INTERCHANGE MODIFICATION REPORT ADDENDUM

I-26 AT S-48 (COLUMBIA AVENUE)
INTERCHANGE IMPROVEMENTS
LEXINGTON COUNTY, SOUTH CAROLINA
PROJECT NO. R4035500-121734.01
PROJECT ID P042383

MARCH 2018

PREPARED FOR:
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
&
LEXINGTON COUNTY

[Images of I-26 and Columbia Avenue]

[Logo of South Carolina Department of Transportation]
AECOM submitted the I-26 at S-48 (Columbia Avenue) Interchange Modification Report (IMR) on December 16, 2016 that addressed comments from SCDOT. Since this submittal date, the Federal Highway Administration (FHWA) has found some inconsistencies in the heavy vehicle percentage used on Interstate 26 between the multiple firms performing traffic studies along this corridor. To provide a consistent analysis, it was recommended for AECOM to update its traffic analysis using the latest available heavy vehicle percentages during the AM and PM peak hours. The following heavy percentages were used in the revised analysis along I-26:

- Eastbound I-26 AM Peak – 16%
- Eastbound I-26 PM Peak – 14%
- Westbound I-26 AM Peak – 23%
- Westbound I-26 PM Peak – 13%

To ease the review process for FHWA, the same table numbers, figure numbers, and appendices were used so this addendum can be directly compared with the December 16, 2016 original IMR.

**Existing 2014 HCS Analysis**

The results of the Existing 2014 revised Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate:

- East of Exit 97 (US 176), I-26 is operating at LOS E in the AM peak hour (eastbound) and LOS D during the PM peak hour (westbound)
- Eastbound merge from Exit 97 (US 176) onto I-26 is operating at LOS D in the AM peak hour
- Westbound diverge from I-26 onto Exit 97 (US 176) is operating at LOS D in the PM peak hour

All other freeway segment / merge / diverge analyses are operating at LOS C or better.

**Table 6** summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in Appendix E.
### Table 6: Existing 2014 Freeway / Merge / Diverge LOS and Density

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
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<th>Density (pc/mi/ln)</th>
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<td><strong>Freeway Segment</strong></td>
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**Figure 10** shows the LOS for the Existing 2014 conditions.

**No-Build 2020 HCS Analysis**

The results of the No-Build 2020 revised Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate:

- East of Exit 97 (US 176), I-26 is expected to operate at LOS F in the AM peak hour (eastbound) the PM peak hour (westbound)
- Eastbound merge from Exit 97 (US 176) onto I-26 is expected to operate at LOS F in the AM peak hour
- Westbound diverge from I-26 onto Exit 97 (US 176) is expected to operate at LOS F in the PM peak hour

All other freeway segment / merge / diverge analyses are operating at LOS C or better.

**Table 8** summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in Appendix G.
### Table 8: No-Build 2020 Freeway / Merge / Diverge LOS and Density

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<tr>
<th>Approach</th>
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Figure 11 shows the LOS for the No-Build 2020 conditions.

**No-Build 2040 HCS Analysis**

The results of the No-Build 2040 revised Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate:

- East of Exit 97 (US 176), I-26 is expected to continue to operate at LOS F in the AM peak hour (eastbound) the PM peak hour (westbound)
- Between Exit 97 (US 176) to Exit 91 (S-48) is expected to operate at LOS E in the AM peak hour (eastbound) the PM peak hour (westbound)
- Eastbound merge from Exit 97 (US 176) onto I-26 is expected to continue to operate at LOS F during the AM and PM peak hours
- Westbound merge from Exit 97 (US 176) to I-26 is expected to operate at LOS D in the PM peak hour
- Eastbound merge from Exit 91 (S-48) onto I-26 is expected to operate at LOS D during the AM and PM peak hours
• Eastbound diverge from I-26 onto Exit 97 (US 176) is expected to operate at LOS E during the AM and PM peak hours
• Westbound diverge from I-26 onto Exit 97 (US 176) is expected to operate at LOS D in the AM peak hour and LOS F during the PM peak hour
• Westbound diverge from I-26 onto Exit 91 (S-48) is expected to operate at LOS D in the PM peak hour
• Westbound diverge from I-26 onto Exit 85 (SC 202) is expected to operate at LOS D during the PM peak hour, but only by 0.6 (pc/hr/in)

All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 10 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in Appendix I.

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Figure 12 shows the LOS for the 2040 No-Build Conditions

Build 2020 HCS Analysis

The Build 2020 analysis results are similar to the No-Build 2020 results except at Exit 91 (S-48) with the addition of Alternative 1 and Alternative 2 (includes a loop ramp). The results of the Build 2020 revised Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate:
- East of Exit 97 (US 176), I-26 is expected to operate at LOS F in the AM peak hour (eastbound) the PM peak hour (westbound)
- Eastbound merge from Exit 97 (US 176) onto I-26 is expected to operate at LOS F in the AM peak hour
- Westbound diverge from I-26 onto Exit 97 (US 176) is expected to operate at LOS F in the PM peak hour

All other freeway segment / merge / diverge analyses are operating at LOS C or better including the various alternatives at Exit 91 (S-48).

Table 12 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in Appendix G.

**Table 12: Build 2020 Freeway / Merge / Diverge LOS and Density**

<table>
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<tr>
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Figure 13 and 14 shows the LOS for the 2020 Build Conditions for Alternative 1 and 2.
Build 2040 HCS Analysis

The Build 2040 analysis results are similar to the No-Build 2040 results except at Exit 91 (S-48) with the addition of Alternative 1 and Alternative 2 (includes a loop ramp). The results of the Build 2040 revised Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate:

- East of Exit 97 (US 176), I-26 is expected to continue to operate at LOS F in the AM peak hour (eastbound) the PM peak hour (westbound)
- Between Exit 97 (US 176) to Exit 91 (S-48) is expected to operate at LOS E in the AM peak hour (eastbound) the PM peak hour (westbound)
- Eastbound merge from Exit 97 (US 176) onto I-26 is expected to continue to operate at LOS F during the AM and PM peak hours
- Westbound merge from Exit 97 (US 176) to I-26 is expected to operate at LOS D in the PM peak hour
- Eastbound merge from Exit 91 (S-48) onto I-26 is expected to operate at LOS D during the AM and PM peak hours
- Eastbound diverge from I-26 onto Exit 97 (US 176) is expected to operate at LOS E during the AM and PM peak hours
- Westbound diverge from I-26 onto Exit 97 (US 176) is expected to operate at LOS D in the AM peak hour and LOS F during the PM peak hour
- Westbound diverge from I-26 onto Exit 91 (S-48) is expected to operate at LOS D in the PM peak hour for Alternative 1
- Westbound diverge from I-26 onto Exit (S-48) is expected to operate at LOS D in the PM peak hour for Alternative 2
- Westbound diverge from I-26 onto Exit 85 (SC 202) is expected to operate at LOS D during the PM peak hour

All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 14 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in Appendix I.
Table 14: Build 2040 Freeway / Merge / Diverge LOS and Density

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<td>E</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>WB Exit 97 Off-Ramp</td>
<td>D</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>WB Exit 91 Off-Ramp – Alt 1</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>WB Exit 91 Off-Ramp – Alt 2</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>WB Exit 91 Off Loop Ramp – Alt 2</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>WB Exit 85 Off-Ramp</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

Figure 15 and 16 shows the LOS for the 2040 Build Conditions for Alternative 1 and 2.
Summary of Findings

Based on the revised traffic analysis that incorporates the latest heavy truck percentages along I-26, it can be concluded that the I-26 at S-48 interchange continues to operate at a LOS D or better for the freeway merge and diverge segments. As indicated in the original IMR dated 12-16-16, the operation around Exit 97 (US 176) continues to operate at LOS F in the 2020 design year with even greater densities by 2040.

One new finding as a result of the increased heavy vehicle percentages is the freeway segment operation between Exit 97 (US 176) and Exit 91 (S-48). Operation is expected to be LOS E instead of LOS D by the year 2040. Widening I-26 between Exit 91 (S-48) and Exit 85 (US 176) from a 4-lane freeway to a 6-lane freeway should be considered by the year 2040.

Finally, the original IMR dated 12-16-16 indicated that the Exit 85 interchange (SC 202) did not require any improvements. With the increased heavy percentages and revised analysis, the Exit 85 interchange (SC 202) continues to operate at a LOS D or better. While this interchange may not need improvements as a result of traffic volumes, this interchange may need improvements to address existing horizontal and vertical clearance issues with I-26.
Figure 10

LOS and Laneage

2014 Existing

LOS and Laneage

EXIT 85

EXIT 91

EXIT 97

I-26 at S-48 (Columbia Avenue)
Interchange Modification Report
Project ID P042383

2014 Existing
LOS and Laneage
Figure 10

Freeway Segment
Merge Segment
Diverge Segment
LOS A/B/C
LOS D
LOS E/F
Laneage & Storage Length
Intersection AM Peak and PM Peak Level of Service
Signalized Intersection
Unsignalized Intersection
Interchange Modification Report
Project ID P042383

2020 No-Build
LOS and Laneage
Figure 11

LOS A/B/C
LOS D
LOS E/F

Laneage & Storage Length
Intersection AM Peak and PM Peak Level of Service
Signalized Intersection
Unsignalized Intersection

