	tics	
Number of maneuver lanes, NWL	2	ln	
Interchange density, ID	0.3	int/mi	
Minimum RF lane changes, LCRF	1	lc/pc	
Minimum FR lane changes, LCFR	1	lc/pc	
Minimum RR lane changes, LCRR		lc/pc	
Minimum weaving lane changes, LCMIN	594	lc/h	
Weaving lane changes, LCW	594	lc/h	
Non-weaving vehicle index, INW	5		
Non-weaving lane change, LCNW	0	lc/h	
Total lane changes, LCALL	594	lc/h	

\_\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_\_

Weaving intensity factor, W

Average non-weaving speed, S	SNW	63.8	mi/h	
Weaving Segment Spe	ed, Density,	Level of Se	rvice and Car	pacity
Weaving segment speed, S		58.9	mi/h	
Weaving segment density, D		6.7	pc/mi/ln	
Level of service, LOS		A		
Weaving segment v/c ratio		0.247		
Weaving segment flow rate, v	7	1089	veh/h	
Weaving segment capacity, cV	I	4400	veh/h	
Limit	ations on We	aving Segmen	ıts	
If limit reached, see note.				
Mi	nimum	Maximum	Actual	Note
Weaving length (ft)	300	7831	300	a,b

mi/h

Density-based capacty,	Maximum 2200*	Analyzed 1624	C
cIWL (pc/h/ln)	2200	1021	C
	Maximum	Analyzed	
,	1 00	0 0 4 11	-

v/c ratio 1.00 0.247

#### Notes:

Average weaving speed, SW

- a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.
- Weaving segments longer than the calculated maximum length should be b. treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- The density-based capacity exceeds the capacity of a basic freeway segment, c. under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Fax:

Phone: E-mail:

\_\_\_\_\_Operational Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date Performed: 4/10/2014

Analysis Time Period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Weaving Location: KY 1682

Analysis Year: 2013 Existing

Description: Edward T Breathitt Pkwy Interstate 69 Upgrade

\_\_\_\_\_Inputs\_\_\_\_\_

	_		
Segment Type	Freeway		
Weaving configuration	One-Sided		
Number of lanes, N	3	ln	
Weaving segment length, LS	300	ft	
Freeway free-flow speed, FFS	70	mi/h	
Minimum segment speed, SMIN	15	mi/h	
Freeway maximum capacity, cIFL	2200*	pc/h/ln	
The same that the same	T 1		
Terrain type	Level		
Grade	0.00	%	
Length	0.00	mi	

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume	Compone	nts		
	VFF	VRF	VFR	VRR	
Volume, V	310	320	60	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	86	89	17	0	
Trucks and buses	15	10	10	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.930	0.952	0.952	1.00	0
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	370	373	70	0	pc/h

Volume ratio, VR 0.545

Configuration	Characterist	ics	
Number of maneuver lanes, NWL	2	ln	
Interchange density, ID	0.3	int/mi	
Minimum RF lane changes, LCRF	1	lc/pc	
Minimum FR lane changes, LCFR	1	lc/pc	
Minimum RR lane changes, LCRR		lc/pc	
Minimum weaving lane changes, LCMIN	443	lc/h	
Weaving lane changes, LCW	443	lc/h	
Non-weaving vehicle index, INW	3		
Non-weaving lane change, LCNW	0	lc/h	
Total lane changes, LCALL	443	lc/h	

\_\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_

Weaving intensity factor, W

Average non-weaving spee	ea, SNW	65.5	mı/n		
Weaving Segment	Speed, Dens:	ity, Level of Se	ervice and Cap	pacity	
Weaving segment speed, S	5	60.6	mi/h		
Weaving segment density,	D	4.5	pc/mi/ln		
Level of service, LOS		A			
Weaving segment v/c rati	-0	0.185			
Weaving segment flow rat	ce, v	757	veh/h		
Weaving segment capacity	, cW	4097	veh/h		
I	imitations or	n Weaving Segmer	nts		
If limit reached, see no					
	Minimum	Maximum	Actual	Note	
Weaving length (ft)	300	8356	300	a,b	
		Maximum	Analyzed		
Density-based capacty,		2200*	1584	С	

mi/h

Analyzed

0.185

d

#### Notes:

v/c ratio

cIWL (pc/h/ln)

Average weaving speed, SW

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

Maximum

- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Phone: Fax:

E-mail:

\_\_\_\_\_\_Operational Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date Performed: 4/10/2014

Analysis Time Period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Weaving Location: KY 1682

Analysis Year: 2040 No Build

Description: Edward T Breathitt Pkwy Interstate 69 Upgrade

\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type Weaving configuration	Freeway One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	300	ft
Freeway free-flow speed, FFS	70	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	2200*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	390	420	80	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	108	117	22	0	
Trucks and buses	18	14	14	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.917	0.935	0.935	1.000	)
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	472	499	95	0	pc/h

Volume ratio, VR 0.557

Configuration	Characteristic	cs
Number of maneuver lanes, NWL	2	ln
Interchange density, ID	0.3	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	594	lc/h
Weaving lane changes, LCW	594	lc/h
Non-weaving vehicle index, INW	4	
Non-weaving lane change, LCNW	0	lc/h
Total lane changes, LCALL	594	lc/h

\_\_\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_\_

Weaving intensity factor, W

Average non-weaving spec	ea, SNW	64.0	m1/n		
Weaving Segmen	Speed, Dens:	ity, Level of Se	ervice and Cap	pacity	
Weaving segment speed,	5	58.4	mi/h		
Weaving segment density	, D	6.1	pc/mi/ln		
Level of service, LOS		A			
Weaving segment v/c rat	io	0.248			
Weaving segment flow ra	ce, v	978	veh/h		
Weaving segment capacity		3951	veh/h		
<u>-</u>	Limitations or	n Weaving Segmer	nts		
If limit reached, see no					
	Minimum	Maximum	Actual	Note	
Weaving length (ft)	300	8503	300	a,b	
		Maximum	Analyzed		
Density-based capacty,		2200*	1572	С	

mi/h

Analyzed

0.248

d

#### Notes:

v/c ratio

cIWL (pc/h/ln)

Average weaving speed, SW

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

Maximum

- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41 (North) Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 330 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 30 vph 1030 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 Ramp
Volume, V (vph)	330	30	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	92	8	V
Trucks and buses	15	20	%
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	

```
394
Flow rate, vp
                                              37
                                                                  pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 394 pc/h
                 12 F FM
                   _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        431
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                    (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 394
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                4600
                    431
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 2.4 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.255
                                         S
Space mean speed in ramp influence area,
                                         S = 62.9
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                         0
```