Meadow Brook Rd
Village
Broad River Rd
Rauch-Metz Rd

Julius Richardson Rd
Filer Rd

Exxon Driveway

Ranch-Mete Rd

176
176
176
176

I-26 at S-48 (Columbia Avenue)
EXIT 85
EXIT 91
EXIT 97
APPENDIX E

EXISTING 2014 HCS REPORTS
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: West of SC 202
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1199 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 333 v
Trucks and buses 16 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.806
Driver population factor, fp 1.00
Flow rate, vp 826 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 826 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 75.0 mi/h
Number of lanes, N 2
Density, D 11.0+ pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1349 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 375 v
Trucks and buses 16 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.806
Driver population factor, fp 1.00
Flow rate, vp 929 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
    FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 929 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 75.0 mi/h
Number of lanes, N 2
Density, D 12.4 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and US 176
Jurisdiction: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1981 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 550 v
Trucks and buses 16 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.806
Driver population factor, fp 1.00
Flow rate, vp 1365 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed:
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1365 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 73.5 mi/h
Number of lanes, N 2
Density, D 18.6 pc/mi/ln
Level of service, LOS C
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: East of US176
Jurisdiction: 2014
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 3315 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 921 v
Trucks and buses 16 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.806
Driver population factor, fp 1.00
Flow rate, vp 2284 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
    FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 2284 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 56.7 mi/h
Number of lanes, N 2
Density, D 40.2 pc/mi/ln
Level of service, LOS E
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: East of US 176
Jurisdiction: 2014
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1476 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 410 v
Trucks and buses 23 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.743
Driver population factor, fp 1.00
Flow rate, vp 1103 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
  FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1103 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 74.9 mi/h
Number of lanes, N 2
Density, D 14.7 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and US 176
Jurisdiction: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1195 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 332 v
Trucks and buses 23 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.743
Driver population factor, fp 1.00
Flow rate, vp 893 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
  FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 893 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 75.0 mi/h
Number of lanes, N 2
Density, D 11.9 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and SC 202
Jurisdiction: 
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 851 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 236 v
Trucks and buses 23 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.743
Driver population factor, fp 1.00
Flow rate, vp 636 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 636 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 75.0 mi/h
Number of lanes, N 2
Density, D 8.5 pc/mi/ln
Level of service, LOS A
Overall results are not computed when free-flow speed is less than 55 mph.
#### Operational Analysis

**Analyst:** AECOM  
**Agency or Company:** AECOM  
**Date Performed:** 6/30/2016  
**Analysis Time Period:** AM Peak  
**Freeway/Direction:** I-26 WB  
**From/To:** West of SC 202  
**Jurisdiction:**  
**Analysis Year:** 2014  
**Description:** S-48 IMR

#### Flow Inputs and Adjustments

| Volume, V | 891 | veh/h |
| Peak-hour factor, PHF | 0.90 |  |
| Peak 15-min volume, v15 | 248 | v |
| Trucks and buses | 23 | % |
| Recreational vehicles | 0 | % |
| Terrain type: Rolling |  |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 2.5 |  |
| Recreational vehicle PCE, ER | 2.0 |  |
| Heavy vehicle adjustment, fHV | 0.743 |  |
| Driver population factor, fp | 1.00 |  |

**Flow rate, vp**  
666 pc/h/ln

#### Speed Inputs and Adjustments

| Lane width | 12.0 | ft |
| Right-side lateral clearance | 6.0 | ft |
| Total ramp density, TRD | 0.33 | ramps/mi |
| Number of lanes, N | 2 |  |
| Free-flow speed: Base |  |
| FFS or BFFS | 75.4 | mi/h |
| Lane width adjustment, fLW | 0.0 | mi/h |
| Lateral clearance adjustment, fLC | 0.0 | mi/h |
| TRD adjustment | 1.3 | mi/h |
| Free-flow speed, FFS | 74.1 | mi/h |

#### LOS and Performance Measures

| Flow rate, vp | 666 | pc/h/ln |
| Free-flow speed, FFS | 74.1 | mi/h |
| Average passenger-car speed, S | 75.0 | mi/h |
| Number of lanes, N | 2 |  |
| Density, D | 8.9 | pc/mi/ln |
| Level of service, LOS | A |  |
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: West of SC 202
Jurisdiction: 2014
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1440 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 400 v
Trucks and buses 14 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 968 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 968 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 75.0 mi/h
Number of lanes, N 2
Density, D 12.9 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1406 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 391 v
Trucks and buses 14 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 945 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
    FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 945 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 75.0 mi/h
Number of lanes, N 2
Density, D 12.6 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and US 176
Jurisdiction: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1804 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 501 v
Trucks and buses 14 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 1213 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1213 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 74.5 mi/h
Number of lanes, N 2
Density, D 16.3 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: East of US176
Jurisdiction: 2014
Analysis Year: Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 2404 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 668 v
Trucks and buses 14%
Recreational vehicles 0%
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 1616 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1616 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 70.8 mi/h
Number of lanes, N 2
Density, D 22.8 pc/mi/ln
Level of service, LOS C
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: East of US 176
Jurisdiction: 2014
Analysis Year: Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V: 3049 veh/h
Peak-hour factor, PHF: 0.90
Peak 15-min volume, v15: 847 v
Trucks and buses: 13 %
Recreational vehicles: 0 %
Terrain type: Rolling
Grade: - %
Segment length: - mi
Trucks and buses PCE, ET: 2.5
Recreational vehicle PCE, ER: 2.0
Heavy vehicle adjustment, fHV: 0.837
Driver population factor, fp: 1.00
Flow rate, vp: 2024 pc/h/ln

Speed Inputs and Adjustments

Lane width: 12.0 ft
Right-side lateral clearance: 6.0 ft
Total ramp density, TRD: 0.33 ramps/mi
Number of lanes, N: 2
Free-flow speed: Base
   FFS or BFFS: 75.4 mi/h
Lane width adjustment, fLW: 0.0 mi/h
Lateral clearance adjustment, fLC: 0.0 mi/h
TRD adjustment: 1.3 mi/h
Free-flow speed, FFS: 74.1 mi/h

LOS and Performance Measures

Flow rate, vp: 2024 pc/h/ln
Free-flow speed, FFS: 74.1 mi/h
Average passenger-car speed, S: 63.4 mi/h
Number of lanes, N: 2
Density, D: 31.9 pc/mi/ln
Level of service, LOS: D
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and US 176
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1870 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 519 v
Trucks and buses 13 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.837
Driver population factor, fp 1.00
Flow rate, vp 1241 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
    FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1241 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 74.4 mi/h
Number of lanes, N 2
Density, D 16.7 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V: 1271 veh/h
Peak-hour factor, PHF: 0.90
Peak 15-min volume, v15: 353 v
Trucks and buses: 13 %
Recreational vehicles: 0 %
Terrain type: Rolling
Grade: - %
Segment length: - mi
Trucks and buses PCE, ET: 2.5
Recreational vehicle PCE, ER: 2.0
Heavy vehicle adjustment, fHV: 0.837
Driver population factor, fp: 1.00
Flow rate, vp: 844 pc/h/ln

Speed Inputs and Adjustments

Lane width: 12.0 ft
Right-side lateral clearance: 6.0 ft
Total ramp density, TRD: 0.33 ramps/mi
Number of lanes, N: 2
Free-flow speed: Base
    FFS or BFFS: 75.4 mi/h
Lane width adjustment, fLW: 0.0 mi/h
Lateral clearance adjustment, fLC: 0.0 mi/h
TRD adjustment: 1.3 mi/h
Free-flow speed, FFS: 74.1 mi/h

LOS and Performance Measures

Flow rate, vp: 844 pc/h/ln
Free-flow speed, FFS: 74.1 mi/h
Average passenger-car speed, S: 75.0 mi/h
Number of lanes, N: 2
Density, D: 11.3 pc/mi/ln
Level of service, LOS: B
Overall results are not computed when free-flow speed is less than 55 mph.
**Operational Analysis**

**Analyst:** AECOM  
**Agency or Company:** AECOM  
**Date Performed:** 6/30/2016  
**Analysis Time Period:** PM Peak  
**Freeway/Direction:** I-26 WB  
**From/To:** West of SC 202  
**Jurisdiction:**  
**Analysis Year:** 2014  
**Description:** S-48 IMR

**Flow Inputs and Adjustments**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V</td>
<td>1215 veh/h</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>338 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>- %</td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.837</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>807 pc/h/ln</td>
</tr>
</tbody>
</table>

**Speed Inputs and Adjustments**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base</td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

**LOS and Performance Measures**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>807 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>75.0 mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>10.8 pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>A</td>
</tr>
</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
**HCS 2010: Freeway Merge and Diverge Segments Release 6.65**

---

**Merge Analysis**

Analyst: AECOM  
Agency/Co.: AECOM  
Date performed: 6/30/2016  
Analysis time period: AM Peak  
Freeway/Dir of Travel: I-26 EB  
Junction: SC-202 EB On-Ramp  
Jurisdiction:  
Analysis Year: 2014  
Description: S-48 IMR

---

**Freeway Data**

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1164 vph</td>
</tr>
</tbody>
</table>

---

**On Ramp Data**

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>25.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>185 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>400 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

**Adjacent Ramp Data (if one exists)**

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>35 vph</td>
</tr>
<tr>
<td>Position of adjacent Ramp</td>
<td>Upstream</td>
</tr>
<tr>
<td>Type of adjacent Ramp</td>
<td>Off</td>
</tr>
<tr>
<td>Distance to adjacent Ramp</td>
<td>1050 ft</td>
</tr>
</tbody>
</table>

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1164</td>
<td>185</td>
<td>35 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>323</td>
<td>51</td>
<td>10 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v \left( \frac{P}{F} \right) = 1604 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = 1816</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\[ v \quad \text{or} \quad v \quad > 2700 \quad \text{pc/h} \quad (\text{Equation 13-14 or 13-17}) \]
\[ v \quad \text{or} \quad v \quad > 1.5 \quad \frac{v}{2} \quad (\text{Equation 13-15, 13-16, 13-18, or 13-19}) \]

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = 1816</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Density, \( D = 5.475 + 0.00734 \quad v + 0.0078 \quad v - 0.00627 \quad \frac{L}{R} \quad 17.0 \quad \text{pc/mi/ln} \)

Level of service for ramp-freeway junction areas of influence \( B \)

Speed Estimation

Intermediate speed variable, \( M = 0.325 \)
Space mean speed in ramp influence area, \( S = 64.3 \quad \text{mph} \)
Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \)
Space mean speed for all vehicles, \( S = 64.3 \quad \text{mph} \)
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB On-Ramp
Jurisdiction: 
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1248 vph

On Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 45.0 mph
Volume on ramp: 733 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?: Yes
Volume on adjacent Ramp: 101 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 1725 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1248</td>
<td>733</td>
<td>101 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>347</td>
<td>204</td>
<td>28 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, $f_{HV}$ & 0.806 & 0.971 & 0.971 \\
Driver population factor, $f_P$ & 1.00 & 1.00 & 1.00 \\
Flow rate, $v_p$ & 1719 & 839 & 116 pcph \\

_________________________Estimation of V12 Merge Areas_________________________

$$L = \quad \text{(Equation 13-6 or 13-7)}$$
$$P = 1.000 \quad \text{Using Equation 0}$$
$$v = v \quad (P \quad) = 1719 \quad \text{pc/h}$$
$$12 \quad F \quad FM$$

_______________________________Capacity Checks_________________________________

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v_{FO}$</td>
<td>2558</td>
<td>4800</td>
</tr>
<tr>
<td>$v_{or v} \quad av34$</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
</tr>
</tbody>
</table>

Is $v_{or v} \quad av34 > 2700$ pc/h? No

Is $v_{or v} \quad av34 > 1.5 \quad v_{av34} / 2$ No

If yes, $v_{12A} = 1719 \quad \text{(Equation 13-15, 13-16, 13-18, or 13-19)}$

________________________Flow Entering Merge Influence Area_____________________

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v_{R12}$</td>
<td>2558</td>
<td>4600</td>
</tr>
</tbody>
</table>

_____________________________Level of Service Determination (if not F)_____________________

Density, $D = 5.475 + 0.00734 \quad v_{R} + 0.0078 \quad v_{R} - 0.00627 \quad L_{R} = \quad 15.6 \quad \text{pc/mi/ln}$

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

_____________________________Speed Estimation_______________________________________________

Intermediate speed variable, $M = 0.236$

Space mean speed in ramp influence area, $S_{R} = 67.2 \quad \text{mph}$

Space mean speed in outer lanes, $S_{0} = \text{N/A} \quad \text{mph}$

Space mean speed for all vehicles, $S = 67.2 \quad \text{mph}$
Freeway Merge and Diverge Segments Release 6.65

---

**Merge Analysis**

Analyst: AECOM  
Agency/Co.: AECOM  
Date performed: 6/30/2016  
Analysis time period: AM Peak  
Freeway/Dir of Travel: I-26 EB  
Junction: US176 EB On-Ramp  
Jurisdiction:  
Analysis Year: 2014  
Description: S-48 IMR

---

**Freeway Data**

Type of analysis: Merge  
Number of lanes in freeway: 2  
Free-flow speed on freeway: 75.0 mph  
Volume on freeway: 1869 vph

---

**On Ramp Data**

Side of freeway: Right  
Number of lanes in ramp: 1  
Free-flow speed on ramp: 25.0 mph  
Volume on ramp: 1446 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? Yes  
Volume on adjacent Ramp: 112 vph  
Position of adjacent Ramp: Upstream  
Type of adjacent Ramp: Off  
Distance to adjacent Ramp: 900 ft

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1869</td>
<td>1446</td>
<td>112</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>519</td>
<td>402</td>
<td>31</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Level</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>
L = \frac{1}{EQ} \quad (Equation \ 13-6 \ or \ 13-7)

P = 1.000 \quad Using \ Equation \ 0

v = v (P) = 2575 \ \text{pc/h}

\textbf{Capacity Checks}

\begin{tabular}{lcc}
\hline
Actual & Maximum & LOS F? \\
\hline
v & 4230 & 4800 \ \text{ pc/h} \\
\text{FO} & & (Equation \ 13-14 \ or \ 13-17) \\
\hline
v \ or \ v & 0 \ \text{ pc/h} & No \\
\text{av} & \text{av} & \text{av} \\
3 & 3 & 3 \\
\hline
\text{Is} \ v \ or \ v & > 2700 \ \text{pc/h}? & No \\
\text{av} & \text{av} & \text{av} \\
3 & 3 & 3 \\
\hline
\text{Is} \ v \ or \ v & > 1.5 \frac{v}{2} & No \\
\text{av} & \text{av} & \text{av} \\
3 & 3 & 3 \\
\hline
If \ yes, \ v & = 2575 & (Equation \ 13-15, \ 13-16, \ 13-18, \ or \ 13-19) \\
\text{12A} & & \\
\hline
\end{tabular}

\textbf{Flow Entering Merge Influence Area}

\begin{tabular}{lcc}
\hline
Actual & Max Desirable & Violation? \\
\hline
v & 4230 & 4600 \ \text{ pc/h} \\
\text{R12} & & No \\
\hline
\end{tabular}

\textbf{Level of Service Determination (if not F)}

Density, \ \text{D} = 5.475 + 0.00734 \text{ v} + 0.0078 \text{ v} - 0.00627 \text{ L} = 28.3 \ \text{ pc/mi/ln} \\
\text{R} \ & \ & \text{R} \\
\text{R} \ & \ & \text{R} \\
12 & & 12 \\
\text{Level of service for ramp-freeway junction areas of influence \ D} \\
\hline
\textbf{Speed Estimation}

Intermediate speed variable, \ \text{M} = 0.514 \\
\text{S} \\
\hline
Space mean speed in ramp influence area, \ \text{S} = 58.0 \ \text{ mph} \\
\text{R} \\
\hline
Space mean speed in outer lanes, \ \text{S} = \text{N/A} \ \text{ mph} \\
0 \\
\hline
Space mean speed for all vehicles, \ \text{S} = 58.0 \ \text{ mph} \\
\hline
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 1028 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 167 vph
Length of first accel/decel lane 1425 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp 448 vph
Position of adjacent Ramp Upstream
Type of adjacent Ramp Off
Distance to adjacent Ramp 775 ft

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp
Volume, V (vph) 1028 167 448 vph
Peak-hour factor, PHF 0.90 0.90 0.90
Peak 15-min volume, v15 286 46 124 v
Trucks and buses 23 2 2 %
Recreational vehicles 0 0 0 %
Terrain type: Rolling Rolling Rolling
Grade % % %
Length mi mi mi
Trucks and buses PCE, ET 2.5 2.5 2.5
Recreational vehicle PCE, ER 2.0 2.0 2.0
Heavy vehicle adjustment, \( f_{HV} \) & 0.743 & 0.971 & 0.971 \\
Driver population factor, \( f_p \) & 1.00 & 1.00 & 1.00 \\
Flow rate, \( v_p \) & 1536 & 191 & 513 \text{ pcph} \\

Estimation of V12 Merge Areas

\[
L = \text{Eqn 13-6 or 13-7} \\
P = 1.000 \text{ Using Eqn 0} \\
v = v \left( \frac{P}{F_{FM}} \right) = 1536 \text{ pc/h} \\
\]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Maximum ( v )</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1727 pc/h</td>
<td>4800 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

If yes, \( v = 1536 \text{ pc/h} \) \text{(Eqn 13-15, 13-16, 13-18, or 13-19)}

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Max Desirable ( v )</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1727 pc/h</td>
<td>4600 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[
D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 9.9 \text{ pc/mi/ln} \\
R \quad 12 \quad A \\
\]

Level of service for ramp-freeway junction areas of influence \( A \)

Speed Estimation

Intermediate speed variable, \( M = 0.272 \text{ } \) \\
Space mean speed in ramp influence area, \( S = 66.0 \text{ mph} \) \\
Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \) \\
Space mean speed for all vehicles, \( S = 66.0 \text{ mph} \)
**Merge Analysis**

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 6/30/2016  
**Analysis time period:** AM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** S-48 WB On-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2014  
**Description:** S-48 IMR  

---

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>753 vph</td>
</tr>
</tbody>
</table>

---

### On Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>98 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1225 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

### Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>442 vph</td>
</tr>
<tr>
<td>Position of adjacent Ramp</td>
<td>Upstream</td>
</tr>
<tr>
<td>Type of adjacent Ramp</td>
<td>Off</td>
</tr>
<tr>
<td>Distance to adjacent Ramp</td>
<td>1475 ft</td>
</tr>
</tbody>
</table>

---

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>753</td>
<td>98</td>
<td>442</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>209</td>
<td>27</td>
<td>123</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.743 0.971 0.971
Driver population factor, fP 1.00 1.00 1.00
Flow rate, vp 1125 112 506 pcph

Estimation of V12 Merge Areas

\[
L = \text{EQ}
\]

\[
P = 1.000 \text{ Using Equation 0}
\]

\[
v = v (P) = 1125 \text{ pc/h}
\]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v 1237</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>v or v 0 pc/h (Equation 13-14 or 13-17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{Is } v \text{ or } v > 2700 pc/h? \text{ No}
\]

\[
\text{Is } v \text{ or } v > 1.5 v /2 \text{ No}
\]

\[
\text{If yes, } v = 1125 \text{ pc/h (Equation 13-15, 13-16, 13-18, or 13-19)}
\]

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v 1237</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 7.4 \text{ pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, M = 0.224
Space mean speed in ramp influence area, S = 67.6 mph
Space mean speed in outer lanes, S = N/A mph
Space mean speed for all vehicles, S = 67.6 mph
HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 826 vph

On Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 45.0 mph
Volume on ramp: 65 vph
Length of first accel/decel lane: 525 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp: 25 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 1000 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>826</td>
<td>65</td>
<td>25 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>229</td>
<td>18</td>
<td>7 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[
L = \text{EQ}
\]
\[
P = 1.000 \quad \text{Using Equation 0}
\]
\[
v = v (P) = 1234 \quad \text{pc/h}
\]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>1308</td>
<td>4800</td>
</tr>
<tr>
<td>(v_{FO})</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
</tr>
<tr>
<td>(v_{av34})</td>
<td>&gt; 2700 pc/h</td>
<td>No</td>
</tr>
<tr>
<td>(v_{av34})</td>
<td>&gt; (1.5v_{av34}/2)</td>
<td>No</td>
</tr>
</tbody>
</table>

If yes, \(v = 1234\) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>1308</td>
<td>4600</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[
\text{Density, } D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.4 \quad \text{pc/mi/ln}
\]

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

Speed Estimation

<p>| Intermediate speed variable, | (M = 0.288) |
| Space mean speed in ramp influence area, | (S = 65.5 \quad \text{mph}) |
| Space mean speed in outer lanes, | (S = \text{N/A} \quad \text{mph}) |
| Space mean speed for all vehicles, | (S = 65.5 \quad \text{mph}) |</p>
<table>
<thead>
<tr>
<th>Analyst:</th>
<th>AECOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency/Co.:</td>
<td>AECOM</td>
</tr>
<tr>
<td>Date performed:</td>
<td>6/30/2016</td>
</tr>
<tr>
<td>Analysis time period:</td>
<td>PM Peak</td>
</tr>
<tr>
<td>Freeway/Dir of Travel:</td>
<td>I-26 EB On-Ramp</td>
</tr>
<tr>
<td>Junction:</td>
<td>SC-202 EB On-Ramp</td>
</tr>
<tr>
<td>Jurisdiction:</td>
<td></td>
</tr>
<tr>
<td>Analysis Year:</td>
<td>2014</td>
</tr>
<tr>
<td>Description:</td>
<td>S-48 IMR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1372 vph</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>25.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>34 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>400 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>68 vph</td>
</tr>
<tr>
<td>Position of adjacent Ramp</td>
<td>Upstream</td>
</tr>
<tr>
<td>Type of adjacent Ramp</td>
<td>Off</td>
</tr>
<tr>
<td>Distance to adjacent Ramp</td>
<td>1050 ft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1372</td>
<td>34</td>
<td>68</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>381</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