S = 62.9

mph

0.930

1.00

0.909

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Agency/Co.: QK4
Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41 (North) KYTC Jurisdiction: Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 440 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 40 vph 1030 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 440 40 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 122 11 V

18

0

1.5

1.2

Level

%

mi

23

0

Level

1.5

1.2

ે

mi

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%

용

шi

Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Flow rate, vp
                                    533
                                               50
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 533 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        583
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 533
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    583
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 3.5 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.256
                                         S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.8

mph

0.917

1.00

0.897

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41 (North) KYTC Jurisdiction: Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 460 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 30 vph 1030 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 460 30 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 128 8 V Trucks and buses 15 20 응

0

1.5

1.2

0

1.5

1.2

ે

mi

Level Level

%

mi

%

용

шi

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Terrain type:

Grade Length

```
549
Flow rate, vp
                                               37
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 549 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         586
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 549
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    586
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 3.6 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.256
                                         S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
```

0

S = 62.8

mph

0.930

1.00

0.909

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41 (North) Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 620 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 40 vph 1030 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	
		Ramp	
620	40		vph
0.90	0.90		
172	11		V
18	23		용
0	0		용
Level	Level		
%	%		왕
mi	m	i	mi
1.5	1.5		
1.2	1.2		
	620 0.90 172 18 0 Level	620 40 0.90 0.90 172 11 18 23 0 0 Level Level % % mi m 1.5 1.5	Ramp 620 40 0.90 0.90 172 11 18 23 0 0 Level Level % % mi mi 1.5 1.5

```
751
Flow rate, vp
                                               50
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 751
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        801
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                    (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 751
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                    Violation?
                                 4600
                    801
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 5.2 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.258
                                         S
Space mean speed in ramp influence area,
                                         S = 62.8
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 62.8

mph

0.917

1.00

0.897

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: E-mail: Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 41 Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2 Free-flow speed on freeway 70

Free-flow speed on freeway 70.0 mph Volume on freeway 410 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	30	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 pc/h Under Base Conditions\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	410	30	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	114	8	v
Trucks and buses	15	20	%
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	

```
Flow rate, vp
                                   490
                                              37
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 490 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        490
                                     4800
                                                    No
     Fi F
    v = v - v
                        453
                                     4800
                                                   No
        F R
     FO
                        37
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 490
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    490
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 6.2 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.431
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.9
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 57.9

mph

0.930

1.00

0.909

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: E-mail: Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 41 Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type	of	analysis	Div	erge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 520

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	40	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? 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)	520	40	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	144	11	V
Trucks and buses	18	23	%
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	

```
Flow rate, vp
                                   630
                                              50
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 630 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        630
                                     4800
                                                   No
     Fi F
    v = v - v
                        580
                                     4800
                                                   No
        F R
     FO
                        50
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 630
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    630
                                                    No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.433
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.9
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 57.9

mph

0.917

1.00

0.897 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: E-mail: Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 41 Jurisdiction: KYTC

Analysis Year: 2013 Existing

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 430 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	30	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 pc/h Under Base Conditions\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	430	30	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	119	8	V
Trucks and buses	15	20	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
1.00
Driver population factor, fP
                                              1.00
Flow rate, vp
                                   514
                                              37
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 514 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        514
                                     4800
                                                   No
     Fi F
    v = v - v
                        477
                                     4800
                                                   No
        F R
     FO
                        37
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
    v or v
               > 1.5 v / 2
                                     No
Is
     3
          av34
                      12
If yes, v = 514
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    514
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.431
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.9
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 57.9

mph

0.930

0.909

Heavy vehicle adjustment, fHV

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 41 Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway

70.0 mph Volume on freeway 550 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	40	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? 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\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	550	40	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	153	11	v
Trucks and buses	18	23	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
1.00
                                              1.00
Driver population factor, fP
Flow rate, vp
                                   666
                                               50
                                                                   pcph
                  _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 666 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        666
                                     4800
                                                    No
     Fi F
    v = v - v
                        616
                                     4800
                                                    No
        F R
     FO
                        50
                                     2000
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 666
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                    Actual
                                 Max Desirable
                                                     Violation?
                                 4400
                    666
                                                     No
    V
     12
             ___Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 7.7 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.433
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                         S = 57.9
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 57.9

mph

0.917

0.897

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_Diverge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 8/1/2014 Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 62 Jurisdiction: KYTC Analysis Year: 2013 No Build Description: \_\_\_\_\_Freeway Data\_\_\_\_\_\_ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 295 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 95 vph Length of first accel/decel lane 290 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

Junction	Components	Freeway	Ramp	Adjacent
				Ramp

\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

				Ramp	
Volume, V (vph)	295		95		vph
Peak-hour factor, PHF	0.90		0.90		
Peak 15-min volume, v15	82		26		V
Trucks and buses	15		15		%
Recreational vehicles	0		0		%
Terrain type:	Level		Level		
Grade	0.00	왕	0.00	%	%
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE. ER	1.2		1.2		

```
Flow rate, vp
                                   352
                                              113
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 352 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        352
                                     4800
                                                    No
     Fi F
    v = v - v
                        239
                                     4800
                                                    No
        F R
     FO
                        113
                                     2000
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 352
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    352
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 4.7 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.438
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.7
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 57.7