L = \text{(Equation 13-6 or 13-7)}

EQ

P = 1.000 Using Equation 0

FM

v = v (P ) = 1845 pc/h

12 F FM

Capacity Checks

<table>
<thead>
<tr>
<th>v</th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>FO</td>
<td>1845</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\[ v \text{ or } v > 2700 \text{ pc/h} \] \text{(Equation 13-14 or 13-17)}

If yes, \( v = 1845 \) \text{(Equation 13-15, 13-16, 13-18, or 13-19)}

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>v</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>R12</td>
<td>1884</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.6 \text{ pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, \( M = 0.327 \)

Space mean speed in ramp influence area, \( S = 64.2 \text{ mph} \)

Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \)

Space mean speed for all vehicles, \( S = 64.2 \text{ mph} \)
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 1303 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 501 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? Yes
Volume on adjacent Ramp 103 vph
Position of adjacent Ramp Upstream
Type of adjacent Ramp Off
Distance to adjacent Ramp 1725 ft

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp
Volume, V (vph) 1303 501 103 vph
Peak-hour factor, PHF 0.90 0.90 0.90
Peak 15-min volume, v15 362 139 29 v
Trucks and buses 14 2 2 %
Recreational vehicles 0 0 0 %
Terrain type:
Grade Rolling Rolling Rolling
Length % % %
Trucks and buses PCE, ET 2.5 mi 2.5 mi 2.5 mi
Recreational vehicle PCE, ER 2.0 2.0 2.0
Estimation of V12 Merge Areas

\[ L = \quad (\text{Equation 13-6 or 13-7}) \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v_{12} \quad (P_{FM}) = 1752 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v_{FO}</td>
<td>2325</td>
<td>4800</td>
</tr>
<tr>
<td>v_{av34} or v_{34}</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
</tr>
</tbody>
</table>

Is \( v_{av34} > 2700 \text{ pc/h} \)? No

Is \( v_{av34} > 1.5 \frac{v_{12}}{2} \)? No

If yes, \( v_{12} = 1752 \) \( \text{(Equation 13-15, 13-16, 13-18, or 13-19)} \)

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v_{R12}</td>
<td>2325</td>
<td>4600</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v_{av34} - 0.00627 L_{12} = 13.9 \quad \text{pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, \( M = 0.226 \)

Space mean speed in ramp influence area, \( S_{R} = 67.5 \quad \text{mph} \)

Space mean speed in outer lanes, \( S_{0} = N/A \quad \text{mph} \)

Space mean speed for all vehicles, \( S = 67.5 \quad \text{mph} \)
### Merge Analysis

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 6/30/2016  
**Analysis time period:** PM Peak  
**Freeway/Dir of Travel:** I-26 EB  
**Junction:** US176 EB On-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2014  
**Description:** S-48 IMR

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1590 vph</td>
</tr>
</tbody>
</table>

### On Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>25.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>814 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1500 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

### Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>214 vph</td>
</tr>
<tr>
<td>Position of adjacent Ramp</td>
<td>Upstream</td>
</tr>
<tr>
<td>Type of adjacent Ramp</td>
<td>Off</td>
</tr>
<tr>
<td>Distance to adjacent Ramp</td>
<td>900 ft</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1590</td>
<td>814</td>
<td>214</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>442</td>
<td>226</td>
<td>59 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Level</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{(Equation 13-6 or 13-7)} \]
\[ P = 1.000 \quad \text{Using Equation 13-7} \]
\[ v = v (P) = 2138 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual v</th>
<th>Maximum v</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3070</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

Is \( v_{3} \text{ or } v_{34} > 2700 \text{ pc/h} \)?
No

Is \( v_{3} \text{ or } v_{34} > 1.5 \frac{v}{12} \)?
No

If yes, \( v_{12} = 2138 \quad \text{(Equation 13-15, 13-16, 13-18, or 13-19)} \)

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual v</th>
<th>Max Desirable v</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3070</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.6 \quad \text{pc/mi/ln} \]

Level of service for ramp-freeway junction areas of influence \( B \)

Speed Estimation

\[ M = 0.330 \]
\[ S = 64.1 \quad \text{mph} \]
\[ S = \text{N/A} \quad \text{mph} \]
\[ S = 64.1 \quad \text{mph} \]
**Merge Analysis**

**Analyst:** AECOM
**Agency/Co.:** AECOM
**Date performed:** 6/30/2016
**Analysis time period:** PM Peak
**Freeway/Dir of Travel:** I-26 WB
**Junction:** US 176 WB On-Ramp
**Jurisdiction:**
**Analysis Year:** 2014
**Description:** S-48 IMR

---

### Freeway Data

- **Type of analysis:** Merge
- **Number of lanes in freeway:** 2
- **Free-flow speed on freeway:** 75.0 mph
- **Volume on freeway:** 1737 vph

---

### On Ramp Data

- **Side of freeway:** Right
- **Number of lanes in ramp:** 1
- **Free-flow speed on ramp:** 25.0 mph
- **Volume on ramp:** 133 vph
- **Length of first accel/decel lane:** 1425 ft
- **Length of second accel/decel lane:** ft

---

### Adjacent Ramp Data (if one exists)

- **Does adjacent ramp exist?** Yes
- **Volume on adjacent Ramp:** 1312 vph
- **Position of adjacent Ramp:** Upstream
- **Type of adjacent Ramp:** Off
- **Distance to adjacent Ramp:** 775 ft

---

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume, V (vph)</strong></td>
<td>1737</td>
<td>133</td>
<td>1312 vph</td>
</tr>
<tr>
<td><strong>Peak-hour factor, PHF</strong></td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td><strong>Peak 15-min volume, v15</strong></td>
<td>483</td>
<td>37</td>
<td>364 v</td>
</tr>
<tr>
<td><strong>Trucks and buses</strong></td>
<td>13</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td><strong>Recreational vehicles</strong></td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td><strong>Terrain type:</strong></td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td><strong>Trucks and buses PCE, ET</strong></td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Recreational vehicle PCE, ER</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{(Equation 13-6 or 13-7)} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v (P) = 2306 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>2458</td>
<td>4800</td>
</tr>
<tr>
<td>FO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v or v</td>
<td></td>
<td>0 pc/h</td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is v or (\overline{v}) &gt; 2700 pc/h?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is v or (\overline{v}) &gt; 1.5 (\overline{v})/2</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, (\overline{v}) = 2306</td>
<td>(Equation 13-15, 13-16, 13-18, or 13-19)</td>
<td></td>
</tr>
<tr>
<td>12A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \(D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 L = 15.6 \text{ pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, \(M = 0.295\)

Space mean speed in ramp influence area, \(S = 65.3 \text{ mph}\)

Space mean speed in outer lanes, \(S = N/A \text{ mph}\)

Space mean speed for all vehicles, \(S = 65.3 \text{ mph}\)
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 1153 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 118 vph
Length of first accel/decel lane 1225 ft
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp 717 vph
Position of adjacent Ramp Upstream
Type of adjacent Ramp Off
Distance to adjacent Ramp 1475 ft

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp
Volume, V (vph) 1153 118 717 vph
Peak-hour factor, PHF 0.90 0.90 0.90
Peak 15-min volume, v15 320 33 199 v
Trucks and buses 13 2 2 %
Recreational vehicles 0 0 0 %
Terrain type: Rolling Rolling Rolling
Grade % % %
Length mi mi mi
Trucks and buses PCE, ET 2.5 2.5 2.5
Recreational vehicle PCE, ER 2.0 2.0 2.0
Heavy vehicle adjustment, $f_{HV}$ 0.837 0.971 0.971
Driver population factor, $f_P$ 1.00 1.00 1.00
Flow rate, $v_p$ 1531 135 821 pcph

Estimation of V12 Merge Areas

$$L = \text{(Equation 13-6 or 13-7)}$$
$$P = 1.000 \quad \text{Using Equation 0}$$
$$v = v (P) = 1531 \text{ pc/h}$$

Capacity Checks

\[
\begin{array}{ccc}
\text{v} & \text{Actual} & \text{Maximum} \\
\text{FO} & 1666 & 4800 \\
\text{v or v} & 0 & \text{pc/h} \\
3 & \text{av34} & \text{(Equation 13-14 or 13-17)} \\
\text{Is v or v > 2700 pc/h?} & \text{No} \\
3 & \text{av34} & \text{No} \\
\text{Is v or v > 1.5 v /2} & \text{No} \\
3 & \text{av34} & 12 \\
\text{If yes, v} & 1531 & \text{No} \\
12A & \text{(Equation 13-15, 13-16, 13-18, or 13-19)} \\
\end{array}
\]

Flow Entering Merge Influence Area

\[
\begin{array}{ccc}
\text{v} & \text{Actual} & \text{Max Desirable} \\
\text{R12} & 1666 & 4600 \\
\end{array}
\]

Level of Service Determination (if not F)

\[
\begin{array}{ccc}
\text{Density, } D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L & = 10.7 \quad \text{pc/mi/ln} \\
\text{R} & R & A \\
\text{Level of service for ramp-freeway junction areas of influence } B \\
\end{array}
\]

Speed Estimation

\[
\begin{array}{ccc}
\text{Intermediate speed variable, } M & = 0.231 \\
\text{Space mean speed in ramp influence area, } S & = 67.4 \quad \text{mph} \\
\text{Space mean speed in outer lanes, } S & = \text{N/A} \quad \text{mph} \\
\text{Space mean speed for all vehicles, } S & = 67.4 \quad \text{mph} \\
\end{array}
\]
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 1165 vph

On 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 525 ft
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp 106 vph
Position of adjacent Ramp Upstream
Type of adjacent Ramp Off
Distance to adjacent Ramp 1000 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1165</td>
<td>50</td>
<td>106 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>324</td>
<td>14</td>
<td>29 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
**Estimation of V12 Merge Areas**

\[ L = \text{(Equation 13-6 or 13-7)} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v (P) = 1547 \quad \text{pc/h} \]

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1604</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\[ v \text{ or } v > 2700 \text{ pc/h?} \]

\[ v \text{ or } v > 1.5 \quad v /2 \]

\[ v \text{ or } v > 2700 \text{ pc/h?} \quad \text{No} \]

\[ v \text{ or } v > 1.5 \quad v /2 \quad \text{No} \]

If yes, \( v = 1547 \) (Equation 13-15, 13-16, 13-18, or 13-19)

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1604</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

**Density**

\[ D = 5.475 + 0.00734 \quad v + 0.0078 \quad v - 0.00627 \quad L = 14.7 \quad \text{pc/mi}/\text{ln} \]

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

**Speed Estimation**

\[ M = 0.293 \]

\[ S = 65.3 \quad \text{mph} \]

\[ S = \text{N/A} \quad \text{mph} \]

\[ S = 65.3 \quad \text{mph} \]
**Diverge Analysis**

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 7/1/2016  
**Analysis time period:** AM Peak  
**Freeway/Dir of Travel:** I-26 EB  
**Junction:** SC 202 EB Off-Ramp  
**Analysis Year:** 2014  
**Description:** S-48 IMR

**Freeway Data**

- **Type of analysis:** Diverge  
- **Number of lanes in freeway:** 2  
- **Free-flow speed on freeway:** 75.0 mph  
- **Volume on freeway:** 1199 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:** 35 vph  
- **Length of first accel/decel lane:** 400 ft  
- **Length of second accel/decel lane:** ft

**Adjacent Ramp Data (if one exists)**

- **Does adjacent ramp exist?** Yes  
- **Volume on adjacent ramp:** 185 vph  
- **Position of adjacent ramp:** Downstream  
- **Type of adjacent ramp:** On  
- **Distance to adjacent ramp:** 1050 ft

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1199</td>
<td>35</td>
<td>185</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>333</td>
<td>10</td>
<td>51</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{(Equation 13-12 or 13-13)} \]

\[ P = 1.000 \text{ Using Equation 0} \]

\[ v = v + (v - v) P = 1652 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1652</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>1612</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>40</td>
<td>2100</td>
<td>No</td>
</tr>
</tbody>
</table>

If yes, \( v = 1652 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1652</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ D = 4.252 + 0.0086 v - 0.009 L = 14.9 \text{ pc/mi/ln} \]

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

Speed Estimation

<table>
<thead>
<tr>
<th>Intermediate speed variable, ( S )</th>
<th>0.302</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space mean speed in ramp influence area, ( S )</td>
<td>65.0 mph</td>
</tr>
<tr>
<td>Space mean speed in outer lanes, ( S )</td>
<td>N/A mph</td>
</tr>
<tr>
<td>Space mean speed for all vehicles, ( S )</td>
<td>65.0 mph</td>
</tr>
</tbody>
</table>
Diverge Analysis

Analyst:                AECOM
Agency/Co.:             AECOM
Date performed:         7/1/2016
Analysis time period:   AM Peak
Freeway/Dir of Travel:  I-26 EB
Junction:               S-48 EB Off-Ramp
Jurisdiction:           
Analysis Year:          2014
Description:  S-48 IMR

Freeway Data

Type of analysis                            Diverge
Number of lanes in freeway                  2
Free-flow speed on freeway                  75.0           mph
Volume on freeway                           1349           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                              101            vph
Length of first accel/decel lane            975            ft
Length of second accel/decel lane           ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?                   Yes
Volume on adjacent ramp                     733            vph
Position of adjacent ramp                   Downstream
Type of adjacent ramp                       On
Distance to adjacent ramp                   1725           ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1349</td>
<td>101</td>
<td>733</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>375</td>
<td>28</td>
<td>204</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV  0.806  0.971  0.971
Driver population factor, fP  1.00  1.00  1.00
Flow rate, vp  1859  116  839  pcph

Estimation of V12 Diverge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \text{ Using Equation 0} \]
\[ v = v + (v - v) P = 1859 \text{ pc/h} \]
\[ 12 R F R FD \]

Capacity Checks

<table>
<thead>
<tr>
<th>v = v</th>
<th>v = v - v</th>
<th>v</th>
<th>v or v</th>
</tr>
</thead>
<tbody>
<tr>
<td>1859</td>
<td>1743</td>
<td>116</td>
<td>0 pc/h</td>
</tr>
</tbody>
</table>

(v or v > 2700 pc/h? No)

(v or v > 1.5 v /2 No)

If yes, \( v = 1859 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

| v | 1859 | 4400 | No |

Level of Service Determination (if not F)

Density, \( D = 4.252 + 0.0086 v - 0.009 L = 11.5 \text{ pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, \( D = 0.308 \)
Space mean speed in ramp influence area, \( S = 64.8 \text{ mph} \)
Space mean speed in outer lanes, \( S = N/A \text{ mph} \)
Space mean speed for all vehicles, \( S = 64.8 \text{ mph} \)
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US 176 EB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1981 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: 112 vph
Length of first accel/decel lane: 1000 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?: Yes
Volume on adjacent ramp: 1446 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 900 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1981</td>
<td>112</td>
<td>1446 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>550</td>
<td>31</td>
<td>402 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, \( f_{HV} \) 0.806 0.971 0.971
Driver population factor, \( f_P \) 1.00 1.00 1.00
Flow rate, \( v_p \) 2729 128 1655 pcph

---

### Estimation of V12 Diverge Areas

\[
L = \quad \text{(Equation 13-12 or 13-13)}
\]

\[
E_Q
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
F_D
\]

\[
v = v + (v - v) P = 2729 \quad \text{pc/h}
\]

\[
12 \quad R \quad F \quad R \quad FD
\]

---

### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v ) = ( v )</td>
<td>2729</td>
<td>4800</td>
</tr>
<tr>
<td>( F_i )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( v )</td>
<td>2601</td>
<td>4800</td>
</tr>
<tr>
<td>( F_O )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( v )</td>
<td>128</td>
<td>2100</td>
</tr>
<tr>
<td>( R )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( v ) or ( v )</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
</tr>
<tr>
<td>( 3 ) av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \) or \( v \) > 2700 pc/h? No

\[ 3 \ \text{av34} \]

Is \( v \) or \( v \) > 1.5 \( v \) /2 No

\[ 3 \ \text{av34} \]

If yes, \( v \) = 2729

\[ 12A \]

---

### Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>2729</td>
<td>4400</td>
</tr>
<tr>
<td>( 12 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

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

Density,
\[
D = 4.252 + 0.0086 \ v - 0.009 \ L = 18.7 \ pc/mi/ln
\]

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

---

### Speed Estimation

Intermediate speed variable,
\[
D = 0.310
\]

Space mean speed in ramp influence area,
\[
S = 64.8 \ \text{mph}
\]

Space mean speed in outer lanes,
\[
S = \text{N/A} \ \text{mph}
\]

Space mean speed for all vehicles,
\[
S = 64.8 \ \text{mph}
\]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1476 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: 448 vph
Length of first accel/decel lane: 1225 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?: Yes
Volume on adjacent ramp: 167 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 775 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1476</td>
<td>448</td>
<td>167</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>410</td>
<td>124</td>
<td>46</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>mi</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.743 0.971 0.971
Driver population factor, fP 1.00 1.00 1.00
Flow rate, vp 2206 513 191 pcph

--- Estimation of V12 Diverge Areas ---

\[
L = \text{(Equation 13-12 or 13-13)}
\]

\[P = 1.000 \quad \text{Using Equation 0} \]

\[v = v + (v - v) P = 2206 \quad \text{pc/h} \quad 12 \quad F \quad R \quad \text{FD} \]

--- Capacity Checks ---

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = v</td>
<td>2206</td>
<td>4800</td>
</tr>
<tr>
<td>Fi</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>v = v - v</td>
<td>1693</td>
<td>4800</td>
</tr>
<tr>
<td>FO</td>
<td>F</td>
<td>R</td>
</tr>
<tr>
<td>v</td>
<td>513</td>
<td>2100</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v or v</td>
<td>0</td>
<td>pc/h</td>
</tr>
<tr>
<td>3</td>
<td>av34</td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \) or \( v \) > 2700 pc/h? No
Is \( v \) or \( v \) > 1.5 \( v \) /2? No
If yes, \( v = 2206 \) (Equation 13-15, 13-16, 13-18, or 13-19)

--- Flow Entering Diverge Influence Area ---

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v 12</td>
<td>2206</td>
<td>4400</td>
</tr>
</tbody>
</table>

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

Density, \( D = 4.252 + 0.0086 v - 0.009 L = 12.2 \) pc/mi/ln

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

--- Speed Estimation ---

Intermediate speed variable, \( D = 0.344 \)
Space mean speed in ramp influence area, \( S = 63.6 \) mph
Space mean speed in outer lanes, \( S = N/A \) mph
Space mean speed for all vehicles, \( S = 63.6 \) mph
**Diverge Analysis**

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 7/1/2016  
**Analysis time period:** AM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** S-48 WB Off-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2014  
**Description:** S-48 IMR

---

**Freeway Data**

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1195 vph</td>
</tr>
</tbody>
</table>

---

**Off Ramp Data**

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>442 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1225 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

**Adjacent Ramp Data (if one exists)**

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>98 vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td>Downstream</td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td>On</td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>1475 ft</td>
</tr>
</tbody>
</table>

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1195</td>
<td>442</td>
<td>98</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>332</td>
<td>123</td>
<td>27</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v + (v - v) P = 1786 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>v = v</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1786</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>v = v - v</td>
<td>1280</td>
<td>4800</td>
</tr>
<tr>
<td>v = v + (v - v) P</td>
<td>506</td>
<td>2100</td>
</tr>
</tbody>
</table>

\[ v = v + (v - v) P \]
\[ v = v = 1786 \quad \text{PC/h} \]

If yes, \( v = 1786 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = 1786</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ D = 4.252 + 0.0086 v - 0.009 L = 8.6 \quad \text{pc/mi/ln} \]