mph

0.930

1.00

0.930 1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: E-mail:		Fax				
	Merge	Analysi	s			
Analyst: Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction: Analysis Year: Description:	AM Design Hour EBT Parkway No US 62 KYTC					
	Free	way Data	·			
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	2 70	rge .0 5		mph vph	
	On R	amp Data				
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	1	.0		mph vph ft ft	
	Adjacent Ramp	Data (i	f on	e exists	3)	
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp Distance to adjacent Ra	t?	No			vph ft	
Con	version to pc/h	Under B	ase	Conditio	ns	
Junction Components  Volume, V (vph)	version to pe/n	Freeway		Ramp	)IIS	Adjacent Ramp
Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:		405 0.90 113 15 0 Level	0,	55 0.90 15 15 0 Level	0,	vph v %
Grade Length Trucks and buses PCE, E Recreational vehicle PC		1.5 1.2	% mi	1.5 1.2	% mi	% mi

```
484
Flow rate, vp
                                               66
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 484
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         550
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 484
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                    550
                                 4600
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 7.0 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.298
                                         S
Space mean speed in ramp influence area,
                                         S = 61.7
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 61.7

mph

0.930

1.00

0.930

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Diverge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 8/1/2014 Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 62 Jurisdiction: KYTC Analysis Year: 2013 No Build Description: \_\_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 610 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 30 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 ft Distance to adjacent ramp

Junction Components	Freeway	Ramp	Adjacent	
			Damp	

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

<del>-</del>	_		_		_
				R	Ramp
Volume, V (vph)	610		30		vph
Peak-hour factor, PHF	0.90		0.90		
Peak 15-min volume, v15	169		8		V
Trucks and buses	15		15		%
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
Flow rate, vp
                                   729
                                              36
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 729 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        729
                                     4800
                                                    No
     Fi F
    v = v - v
                        693
                                     4800
                                                    No
        F R
     FO
                        36
                                     2000
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 729
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    729
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 7.0 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.431
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                         S = 57.9
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 57.9

mph

0.930

0.930

Heavy vehicle adjustment, fHV

Phone: E-mail:		Fa	ax:				
	Merge	Analys	sis				
Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction:			nd				
	Free	way Dat	ta				
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	2	Merge 2 70.0 340		mph vph		
	On R	amp Dat	ta				
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	I : :	Right 1 35.0 200 250		mph vph ft ft		
	Adjacent Ramp	Data	(if on	e exists	s)		
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp Distance to adjacent Ra	t? mp		No		vph ft		
Con	version to pc/h	Under	Base	Conditio	ons		
Junction Components		Freewa		Ramp	<del>~</del>	Adjacent Ramp	
Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length		340 0.90 94 15 0 Level	% mi	200 0.90 56 15 0 Level	% mi	-	vph v % % mi
Trucks and buses DCF F	TT.	1 5		1 5			

1.2

1.5

1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
406
Flow rate, vp
                                               239
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 406
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        645
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 406
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    645
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.8 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.311
                                         S
Space mean speed in ramp influence area,
                                         S = 61.3
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 61.3

mph

0.930

1.00

0.930

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Diverge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 8/1/2014 Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 62 Jurisdiction: KYTC Analysis Year: 2040 No Build Description: \_\_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Diverge Number of lanes in freeway 70.0 Free-flow speed on freeway mph Volume on freeway 350 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 150 vph Length of first accel/decel lane 290 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

Junction	Components	Freeway	Ramp	Adjacent
				Ramp

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

				Rallip	
Volume, V (vph)	350		150		vph
Peak-hour factor, PHF	0.90		0.90		
Peak 15-min volume, v15	97		42		V
Trucks and buses	18		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		

```
Flow rate, vp
                                   424
                                              182
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 424 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        424
                                     4800
                                                   No
     Fi F
    v = v - v
                        242
                                     4800
                                                   No
        F R
     FO
                        182
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 424
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                    Actual
                                4400
                    424
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 5.3 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.444
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.6
                                                    mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                    mph
Space mean speed for all vehicles,
                                        S = 57.6
                                                    mph
```

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: E-mail:		Fa	х:				
	Merge	Analys	is				
Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction:			d				
	Free	way Dat	a				
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	2 7	erge 0.0 00		mph vph		
	On R	amp Dat	a				
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	1 3 9	ight 5.0 0 30		mph vph ft ft		
	Adjacent Ramp	Data (	if on	e exists	s)		
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp Distance to adjacent Ra	mp	N	0		vph ft		
Con	version to pc/h	Under	Base	Conditio	ons		
Junction Components		Freewa		Ramp		Adjacent Ramp	
Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length		500 0.90 139 18 0 Level	% mi	90 0.90 25 18 0 Level	% mi	-	vph v % % mi
Trucks and buses DCF F	TT.	1 5		1 5			

1.2

1.5

1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
606
Flow rate, vp
                                               109
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 606 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                         Actual
                                     Maximum
                         715
                                      4800
                                                    No
    V
     FO
    v or v
                         0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 606
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    715
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.299
                                         S
Space mean speed in ramp influence area,
                                         S = 61.6
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 61.6
                                                     mph
```

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Diverge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 8/1/2014 Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 62 Jurisdiction: KYTC Analysis Year: 2040 No Build Description: \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 760 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 50 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 ft Distance to adjacent ramp

Junction Components	Freeway	7	Ramp		Adjacent Ramp
Volume, V (vph)	760		50		vph
Peak-hour factor, PHF	0.90		0.90		
Peak 15-min volume, v15	211		14		v
Trucks and buses	18		18		%
Recreational vehicles	0		0		%
Terrain type:	Level		Level		
Grade	0.00	%	0.00	8	%
Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

```
Flow rate, vp
                                   920
                                              61
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 920 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        920
                                     4800
                                                   No
     Fi F
    v = v - v
                        859
                                     4800
                                                   No
        F R
     FO
                        61
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 920
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    920
                                                    No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 8.7 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.433
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.9
                                                    mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                    mph
```

S = 57.9

mph

0.917

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: E-mail:		Fax	χ:				
	Merge	e Analys:	is				
Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction:			đ.				
	Free	eway Data	a				
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	2 70	erge 0.0 30		mph vph		
	On F	Ramp Data	a				
	011 1	tamp back	ــــــــــــــــــــــــــــــــــــــ				
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	1 3! 32	ight 5.0 20 50		mph vph ft ft		
	Adjacent Ramp	Data (:	if on	e exists	g )		
	najaoene namp	Dava (	011	C C111501	,		
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp Distance to adjacent Ra	mp	No	D.		vph ft		
Con	version to pc/h	n Under 1	Base	Conditio	ons		
Junction Components		Freeway	Y	Ramp		Adjacent Ramp	
Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length		380 0.90 106 18 0 Level	% mi	320 0.90 89 18 0 Level	% mi	-	vph v % % i
menigen	m	1 -	шт	1 -	шт	L	

1.2

1.5

1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
460
Flow rate, vp
                                               388
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 460 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         848
                                      4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 460
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    848
                                                     No
     R12
            _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence B
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.313
                                          S
Space mean speed in ramp influence area,
                                         S = 61.2
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 61.2
                                                     mph
```

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Diverge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 8/1/2014 Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 62 Jurisdiction: KYTC Analysis Year: 2013 No Build Description: \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 330 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 210 vph Length of first accel/decel lane 290 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

 COHVETPION	to	pc/n	Under	Base	Conditions	

Junction Components	Freeway	Ramp	Adjacent
			Ramp
Volume, V (vph)	330	210	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	92	58	v
Trucks and buses	15	15	%
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	