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

Speed Estimation

\[ D = 0.344 \]
\[ S = 63.7 \quad \text{mph} \]

\[ S = \text{N/A} \quad \text{mph} \]
\[ S = 63.7 \quad \text{mph} \]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 851 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 25.0 mph
Volume on ramp 25 vph
Length of first accel/decel lane 400 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp 65 vph
Position of adjacent ramp Downstream
Type of adjacent ramp On
Distance to adjacent ramp 1000 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>851</td>
<td>25</td>
<td>65</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>236</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{(Equation 13-12 or 13-13)} \]

\[ P = 1.00 \quad \text{Using Equation 0} \]

\[ v = v + (v - v) P = 1272 \text{ pc/h} \]

---

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1272</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

If yes, \( v = 1272 \)

---

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1272</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

---

Level of Service Determination (if not F)

\[ \text{Density, } \quad D = 4.252 + 0.0086 v - 0.009 L = 11.6 \text{ pc/mi/ln} \]

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

---

Intermediate speed variable, \( D = 0.561 \)

Space mean speed in ramp influence area, \( S = 56.5 \) mph

Space mean speed in outer lanes, \( S = \text{N/A} \) mph

Space mean speed for all vehicles, \( S = 56.5 \) mph
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC 202 EB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1440 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: 68 vph
Length of first accel/decel lane: 400 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 34 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1050 ft

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp
Volume, V (vph) 1440 68 34 vph
Peak-hour factor, PHF 0.90 0.90 0.90
Peak 15-min volume, v15 400 19 9 v
Trucks and buses 14 2 2 %
Recreational vehicles 0 0 0 %
Terrain type: Rolling Rolling Rolling
Grade 0.00 % 0.00 % 0.00 %
Length 0.00 mi 0.00 mi 0.00 mi
Trucks and buses PCE, ET 2.5 2.5 2.5
Recreational vehicle PCE, ER 2.0 2.0 2.0
Estimation of V12 Diverge Areas

\[
L = \text{Equation 13-12 or 13-13}
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
v = v + (v - v) P = 1936 \quad \text{pc/h}
\]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(v)</td>
<td>1936</td>
<td>4800</td>
</tr>
<tr>
<td>(v - v)</td>
<td>1858</td>
<td>4800</td>
</tr>
<tr>
<td>(v)</td>
<td>78</td>
<td>2100</td>
</tr>
<tr>
<td>(v)</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Is \(v\) or \(v\) > 2700 pc/h? No

Is \(v\) or \(v\) > 1.5 \(v\) /2 No

If yes, \(v\) = 1936 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(v)</td>
<td>1936</td>
<td>4400</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density,

\[
D = 4.252 + 0.0086 v - 0.009 L = 17.3 \quad \text{pc/mi/ln}
\]

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

Speed Estimation

Intermediate speed variable,

\[
D = 0.305
\]

Space mean speed in ramp influence area,

\[
S = 64.9 \quad \text{mph}
\]

Space mean speed in outer lanes,

\[
S = \text{N/A} \quad \text{mph}
\]

Space mean speed for all vehicles,

\[
S = 64.9 \quad \text{mph}
\]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1406 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: 103 vph
Length of first accel/decel lane: 975 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?: Yes
Volume on adjacent ramp: 501 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1725 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1406</td>
<td>103</td>
<td>501</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>391</td>
<td>29</td>
<td>139</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>%</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>mi</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV \hspace{1cm} 0.826 \hspace{1cm} 0.971 \hspace{1cm} 0.971
Driver population factor, fP \hspace{1cm} 1.00 \hspace{1cm} 1.00 \hspace{1cm} 1.00
Flow rate, vp \hspace{1cm} 1890 \hspace{1cm} 118 \hspace{1cm} 573 \hspace{1cm} pc/h

---

Estimation of V12 Diverge Areas

\[ L = \quad \text{(Equation 13-12 or 13-13)} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v + (v - v) P = 1890 \quad \text{pc/h} \]

---

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>1890</td>
<td>4800</td>
</tr>
<tr>
<td>Fi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v = v</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v = v - v</td>
<td>1772</td>
<td>4800</td>
</tr>
<tr>
<td>FO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>118</td>
<td>2100</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v or v</td>
<td>0 \hspace{1cm} \text{pc/h} \hspace{1cm} \text{(Equation 13-14 or 13-17)}</td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \text{ or } v > 2700 \text{ pc/h?} \) \hspace{1cm} No
Is \( v \text{ or } v > 1.5 \frac{v}{2} \) \hspace{1cm} No
If yes, \( v = 1890 \hspace{1cm} \text{(Equation 13-15, 13-16, 13-18, or 13-19)} \)

---

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>1890</td>
<td>4400</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Level of Service Determination (if not F)

Density, \( D = 4.252 + 0.0086 v - 0.009 \frac{L}{R} = 11.7 \quad \text{pc/mi/ln} \)

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

---

Speed Estimation

Intermediate speed variable, \( D = 0.309 \) \hspace{1cm} S
Space mean speed in ramp influence area, \( S = 64.8 \quad \text{mph} \) \hspace{1cm} R
Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \) \hspace{1cm} 0
Space mean speed for all vehicles, \( S = 64.8 \quad \text{mph} \) \hspace{1cm} 0
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US 176 EB Off-Ramp
Jurisdiction: 
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

- Type of analysis: Diverge
- Number of lanes in freeway: 2
- Free-flow speed on freeway: 75.0 mph
- Volume on freeway: 1804 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: 214 vph
- Length of first accel/decel lane: 1000 ft
- Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

- Does adjacent ramp exist?: Yes
- Volume on adjacent ramp: 814 vph
- Position of adjacent ramp: Downstream
- Type of adjacent ramp: On
- Distance to adjacent ramp: 900 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1804</td>
<td>214</td>
<td>814</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>501</td>
<td>59</td>
<td>226</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
### Heavy vehicle adjustment, \( f_{HV} \)

<table>
<thead>
<tr>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.826</td>
<td>0.971</td>
<td>0.971</td>
</tr>
</tbody>
</table>

### Driver population factor, \( f_{P} \)

<table>
<thead>
<tr>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

### Flow rate, \( v_p \)

<table>
<thead>
<tr>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2425</td>
<td>245</td>
<td>932 pcph</td>
</tr>
</tbody>
</table>

---

#### Estimation of \( V_{12} \) Diverge Areas

\[
L = \text{(Equation 13-12 or 13-13)}
\]

\[
E_Q
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
v = v + (v - v) P = 2425 \quad \text{pc/h}
\]

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Maximum ( v )</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2425 pc/h</td>
<td>4800 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Maximum ( v )</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2180 pc/h</td>
<td>4800 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Maximum ( v )</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>245 pc/h</td>
<td>2100 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

If yes, \( v = 2425 \) (Equation 13-15, 13-16, 13-18, or 13-19)

---

#### Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Max Desirable ( v )</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2425 pc/h</td>
<td>4400 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

---

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

\[
D = 4.252 + 0.0086 v - 0.009 L = 16.1 \quad \text{pc/mi/ln}
\]

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

---

#### Speed Estimation

<table>
<thead>
<tr>
<th>Expressions</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate speed variable, ( S )</td>
<td>( D = 0.320 )</td>
</tr>
<tr>
<td>Space mean speed in ramp influence area, ( S )</td>
<td>( S = 64.4 ) mph</td>
</tr>
<tr>
<td>Space mean speed in outer lanes, ( S )</td>
<td>( S = N/A ) mph</td>
</tr>
<tr>
<td>Space mean speed for all vehicles, ( S )</td>
<td>( S = 64.4 ) mph</td>
</tr>
</tbody>
</table>
**Diverge Analysis**

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 7/1/2016  
**Analysis time period:** PM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** US 176 WB Off-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2014  
**Description:** S-48 IMR

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>3049 vph</td>
</tr>
</tbody>
</table>

### Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>1312 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1225 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

### Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>133 vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td>Downstream</td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td>On</td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>775 ft</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>3049</td>
<td>1312</td>
<td>133</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>847</td>
<td>364</td>
<td>37 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v + (v - v) P = 4048 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>4048</td>
<td>4800</td>
</tr>
<tr>
<td>( v )</td>
<td>2546</td>
<td>4800</td>
</tr>
<tr>
<td>( v )</td>
<td>1502</td>
<td>2100</td>
</tr>
</tbody>
</table>

If yes, \( v \) = 4048 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>4048</td>
<td>4400</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ D = 4.252 + 0.0086 v - 0.009 L = 28.0 + \text{pc/mi/ln} \]

Speed Estimation

\[ D = 0.433 \]
\[ S = 60.7 \text{ mph} \]
\[ S = \text{N/A} \text{ mph} \]
\[ S = 60.7 \text{ mph} \]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1870 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: 717 vph
Length of first accel/decel lane: 1225 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?: Yes
Volume on adjacent ramp: 118 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1475 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1870</td>
<td>717</td>
<td>118</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>519</td>
<td>199</td>
<td>33</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{Equation 13-12 or 13-13} \]

\[ \text{FD} P = 1.00 \text{ Using Equation 0} \]

\[ v = v + (v - v) P = 2483 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>2483</td>
<td>4800</td>
</tr>
<tr>
<td>( v - v )</td>
<td>1662</td>
<td>4800</td>
</tr>
<tr>
<td>( v )</td>
<td>821</td>
<td>2100</td>
</tr>
</tbody>
</table>

If \( v \) or \( v \) > 2700 pc/h? \( v \) = 2483 pc/h (Equation 13-14 or 13-17)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>2483</td>
<td>4400</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 4.252 + 0.0086 v - 0.009 L = 14.6 \text{ pc/mi/ln} \)

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

Intermediate speed variable, \( D = 0.372 \)

Space mean speed in ramp influence area, \( S = 62.7 \text{ mph} \)

Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \)

Space mean speed for all vehicles, \( S = 62.7 \text{ mph} \)
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1271 vph</td>
</tr>
</tbody>
</table>

Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>25.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>106 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>400 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>50 vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td>Downstream</td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td>On</td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>1000 ft</td>
</tr>
</tbody>
</table>

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1271</td>
<td>106</td>
<td>50</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>353</td>
<td>29</td>
<td>14</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{(Equation 13-12 or 13-13)} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v + (v - v) P = 1688 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>1688</td>
<td>4800</td>
</tr>
<tr>
<td>( F_i ) ( F )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( v )</td>
<td>1567</td>
<td>4800</td>
</tr>
<tr>
<td>( F_O ) ( F ) ( R )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( v )</td>
<td>121</td>
<td>1900</td>
</tr>
<tr>
<td>( R )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( v ) or ( v )</td>
<td>0 pc/h</td>
<td></td>
</tr>
<tr>
<td>( R ) ( R ) ( v )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If yes, \( v = 1688 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>1688</td>
<td>4400</td>
</tr>
<tr>
<td>( 12 )</td>
<td></td>
<td></td>
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</table>