```
Flow rate, vp
                                   394
                                              251
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 394 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                        Actual
                                     Maximum
                                                  LOS F?
    v = v
                        394
                                     4800
                                                   No
     Fi F
    v = v - v
                        143
                                     4800
                                                   No
     FO F R
                        251
                                     2000
                                                   No
    V
    R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 394
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                   394
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 5.0 	pc/mi/ln
Density,
                                      12
                     R
Level of service for ramp-freeway junction areas of influence A
               _____Speed Estimation_____
                                        D = 0.451
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.4
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
Space mean speed for all vehicles,
                                       S = 57.4
                                                    mph
```

1.00

0.930

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: E-mail:		Fax				
	Merge	Analysi	s			
Analyst: Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction: Analysis Year: Description:	PM Design Hour EBT Parkway No US 62 KYTC					
	Free	way Data				
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	2 70	rge .0 5		mph vph	
	On R	amp Data				
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	1	.0		mph vph ft ft	
	Adiacent Ramp	Data (i	f on	e exists	s )	
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp Distance to adjacent Ra	t?	No			vph ft	
Con	version to pc/h	Under B	ase	Conditio	ns	
Junction Components	version to perm	Freeway		Ramp	)IIS	Adjacent Ramp
Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade		605 0.90 168 15 0 Level	0/0	35 0.90 10 15 0 Level	90	vph v % %
Length Trucks and buses PCE, E Recreational vehicle PC		1.5 1.2	mi	1.5 1.2	mi	mi

```
Flow rate, vp
                                   723
                                               42
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 723 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        765
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 723
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    765
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.7 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.299
                                         S
Space mean speed in ramp influence area,
                                         S = 61.6
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 61.6

mph

0.930

1.00

0.930

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Diverge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 8/1/2014 Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 62 Jurisdiction: KYTC Analysis Year: 2013 No Build Description: \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 405 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 55 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	τo	pc/n	unaer	вase	Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	405		55		vph
Peak-hour factor, PHF	0.90		0.90		
Peak 15-min volume, v15	113		15		V
Trucks and buses	15		15		8
Recreational vehicles	0		0		8
Terrain type:	Level		Level		
Grade	0.00	용	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		

```
Flow rate, vp
                                   484
                                              66
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 484 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        484
                                     4800
                                                   No
     Fi F
    v = v - v
                        418
                                     4800
                                                   No
        F R
     FO
                        66
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 484
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                    Actual
                                4400
                    484
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 4.9 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.434
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.8
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 57.8

mph

0.930

1.00

0.930

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

	F	ax:				
Merg	ge Analy	sis				
PM Design Hou EBT Parkway S US 62 KYTC		nd				
Fre	eway Da	ta				
-		2 70.0		_		
On	Ramp Da	ta				
ecel lane		1 35.0 120		_		
Adjacent Ram	np Data	(if on	e exists	s)		
mp	1	No		vph ft		
version to pc/	h Under	Base	Conditio	ns		
_ `			Ramp		Adjacent	
	270 0.90 75 15 0 Level	% mi	120 0.90 33 15 0 Level	% mi		vph v % % mi
	Qk4 8/1/2014 PM Design Hou EBT Parkway S US 62 KYTC 2013 NB  Eway Eway Eway Eway Eway Eway Eway Ewa	Merge Analy  Qk4 8/1/2014 PM Design Hour EBT Parkway Southbour US 62 KYTC 2013 NB Freeway Da  eway eway On Ramp Da  decel laneAdjacent Ramp Data  st?  amp  amp  amp  aversion to pc/h Under  Freeway  270 0.90 75 15 0	Qk4 8/1/2014 PM Design Hour EBT Parkway Southbound US 62 KYTC 2013 NB Freeway Data  Merge 2 2 2000 270  On Ramp Data  Right 1 35.0 120 decel lane 250 decel lane Adjacent Ramp Data (if on st? No st? Level	Ok4 8/1/2014 PM Design Hour EBT Parkway Southbound US 62 KYTC 2013 NB  Freeway Data  Freeway Data  On Ramp Data  Right 1 35.0 120 decel lane decel lane Adjacent Ramp Data (if one exists st? No  nump  nump	Merge Analysis	

1.2

1.5

1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Flow rate, vp
                                   322
                                               143
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 322
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                        465
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 322
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                    Violation?
                                 4600
                    465
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 7.5 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.310
                                         S
Space mean speed in ramp influence area,
                                         S = 61.3
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 61.3

mph

0.930

1.00

0.930

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Diverge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 8/1/2014 Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 62 Jurisdiction: KYTC Analysis Year: 2040 No Build Description: \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 370 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 330 vph Length of first accel/decel lane 290 ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists)\_\_\_\_\_ Does adjacent ramp exist? NoVolume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft

Conversion	τo	pc/n	unaer	вase	Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp
Volume, V (vph)	370		330		vph
Peak-hour factor, PHF	0.90		0.90		
Peak 15-min volume, v15	103		92		V
Trucks and buses	18		18		%
Recreational vehicles	0		0		%
Terrain type:	Level		Level		
Grade	0.00 %	8	0.00	%	%
Length	0.00 m	ni	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		

```
Flow rate, vp
                                   448
                                              400
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 448 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        448
                                     4800
                                                   No
     Fi F
    v = v - v
                        48
                                     4800
                                                   No
        F R
     FO
                        400
                                     2000
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 448
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    448
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 5.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.464
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 57.0
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
Space mean speed for all vehicles,
                                       S = 57.0
                                                    mph
```

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

Phone: E-mail:		Fa	x:				
	Merge	Analys	is				
			đ				
	Free	way Data	a				
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	2 7	erge 0.0 50		mph vph		
	On R	amp Data	a				
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	1 3!	ight 5.0 0 30		mph vph ft ft		
	Adjacent Ramp	Data (:	if on	e exists	s)		
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp Distance to adjacent Ra	mp	No	0		vph ft		
Con	version to pc/h	Under 1	Base	Conditio	ns		
Junction Components	<u>.</u> - ,	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length		750 0.90 208 18 0 Level	% mi	60 0.90 17 18 0 Level	% mi	-	vph v % % mi
Trucks and buses DCF F	т	1 5		1 5			

1.2

1.5

1.2

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
908
Flow rate, vp
                                               73
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 908 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         981
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 908
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    981
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.4 pc/mi/ln
Level of service for ramp-freeway junction areas of influence B
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.301
                                         S
Space mean speed in ramp influence area,
                                         S = 61.6
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
```

0

S = 61.6

mph

0.917

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Phone: Fax: E-mail: \_\_\_\_\_Diverge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 8/1/2014 Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 62 Jurisdiction: KYTC Analysis Year: 2040 No Build Description: \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Diverge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 500 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 90 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? NoVolume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft

Conversion	τo	pc/n	unaer	Base	Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	500	90		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	139	25		v
Trucks and buses	18	18		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00	%	5
Length	0.00 m:	L 0.00	mi n	ni
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                   606
                                              109
                                                                   pcph
                  _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 606 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        606
                                     4800
                                                    No
     Fi F
    v = v - v
                        497
                                     4800
                                                    No
        F R
     FO
                        109
                                     2000
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 606
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                 Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    606
                                                     No
    V
     12
            ___Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 6.0 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.438
Intermediate speed variable,
                                          S
Space mean speed in ramp influence area,
                                         S = 57.7
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
Space mean speed for all vehicles,
                                        S = 57.7
                                                     mph
```

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

Phone: E-mail:		Fax				
	Merge	Analysi	Ls			
Analyst: Agency/Co.: Date performed: Analysis time period: Freeway/Dir of Travel: Junction: Jurisdiction: Analysis Year: Description:	PM Design Hour EBT Parkway So US 62 KYTC 2040 NB	uthbound				
	Free	way Data	a			
Type of analysis Number of lanes in free Free-flow speed on free Volume on freeway	_	2 70	erge ).0 L0		mph vph	
	On R	amp Data	a.			
Side of freeway Number of lanes in ramp Free-flow speed on ramp Volume on ramp Length of first accel/d Length of second accel/	ecel lane	1 35 19	ight 5.0 90 50		mph vph ft ft	
	Adjacent Ramp	Data (i	if on	e exists	s )	
Does adjacent ramp exis Volume on adjacent Ramp Position of adjacent Ra Type of adjacent Ramp Distance to adjacent Ra	t?	Nc			vph	
Con	version to pc/h	Under E	Base	Conditio	ns	
Junction Components  Volume, V (vph)	verbron eo pe/n	Freeway		Ramp	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Adjacent Ramp vph
Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:		0.90 86 18 0 Level		0.90 53 18 0 Level		V % %
Grade Length Trucks and buses PCE, E Recreational vehicle PC		1.5	% mi	1.5	% mi	% mi

```
Flow rate, vp
                                    375
                                               230
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 375 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         605
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 375
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    605
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.5 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.311
                                         S
Space mean speed in ramp influence area,
                                         S = 61.3
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 61.3
                                                     mph
```

1.00

0.917

1.00

Heavy vehicle adjustment, fHV

HCS 2010: Freeway Weaving Release 6.50

Fax:

Phone: E-mail:

\_\_\_\_\_\_Operational Analysis\_\_\_\_\_\_

Analyst: JJL
Agency/Co.: Qk4
Date Performed: 9/2/2014
Analysis Time Period: Design Hour

Freeway/Dir of Travel: ETB Parkway Weaving Location: US 62 to I69

Analysis Year: 2040

Description:

\_\_\_\_\_\_Inputs\_\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type	Freeway	
Weaving configuration	One-Sideo	i
Number of lanes, N	2	ln
Weaving segment length, LS	4350	ft
Freeway free-flow speed, FFS	70	mi/h
Minimum segment speed, SMIN	60	mi/h
Freeway maximum capacity, cIFL	2400	pc/h/ln

Terrain type Rolling

Grade %
Length mi

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume	Compone	ents		
	VFF	VRF	VFR	VRR	
Volume, V	540	90	210	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	150	25	58	0	
Trucks and buses	18	18	18	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	2.5	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	2.0	
Heavy vehicle adjustment, fHV	0.787	0.787	0.787	1.00	0
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	762	127	296	0	pc/h

Volume ratio, VR 0.357

Configuration	Characterist	ics	
Number of maneuver lanes, NWL	2	ln	
Interchange density, ID	1.0	int/mi	
Minimum RF lane changes, LCRF	1	lc/pc	
Minimum FR lane changes, LCFR	1	lc/pc	
Minimum RR lane changes, LCRR		lc/pc	
Minimum weaving lane changes, LCMIN	423	lc/h	
Weaving lane changes, LCW	596	lc/h	
Non-weaving vehicle index, INW	331		
Non-weaving lane change, LCNW	2129	lc/h	
Total lane changes, LCALL	2725	lc/h	

\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_

Weaving intensity factor, W

0.156

Average non-weaving spe	eea, SNW	64.1	m1/n		
Weaving Segmen	nt Speed, Dens:	ity, Level of Se	ervice and Ca	apacity	
Weaving segment speed,	S	65.7	mi/h		
Weaving segment density	7, D	9.0	pc/mi/ln		
Level of service, LOS		A			
Weaving segment v/c rat	cio	0.262			
Weaving segment flow ra	ate, v	934	veh/h		
Weaving segment capacit	y, cW	3556	veh/h		
	_Limitations or	n Weaving Segmer	nts		
If limit reached, see r	note.				
	Minimum	Maximum	Actual	Note	
Weaving length (ft)	300	6203	4350	a,b	
		Maximum	Analyzed		

2400

1.00

Maximum

mi/h

2258

Analyzed

0.262

d

## Notes:

v/c ratio

Average weaving speed, SW

Density-based capacty,

cIWL (pc/h/ln)

- a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.
- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 520 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	200	vph
Length of first accel/decel lane	240	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	520	200	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	144	56	V
Trucks and buses	16	10	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   624
                                              233
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 624 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        624
                                     4800
                                                    No
     Fi F
    v = v - v
                        391
                                     4800
                                                   No
        F R
     FO
                        233
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
    v or v
               > 1.5 v / 2
                                     No
Is
     3
          av34
                      12
If yes, v = 624
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    624
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.319
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.1
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 61.1

mph

0.926

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 520 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	200	vph
Length of first accel/decel lane	240	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	520	200	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	144	56	V
Trucks and buses	16	10	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   624
                                              233
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 624 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        624
                                     4800
                                                    No
     Fi F
    v = v - v
                        391
                                     4800
                                                   No
        F R
     FO
                        233
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
    v or v
               > 1.5 v / 2
                                     No
Is
     3
          av34
                      12
If yes, v = 624
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    624
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.5 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.319
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.1
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 61.1

mph

0.926

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

4/10/2014

Date performed: Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: Jurisdiction: US 41A KYTC

Analysis Year:

2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway

70.0 mph Volume on freeway 510 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	240	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

Junction Components	Freeway	Ramp	Adjacent	
Volume, V (vph)	510	260	Ramp	7ph
Peak-hour factor, PHF	0.90	0.90	V	/ P11
Peak 15-min volume, v15	142	72	7	7
Trucks and buses	20	14	9	5
Recreational vehicles	0	0	9	Š
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		

```
Flow rate, vp
                                   623
                                              309
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 623 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        623
                                     4800
                                                   No
     Fi F
    v = v - v
                        314
                                     4800
                                                   No
        F R
     FO
                        309
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 623
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    623
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.326
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.9
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 60.9

mph

0.909

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

4/10/2014

Date performed: Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: Jurisdiction: US 41A KYTC