Level of Service Determination (if not F)

Density,

\[ D = 4.252 + 0.0086 v - 0.009 L = 15.2 \text{ pc/mi/ln} \]

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

Intermediate speed variable,

\[ D = 0.569 \]

Space mean speed in ramp influence area,

\[ S = 56.2 \text{ mph} \]

Space mean speed in outer lanes,

\[ S = \text{N/A} \text{ mph} \]

Space mean speed for all vehicles,

\[ S = 56.2 \text{ mph} \]
APPENDIX G

NO-BUILD 2020 HCS REPORTS
### Operational Analysis

**Analyst:** AECOM  
**Agency or Company:** AECOM  
**Date Performed:** 6/30/2016  
**Analysis Time Period:** AM Peak  
**Freeway/Direction:** I-26 EB  
**From/To:** West of SC 202  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR

### Flow Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V</td>
<td>1385 veh/h</td>
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<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>385 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>- %</td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.806</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>954 pc/h/ln</td>
</tr>
</tbody>
</table>

### Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base</td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, flW</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

### LOS and Performance Measures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>954 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>75.0 mi/h</td>
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<tr>
<td>Number of lanes, N</td>
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<tr>
<td>Density, D</td>
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<tr>
<td>Level of service, LOS</td>
<td>B</td>
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</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
### Operational Analysis

**Analyst:** AECOM  
**Agency or Company:** AECOM  
**Date Performed:** 6/30/2016  
**Analysis Time Period:** AM Peak  
**Freeway/Direction:** I-26 EB  
**From/To:** Between S-48 and SC 202  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR

### Flow Inputs and Adjustments

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<thead>
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<th>Parameter</th>
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<td>Volume, V</td>
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<tr>
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<tr>
<td>Peak 15-min volume, v15</td>
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<tr>
<td>Trucks and buses</td>
<td>16 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type: Rolling</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>- %</td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
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<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
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<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
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<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.806</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>1065 pc/h/ln</td>
</tr>
</tbody>
</table>

### Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed: Base</td>
<td></td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, flW</td>
<td>0.0 mi/h</td>
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<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
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<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

### LOS and Performance Measures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>1065 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>75.0 mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>14.2 pc/mi/ln</td>
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<tr>
<td>Level of service, LOS</td>
<td>B</td>
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</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and US 176
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 2475 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 688 v
Trucks and buses 16 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.806
Driver population factor, fp 1.00
Flow rate, vp 1705 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, flW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

 LOS and Performance Measures

Flow rate, vp 1705 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 69.5 mi/h
Number of lanes, N 2
Density, D 24.5 pc/mi/ln
Level of service, LOS C
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: East of US176
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

<table>
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<th>Value</th>
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</thead>
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<tr>
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<tr>
<td>Peak 15-min volume, v15</td>
<td>1086 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type: Rolling</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td></td>
</tr>
<tr>
<td>Segment length</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.806</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
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<tr>
<td>Flow rate, vp</td>
<td>2693 pc/h/ln</td>
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Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed: Base</td>
<td></td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

LOS and Performance Measures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>2693 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>43.3 mi/h</td>
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<tr>
<td>Number of lanes, N</td>
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<td>Density, D</td>
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<td>Level of service, LOS</td>
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Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: East of US 176
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

<table>
<thead>
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<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Volume, V</td>
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</tr>
<tr>
<td>Trucks and buses</td>
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</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>- %</td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
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<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
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<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.743</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>1506 pc/h/ln</td>
</tr>
</tbody>
</table>

Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base</td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

LOS and Performance Measures

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>1506 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>72.2 mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
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<tr>
<td>Density, D</td>
<td>20.9 pc/mi/ln</td>
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<tr>
<td>Level of service, LOS</td>
<td>C</td>
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</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and US 176
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Volume, V</td>
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</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>476 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>- %</td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.743</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>1280 pc/h/ln</td>
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Speed Inputs and Adjustments

<table>
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<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed: Base</td>
<td>Base</td>
</tr>
<tr>
<td>Free-flow speed: FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
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<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

LOS and Performance Measures

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>1280 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>17.3 pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>B</td>
</tr>
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</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM  
Agency or Company: AECOM  
Date Performed: 6/30/2016  
Analysis Time Period: AM Peak  
Freeway/Direction: I-26 WB  
From/To: Between S-48 and SC 202  
Jurisdiction:  
Analysis Year: 2020 No-Build  
Description: S-48 IMR

Flow Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Volume, V</td>
<td>1004 veh/h</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>279 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
</tr>
<tr>
<td>Segment length</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.743</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>750 pc/h/ln</td>
</tr>
</tbody>
</table>

Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base 75.4 mi/h</td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td></td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
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<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
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</table>

LOS and Performance Measures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>750 pc/h/ln</td>
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<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
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<tr>
<td>Average passenger-car speed, S</td>
<td>75.0 mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>10.0 pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>A</td>
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</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: West of SC 202
Jurisdiction:  
Analysis Year: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1047 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 291 veh
Trucks and buses 23 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade -%
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.743
Driver population factor, fp 1.00
Flow rate, vp 782 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
    FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 782 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 75.0 mi/h
Number of lanes, N 2
Density, D 10.4 pc/mi/ln
Level of service, LOS A
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: West of SC 202
Jurisdiction: 
Analysis Year: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1714 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 476 v
Trucks and buses 14 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 1152 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1152 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 74.7 mi/h
Number of lanes, N 2
Density, D 15.4 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1677 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 466 v
Trucks and buses 14 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 1127 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
  FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1127 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 74.8 mi/h
Number of lanes, N 2
Density, D 15.1 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
HCS 2010: Basic Freeway Segments Release 6.65

Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and US 176
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 2499 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 694 v
Trucks and buses 14 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 1680 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1680 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 69.9 mi/h
Number of lanes, N 2
Density, D 24.0 pc/mi/ln
Level of service, LOS C
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: East of US176
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Volume, V</td>
<td>3144  veh/h</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>873   v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14    %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0     %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>-     %</td>
</tr>
<tr>
<td>Segment length</td>
<td>-     mi</td>
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<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
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<td>Heavy vehicle adjustment, fHV</td>
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<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>2113  pc/h/ln</td>
</tr>
</tbody>
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Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0  ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0   ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33  ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base</td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4  mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
<td>0.0   mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0   mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3   mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1  mi/h</td>
</tr>
</tbody>
</table>

LOS and Performance Measures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>2113  pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1  mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>61.3  mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>34.5  pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>D</td>
</tr>
</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: East of US 176
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

| Volume, V | 3790 veh/h |
| Peak-hour factor, PHF | 0.90 |
| Peak 15-min volume, v15 | 1053 v |
| Trucks and buses | 13 % |
| Recreational vehicles | 0 % |
| Terrain type: Rolling |
| Grade | - % |
| Segment length | - mi |
| Trucks and buses PCE, ET | 2.5 |
| Recreational vehicle PCE, ER | 2.0 |
| Heavy vehicle adjustment, fHV | 0.837 |
| Driver population factor, fp | 1.00 |
| Flow rate, vp | 2516 pc/h/ln |

Speed Inputs and Adjustments

| Lane width | 12.0 ft |
| Right-side lateral clearance | 6.0 ft |
| Total ramp density, TRD | 0.33 ramps/mi |
| Number of lanes, N | 2 |
| Free-flow speed: Base |
| FFS or BFFS | 75.4 mi/h |
| Lane width adjustment, fLW | 0.0 mi/h |
| Lateral clearance adjustment, fLC | 0.0 mi/h |
| TRD adjustment | 1.3 mi/h |
| Free-flow speed, FFS | 74.1 mi/h |

LOS and Performance Measures

| Flow rate, vp | 2516 pc/h/ln |
| Free-flow speed, FFS | 74.1 mi/h |
| Average passenger-car speed, S | 49.6 mi/h |
| Number of lanes, N | 2 |
| Density, D | 50.8 pc/mi/ln |
| Level of service, LOS | F |
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and US 176
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 2523 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 701 v
Trucks and buses 13 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.837
Driver population factor, fp 1.00
Flow rate, vp 1675 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
  FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1675 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 70.0 mi/h
Number of lanes, N 2
Density, D 23.9 pc/mi/ln
Level of service, LOS C
Overall results are not computed when free-flow speed is less than 55 mph.
### Operational Analysis

**Analyst:** AECOM  
**Agency or Company:** AECOM  
**Date Performed:** 6/30/2016  
**Analysis Time Period:** PM Peak  
**Freeway/Direction:** I-26 WB  
**From/To:** Between S-48 and SC 202  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR

### Flow Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V</td>
<td>1519</td>
<td>veh/h</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>422</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>%</td>
</tr>
<tr>
<td>recreational vehicles</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>-</td>
<td>%</td>
</tr>
<tr>
<td>Segment length</td>
<td>-</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.837</td>
<td></td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>1008</td>
<td>pc/h/ln</td>
</tr>
</tbody>
</table>

### Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0</td>
<td>ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0</td>
<td>ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33</td>
<td>ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base</td>
<td></td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4</td>
<td>mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, flW</td>
<td>0.0</td>
<td>mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0</td>
<td>mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3</td>
<td>mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1</td>
<td>mi/h</td>
</tr>
</tbody>
</table>

### LOS and Performance Measures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>1008</td>
<td>pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1</td>
<td>mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>75.0</td>
<td>mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Density, D</td>
<td>13.4</td>
<td>pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
**Operational Analysis**

Analyst: AECOM  
Agency or Company: AECOM  
Date Performed: 6/30/2016  
Analysis Time Period: PM Peak  
Freeway/Direction: I-26 WB  
From/To: West of SC 202  
Jurisdiction:  
Analysis Year: 2020 No-Build  
Description: S-48 IMR

**Flow Inputs and Adjustments**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Volume, V</td>
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<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>405 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>- %</td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.837</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>969 pc/h/ln</td>
</tr>
</tbody>
</table>

**Speed Inputs and Adjustments**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base</td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

**LOS and Performance Measures**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>969 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>75.0 mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>12.9 pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>B</td>
</tr>
</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Freeway Merge and Diverge Segments