Analysis Year:

2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway

70.0 mph Volume on freeway 510 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	240	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

Junction Components	Freeway	Ramp	Adjacent	
Volume, V (vph)	510	260	Ramp	7ph
Peak-hour factor, PHF	0.90	0.90	V	/ P11
Peak 15-min volume, v15	142	72	7	7
Trucks and buses	20	14	9	5
Recreational vehicles	0	0	9	Š
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		

```
Flow rate, vp
                                   623
                                              309
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 623 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        623
                                     4800
                                                   No
     Fi F
    v = v - v
                        314
                                     4800
                                                   No
        F R
     FO
                        309
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 623
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    623
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 7.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.326
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.9
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 60.9

mph

0.909

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 390 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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	390	200	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	108	56	V
Trucks and buses	16	10	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   468
                                              233
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 468 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        468
                                     4800
                                                   No
     Fi F
    v = v - v
                        235
                                     4800
                                                   No
        F R
     FO
                        233
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 468
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    468
                                                    No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.1 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.319
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.1
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 61.1

mph

0.926

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph Volume on freeway 390 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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	390	200	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	108	56	V
Trucks and buses	16	10	8
Recreational vehicles	0	0	8
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	

```
Flow rate, vp
                                   468
                                              233
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 468 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        468
                                     4800
                                                   No
     Fi F
    v = v - v
                        235
                                     4800
                                                   No
        F R
     FO
                        233
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 468
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    468
                                                    No
    V
     12
            ___Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = 6.1 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.319
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 61.1
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 61.1

mph

0.926

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

4/10/2014

Date performed: Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 370 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	240	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	370	260	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	103	72	V
Trucks and buses	20	14	%
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	

```
Flow rate, vp
                                   452
                                              309
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 452 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        452
                                     4800
                                                    No
     Fi F
    v = v - v
                        143
                                     4800
                                                   No
        F R
     FO
                        309
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 452
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                 4400
                    452
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 6.0 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
               _____Speed Estimation_____
                                         D = 0.326
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.9
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
Space mean speed for all vehicles,
                                        S = 60.9
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

4/10/2014

Date performed: Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Northbound

Junction: US 41A Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 370 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	240	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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	370	260	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	103	72	V
Trucks and buses	20	14	%
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	

```
Flow rate, vp
                                   452
                                              309
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 452 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        452
                                     4800
                                                    No
     Fi F
    v = v - v
                        143
                                     4800
                                                   No
        F R
     FO
                        309
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 452
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                 4400
                    452
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = 6.0 	pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
               _____Speed Estimation_____
                                         D = 0.326
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.9
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
Space mean speed for all vehicles,
                                        S = 60.9
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 300 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 420 vph Length of first accel/decel lane 940 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	
		Ramp	
300	420		vph
0.90	0.90		
83	117		v
15	10		%
0	0		%
Level	Level		
%	%		%
mi	m	ii ·	mi
1.5	1.5		
1.2	1.2		
	300 0.90 83 15 0 Level % mi	300 420 0.90 0.90 83 117 15 10 0 0 Level Level % % mi m 1.5 1.5	Ramp 300 420 0.90 0.90 83 117 15 10 0 0 Level Level % % mi mi mi 1.5 1.5

```
358
Flow rate, vp
                                               490
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 358 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         848
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 358
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    848
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.0 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.264
                                         S
Space mean speed in ramp influence area,
                                         S = 62.6
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.6
                                                     mph
```

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 300 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 420 vph Length of first accel/decel lane 940 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	
		Ramp	
300	420		vph
0.90	0.90		
83	117		v
15	10		%
0	0		%
Level	Level		
%	%		%
mi	m	ii ·	mi
1.5	1.5		
1.2	1.2		
	300 0.90 83 15 0 Level % mi	300 420 0.90 0.90 83 117 15 10 0 0 Level Level % % mi m 1.5 1.5	Ramp 300 420 0.90 0.90 83 117 15 10 0 0 Level Level % % mi mi mi 1.5 1.5

```
358
Flow rate, vp
                                               490
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 358 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         848
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 358
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    848
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.0 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.264
                                         S
Space mean speed in ramp influence area,
                                         S = 62.6
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.6
                                                     mph
```

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Agency/Co.: QK4
Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 410 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 550 Volume on ramp vph Length of first accel/decel lane 940 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 550 410 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 114 153 V

18

0

1.5

1.2

Level

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mi

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Level

1.5

1.2

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mi

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%

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Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
497
                                               654
Flow rate, vp
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 497 pc/h
                 12 F FM
                   _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         1151
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 497
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    1151
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.268
                                         S
                                         S = 62.5
Space mean speed in ramp influence area,
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.5
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Agency/Co.: QK4
Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 410 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 550 Volume on ramp vph Length of first accel/decel lane 940 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 550 410 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 114 153 V Trucks and buses 18 14 응

0

1.5

1.2

Level

%

mi

0

Level

1.5

1.2

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mi

%

용

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Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Terrain type:

Grade Length

```
497
                                               654
Flow rate, vp
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 497 pc/h
                 12 F FM
                   _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         1151
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 497
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    1151
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.268
                                         S
                                         S = 62.5
Space mean speed in ramp influence area,
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.5
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 380 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 420 Volume on ramp vph Length of first accel/decel lane 940 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 380 420 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 106 117 V Trucks and buses 15 10 응

0

1.5

1.2

Level

%

mi

0

Level

1.5

1.2

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mi

%

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Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Terrain type:

Grade Length

```
454
Flow rate, vp
                                               490
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 454 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         944
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 454
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    944
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.7 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.265
                                         S
Space mean speed in ramp influence area,
                                         S = 62.6
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.6
                                                     mph
```

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 380 vph \_\_\_\_\_On Ramp Data\_\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 35.0 mph 420 Volume on ramp vph Length of first accel/decel lane 940 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 380 420 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 106 117 V Trucks and buses 15 10 응

0

1.5

1.2

Level

%

mi

0

Level

1.5

1.2

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mi

%

용

шi

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Terrain type:

Grade Length

```
454
Flow rate, vp
                                               490
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 454 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         944
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 454
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    944
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 6.7 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.265
                                         S
Space mean speed in ramp influence area,
                                         S = 62.6
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.6
                                                     mph
```

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 510 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 550 vph Length of first accel/decel lane 940 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)	510	550		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	142	153		v
Trucks and buses	18	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	9	í	%
Length	mi	n	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                    618
                                               654
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 618 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         1272
                                     4800
                                                    No
    V
     FO
    v or v
                        0 pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 618
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    1272
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 9.2 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.269
                                         S
                                         S = 62.5
Space mean speed in ramp influence area,
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.5
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Northbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 510 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 550 vph Length of first accel/decel lane 940 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)	510	550		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	142	153		v
Trucks and buses	18	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	9	í	%
Length	mi	n	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                    618
                                               654
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 618 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         1272
                                     4800
                                                    No
    V
     FO
    v or v
                        0 pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 618
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    1272
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 9.2 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.269
                                         S
                                         S = 62.5
Space mean speed in ramp influence area,
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 62.5
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 420 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

\_\_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_\_

Does adjacent ramp exist? No

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	420	360		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	117	100		v
Trucks and buses	15	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00	%	%
Length	0.00 mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Flow rate, vp
                                   502
                                              420
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 502 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks_____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        502
                                     4800
                                                   No
     Fi F
    v = v - v
                        82
                                     4800
                                                   No
        F R
     FO
                        420
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v 	 or v 	 > 2700 	 pc/h?
                                     No
     3 av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 502
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    502
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = -4.9 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
               _____Speed Estimation_____
                                         D = 0.336
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.6
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
```

S = 60.6

mph

0.930

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: AM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 41A Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge Number of lanes in freeway 2

Free-flow speed on freeway 70.0 mph
Volume on freeway 570 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	470	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

\_\_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_\_

Does adjacent ramp exist?

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	570	470	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	158	131	V
Trucks and buses	18	14	%
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	

```
Flow rate, vp
                                   690
                                               559
                                                                   pcph
                  _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 690 	 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        690
                                     4800
                                                    No
     Fi F
    v = v - v
                        131
                                     4800
                                                    No
        F R
     FO
                        559
                                     2100
                                                    No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 690
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                   _Flow Entering Diverge Influence Area___
                                 Max Desirable
                                                     Violation?
                    Actual
                                 4400
                    690
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                     D = 4.252 + 0.0086 v - 0.009 L = -3.3 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.348
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                         S = 60.2
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
Space mean speed for all vehicles,
                                        S = 60.2
                                                     mph
```

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

4/10/2014

Date performed: Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 41A Jurisdiction: KYTC Analysis Year: 2013

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway Free-flow speed on freeway

70.0 mph Volume on freeway 350 vph

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

\_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_

Does adjacent ramp exist? No

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

ft Distance to adjacent ramp

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent
			Ramp
Volume, V (vph)	350	360	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	97	100	v
Trucks and buses	15	10	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Flow rate, vp
                                   418
                                              420
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                               (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 418 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                        Actual
                                     Maximum
                                                   LOS F?
    v = v
                        418
                                     4800
                                                   No
     Fi F
    v = v - v
                        -2
                                     4800
                                                   No
        F R
     FO
                        420
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 418
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                     Violation?
                   Actual
                                4400
                    418
                                                     No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = -5.7 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                         D = 0.336
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.6
                                                     mph
                                         R
Space mean speed in outer lanes,
                                         S = N/A
                                                     mph
Space mean speed for all vehicles,
                                        S = 60.6
                                                     mph
```

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Phone: E-mail: Fax:

\_\_\_\_\_\_Diverge Analysis\_\_\_\_\_\_

Analyst:

Agency/Co.: Qk4

Date performed: 4/10/2014 Analysis time period: PM Design Hour

Freeway/Dir of Travel: ETB Parkway Southbound

Junction: US 41A Jurisdiction: KYTC

Analysis Year: 2040 No Build

Description: ETB Pkwy Interstate 69 Upgrade

\_\_\_\_\_\_Freeway Data\_\_\_\_\_\_

Type of analysis Diverge

Number of lanes in freeway 2
Free-flow speed on freeway 70.0
Volume on freeway 470

\_\_\_\_\_Off Ramp Data\_\_\_\_\_

mph

vph

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	470	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

\_\_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_\_

Does adjacent ramp exist? No

Volume on adjacent ramp vph

Position of adjacent ramp Type of adjacent ramp

Distance to adjacent ramp ft

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	470	470	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	131	131	V
Trucks and buses	18	14	%
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	

```
Flow rate, vp
                                   569
                                              559
                                                                  pcph
                 _____Estimation of V12 Diverge Areas__
                              (Equation 13-12 or 13-13)
                L =
                 ΕQ
                      1.000 Using Equation 0
                 FD
                v = v + (v - v) P = 569 pc/h
                 12 R
                         F R FD
                  _____Capacity Checks____
                                     Maximum
                                                   LOS F?
                        Actual
    v = v
                        569
                                     4800
                                                   No
     Fi F
    v = v - v
                        10
                                     4800
                                                   No
        F R
     FO
                        559
                                     2100
                                                   No
    V
     R
                        0 pc/h (Equation 13-14 or 13-17)
    v or v
     3
         av34
Is
    v or v
               > 2700 pc/h?
                                     No
     3
         av34
               > 1.5 v /2
    v or v
                                     No
Is
     3
          av34
                      12
If yes, v = 569
                                  (Equation 13-15, 13-16, 13-18, or 13-19)
       12A
                   _Flow Entering Diverge Influence Area___
                                Max Desirable
                                                    Violation?
                   Actual
                                4400
                    569
                                                    No
    V
     12
            ____Level of Service Determination (if not F)______
                    D = 4.252 + 0.0086 v - 0.009 L = -4.4 pc/mi/ln
Density,
                                       12
                     R
Level of service for ramp-freeway junction areas of influence A
                _____Speed Estimation_____
                                        D = 0.348
Intermediate speed variable,
                                         S
Space mean speed in ramp influence area,
                                        S = 60.2
                                                    mph
                                         R
Space mean speed in outer lanes,
                                        S = N/A
                                                    mph
```

S = 60.2

mph

0.917

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Agency/Co.: QK4
Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 41A KYTC Jurisdiction: Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 350 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 240 vph Length of first accel/decel lane 1480 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 350 240 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 97 67 V Trucks and buses 16 10 응 Recreational vehicles 0 0 %

Level Level

%

1.5

1.2

mi

1.5

1.2

ે

mi

용

шi

Terrain type:

Grade Length

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Flow rate, vp
                                    420
                                               280
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 420 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                         Actual
                                     Maximum
                         700
                                      4800
                                                    No
    V
     FO
    v or v
                         0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 420
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                    700
                                 4600
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 1.5 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.225
                                         S
Space mean speed in ramp influence area,
                                         S = 63.7
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
Space mean speed for all vehicles,
                                         S = 63.7
                                                     mph
```

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: AM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 330 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 300 vph Length of first accel/decel lane 1480 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)	330	300		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	92	83		V
Trucks and buses	20	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	!	Š	%
Length	mi	ī	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
403
Flow rate, vp
                                               357
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 403
                                     pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         760
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 403
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                    Violation?
                                 4600
                    760
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 2.0 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.226
                                         S
Space mean speed in ramp influence area,
                                         S = 63.7
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 63.7

mph

0.909

1.00

0.935

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: Fax: E-mail: \_\_\_\_\_\_Merge Analysis\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 41A KYTC Jurisdiction: Analysis Year: 2013 Existing Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 480 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 240 vph Length of first accel/decel lane 1480 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 Adjacent Junction Components Ramp Ramp Volume, V (vph) 480 240 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 133 67 V

16

0

1.5

1.2

10

Level Level

%

mi

0

1.5

1.2

ે

mi

응

%

용

шi

Trucks and buses

Terrain type:

Grade Length

Recreational vehicles

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

```
Flow rate, vp
                                    576
                                               280
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 576 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         856
                                     4800
                                                    No
    V
     FO
    v or v
                        0
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
          av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 576
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual
                          Max Desirable
                                                     Violation?
                                 4600
                    856
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 2.7 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation___
Intermediate speed variable,
                                         M = 0.227
                                          S
Space mean speed in ramp influence area,
                                         S = 63.7
                                                     mph
                                          R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 63.7

mph

0.926

1.00

0.952

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

Phone: Fax: E-mail: \_\_\_\_\_\_\_Merge Analysis\_\_\_\_\_\_ Analyst: Agency/Co.: Qk4 Date performed: 4/10/2014
Analysis time period: PM Design Hour Freeway/Dir of Travel: EBT Parkway Southbound Junction: US 41A Jurisdiction: KYTC Analysis Year: 2040 No Build Description: Edward T Breathitt Parkway Interstate 69 Upgrade \_\_\_\_\_Freeway Data\_\_\_\_\_ Type of analysis Merge Number of lanes in freeway Free-flow speed on freeway 70.0 mph Volume on freeway 470 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 300 vph Length of first accel/decel lane 1480 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)	470	300		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	131	83		V
Trucks and buses	20	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	:	ò	용
Length	mi	1	ni	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
574
Flow rate, vp
                                               357
                                                                   pcph
                  _____Estimation of V12 Merge Areas__
                L =
                               (Equation 13-6 or 13-7)
                 ΕQ
                      1.000 Using Equation 0
                 FM
                v = v (P) = 574 pc/h
                 12 F FM
                    _____Capacity Checks_____
                                                   LOS F?
                        Actual
                                     Maximum
                         931
                                     4800
                                                    No
    V
     FO
    v or v
                            pc/h
                                     (Equation 13-14 or 13-17)
          av34
     3
Is
    v or v
                > 2700 pc/h?
                                     No
     3
         av34
                > 1.5 v /2
                                     No
Is
    v or v
          av34
                     12
     3
If yes, v = 574
                                   (Equation 13-15, 13-16, 13-18, or 13-19)
        12A
                    __Flow Entering Merge Influence Area_
                    Actual Max Desirable
                                                     Violation?
                                 4600
                    931
                                                     No
     R12
           _____Level of Service Determination (if not F)______
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 3.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence A
                  _____Speed Estimation____
Intermediate speed variable,
                                         M = 0.227
                                         S
Space mean speed in ramp influence area,
                                         S = 63.6
                                                     mph
                                         R
                                         S = N/A
Space mean speed in outer lanes,
                                                     mph
                                          0
```

S = 63.6

mph

0.909

1.00

0.935

1.00

Heavy vehicle adjustment, fHV

Driver population factor, fP

Space mean speed for all vehicles,

HCS 2010: Freeway Weaving Release 6.50

Fax:

Phone: E-mail:

\_\_\_\_\_\_Operational Analysis\_\_\_\_\_\_

Analyst: JJL
Agency/Co.: Qk4
Date Performed: 9/2/2014
Analysis Time Period: Design Hour

Freeway/Dir of Travel: ETB Parkway Weaving Location: US 62 to I69

Analysis Year: 2040

Description:

\_\_\_\_\_\_Inputs\_\_\_\_\_\_Inputs\_\_\_\_\_

Segment Type	Freeway		
Weaving configuration	One-Sided		
Number of lanes, N	2	ln	
Weaving segment length, LS	4350	ft	
Freeway free-flow speed, FFS	70	mi/h	
Minimum segment speed, SMIN	60	mi/h	
Freeway maximum capacity, cIFL	2400	pc/h/ln	

Terrain type Rolling

Grade %
Length mi

\_\_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	540	90	210	0	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.94	
Peak 15-min volume, v15	150	25	58	0	
Trucks and buses	18	18	18	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	2.5	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	2.0	
Heavy vehicle adjustment, fHV	0.787	0.787	0.787	1.00	0
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	762	127	296	0	pc/h

Volume ratio, VR 0.357

Configuration	Characterist	ics	
Number of maneuver lanes, NWL	2	ln	
Interchange density, ID	1.0	int/mi	
Minimum RF lane changes, LCRF	1	lc/pc	
Minimum FR lane changes, LCFR	1	lc/pc	
Minimum RR lane changes, LCRR		lc/pc	
Minimum weaving lane changes, LCMIN	423	lc/h	
Weaving lane changes, LCW	596	lc/h	
Non-weaving vehicle index, INW	331		
Non-weaving lane change, LCNW	2129	lc/h	
Total lane changes, LCALL	2725	lc/h	

\_\_\_Weaving and Non-Weaving Speeds\_\_\_\_\_

Weaving intensity factor, W

0.156

Average non-weaving spe	eea, SNW	64.1	m1/n		
Weaving Segmen	nt Speed, Dens:	ity, Level of Se	ervice and Ca	apacity	
Weaving segment speed,	S	65.7	mi/h		
Weaving segment density	7, D	9.0	pc/mi/ln		
Level of service, LOS		A			
Weaving segment v/c rat	cio	0.262			
Weaving segment flow ra	ate, v	934	veh/h		
Weaving segment capacit	cy, cW	3556	veh/h		
	_Limitations or	n Weaving Segmer	nts		
If limit reached, see r	note.				
	Minimum	Maximum	Actual	Note	
Weaving length (ft)	300	6203	4350	a,b	
		Maximum	Analyzed		

2400

1.00

Maximum

mi/h

2258

Analyzed

0.262

d

## Notes:

v/c ratio

Average weaving speed, SW

Density-based capacty,

cIWL (pc/h/ln)

- a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.
- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.