Phone:                                      Fax:
E-mail:

------------------------------------------- Merge Analysis -------------------------------------------

Analyst:                AECOM
Agency/Co.:             AECOM
Date performed:         6/30/2016
Analysis time period:   AM Peak
Freeway/Dir of Travel:  I-26 EB
Junction:               SC-202 EB On-Ramp
Jurisdiction:           
Analysis Year:          2020 No-Build
Description:  S-48 IMR

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

Type of analysis                            Merge
Number of lanes in freeway                  2
Free-flow speed on freeway                  75.0           mph
Volume on freeway                           1347           vph

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

Side of freeway                             Right
Number of lanes in ramp                     1
Free-flow speed on ramp                     25.0           mph
Volume on ramp                              199            vph
Length of first accel/decel lane            400            ft
Length of second accel/decel lane           ft

------------------------------------------- Adjacent Ramp Data (if one exists) -------------------------------------------

Does adjacent ramp exist?                   Yes
Volume on adjacent Ramp                     38             vph
Position of adjacent Ramp                   Upstream
Type of adjacent Ramp                       Off
Distance to adjacent Ramp                   1050           ft

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

Junction Components                        Freeway    Ramp    Adjacent
Volume, V (vph)                             1347       199      38             vph
Peak-hour factor, PHF                       0.90       0.90     0.90
Peak 15-min volume, v15                    374        55       11             v
Trucks and buses                           16         2        2             %
Recreational vehicles                      0          0        0             %
Terrain type:                             Rolling     Rolling   Rolling
    Grade                                  %           %           %
    Length                                 mi          mi          mi
    Trucks and buses PCE, ET                2.5        2.5       2.5
    Recreational vehicle PCE, ER           2.0        2.0       2.0
Heavy vehicle adjustment, \( f_{HV} \)          \ 0.806       0.971       0.971
Driver population factor, \( f_P \)           \ 1.00       1.00       1.00
Flow rate, \( v_p \)                          \ 1856       228         43 pcph

_________________________Estimation of V12 Merge Areas_________________________

\[ L = \text{EQ} \]  
\[ P = 1.000 \text{ Using Equation 0} \]  
\[ v = v_{12} (P) = 1856 \text{ pc/h} \]

_______________________________Capacity Checks_________________________________

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v_{FO} )</td>
<td>2084</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>( v_{av34} )</td>
<td>0 pc/h</td>
<td></td>
<td>(Equation 13-14 or 13-17)</td>
</tr>
<tr>
<td>Is ( v_{av34} &gt; 2700 \text{ pc/h}? )</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is ( v_{av34} &gt; 1.5 \frac{v_{12}}{2} )</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If yes, \( v_{12A} = 1856 \text{ (Equation 13-15, 13-16, 13-18, or 13-19)} \)

________________________Flow Entering Merge Influence Area_______________________

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v_{R12} )</td>
<td>2084</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

_________________Level of Service Determination (if not F)_______________________

Density, \( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.1 \text{ pc/mi/ln} \)

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

_____________________________Speed Estimation_________________________________

Intermediate speed variable, \( M = 0.332 \)
Space mean speed in ramp influence area, \( S = 64.0 \text{ mph} \)
Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \)
Space mean speed for all vehicles, \( S = 64.0 \text{ mph} \)
HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone:                                     Fax:
E-mail:_________________________________

---------------Merge Analysis-----------------------------

Analyst:                AECOM
Agency/Co.:             AECOM
Date performed:         6/30/2016
Analysis time period:   AM Peak
Freeway/Dir of Travel:  I-26 EB
Junction:               S-48 EB On-Ramp
Jurisdiction:           
Analysis Year:          2020 No-Build
Description:            S-48 IMR

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

Type of analysis                            Merge
Number of lanes in freeway                  2
Free-flow speed on freeway                  75.0           mph
Volume on freeway                           1382           vph

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

Side of freeway                             Right
Number of lanes in ramp                     1
Free-flow speed on ramp                     45.0           mph
Volume on ramp                              1093           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?                   Yes
Volume on adjacent Ramp                     164            vph
Position of adjacent Ramp                   Upstream
Type of adjacent Ramp                       Off
Distance to adjacent Ramp                   1725           ft

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

Junction Components                    Freeway   Ramp   Adjacent   Ramp
Volume, V (vph)                        1382       1093      164       vph
Peak-hour factor, PHF                  0.90       0.90      0.90
Peak 15-min volume, v15                384        304       46        v
Trucks and buses                       16         2        2         %
Recreational vehicles                  0          0        0         %
Terrain type:                          Rolling    Rolling    Rolling
Grade                                %          %         %
Length                                mi         mi         mi
Trucks and buses PCE, ET              2.5        2.5       2.5
Recreational vehicle PCE, ER          2.0        2.0       2.0
Estimation of V12 Merge Areas

\[
L = \text{(Equation 13-6 or 13-7)}
\]
\[
P = 1.000 \quad \text{Using Equation 0}
\]
\[
v = v (P) = 1904 \quad \text{pc/h}
\]

Capacity Checks

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(v) FO</td>
<td>3155</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>(v \text{ or } v) 3 av34</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
<td></td>
</tr>
<tr>
<td>Is (v \text{ or } v) 3 av34 &gt; 2700 pc/h?</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is (v \text{ or } v) 3 av34 &gt; 1.5 (v) / 2</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, (v) 12A = 1904</td>
<td>(Equation 13-15, 13-16, 13-18, or 13-19)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(v) R12</td>
<td>3155</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \(D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 L = 20.1 \quad \text{pc/mi/ln}
\]

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

Speed Estimation

Intermediate speed variable, \(M = 0.277\)

Space mean speed in ramp influence area, \(S = 65.8 \quad \text{mph}\)

Space mean speed in outer lanes, \(S = \text{N/A} \quad \text{mph}\)

Space mean speed for all vehicles, \(S = 65.8 \quad \text{mph}\)
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US176 EB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2354 vph

On Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 25.0 mph
Volume on ramp: 1555 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?: Yes
Volume on adjacent Ramp: 121 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 900 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2354</td>
<td>1555</td>
<td>121</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>654</td>
<td>432</td>
<td>34</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Level</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV \[ 0.806 \quad 0.971 \quad 0.990 \]
Driver population factor, fP \[ 1.00 \quad 1.00 \quad 1.00 \]
Flow rate, v_p \[ 3243 \quad 1780 \quad 136 \quad \text{pcph} \]

---

Estimation of V12 Merge Areas

\[ L = \quad \text{(Equation 13-6 or 13-7)} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v \quad (P \quad F) = 3243 \quad \text{pc/h} \]

---

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>5023</td>
<td>4800</td>
</tr>
</tbody>
</table>

\( v \) or \( v \) > 2700 pc/h (Equation 13-14 or 13-17)
\( \text{av34} \)

Is \( v \) or \( v \) > \( 1.5 \frac{v}{12} \)? No
\( \text{av34} \)

If yes, \( v = 3243 \) (Equation 13-15, 13-16, 13-18, or 13-19)

---

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>5023</td>
<td>4600</td>
</tr>
</tbody>
</table>

---

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L \)
\[ R \quad 12 \quad A \]

Level of service for ramp-freeway junction areas of influence \( F \)

---

Speed Estimation

Intermediate speed variable, \( M = 0.838 \)
Space mean speed in ramp influence area, \( S = 47.3 \quad \text{mph} \)
Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \)
Space mean speed for all vehicles, \( S = 47.3 \quad \text{mph} \)
## Merge Analysis

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 6/30/2016  
**Analysis time period:** AM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** US 176 WB On-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1533 vph</td>
</tr>
</tbody>
</table>

### On Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>25.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>180 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1425 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

### Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>482 vph</td>
</tr>
<tr>
<td>Position of adjacent Ramp</td>
<td>Upstream</td>
</tr>
<tr>
<td>Type of adjacent Ramp</td>
<td>Off</td>
</tr>
<tr>
<td>Distance to adjacent Ramp</td>
<td>775 ft</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1533</td>
<td>180</td>
<td>482</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>426</td>
<td>50</td>
<td>134</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v (P) = 2291 \quad \text{pc/h} \]

Capacity Checks

\[
\begin{array}{c|c|c|c}
\text{v} & \text{Actual} & \text{Maximum} & \text{LOS F?} \\
\text{FO} & 2497 & 4800 & \text{No} \\
\text{v or } v & 0 & \text{pc/h} & \text{(Equation 13-14 or 13-17)} \\
\text{av34} & & & \\
\text{Is } v \text{ or } v & > 2700 \quad \text{pc/h?} & \text{No} \\
\text{av34} & & & \\
\text{Is } v \text{ or } v & > 1.5 \frac{v}{2} & \text{No} \\
\text{av34} & & & \\
\text{If yes, } v & = 2291 & \text{(Equation 13-15, 13-16, 13-18, or 13-19)} \\
\text{12A} & & & \\
\end{array}
\]

Flow Entering Merge Influence Area

\[
\begin{array}{c|c|c|c}
\text{v} & \text{Actual} & \text{Max Desirable} & \text{Violation?} \\
\text{R12} & 2497 & 4600 & \text{No} \\
\end{array}
\]

Level of Service Determination (if not F)

\[
\text{Density, } D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.9 \quad \text{pc/mi/ln} \\
\text{R} & \text{R} & 12 & \text{A} \\
\text{Level of service for ramp-freeway junction areas of influence B} \\
\]

Speed Estimation

\[
\begin{array}{c|c|c|c}
\text{Intermediate speed variable,} & M = 0.297 \\
\text{S} & & & \\
\text{Space mean speed in ramp influence area,} & S = 65.2 \quad \text{mph} \\
\text{R} & & & \\
\text{Space mean speed in outer lanes,} & S = \text{N/A} \quad \text{mph} \\
\text{0} & & & \\
\text{Space mean speed for all vehicles,} & S = 65.2 \quad \text{mph} \\
\end{array}
\]
**Merge Analysis**

Analyst: AECOM  
Agency/Co.: AECOM  
Date performed: 6/30/2016  
Analysis time period: AM Peak  
Freeway/Dir of Travel: I-26 WB  
Junction: S-48 WB On-Ramp  
Jurisdiction:  
Analysis Year: 2020 No-Build  
Description: S-48 IMR

**Freeway Data**

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>863 vph</td>
</tr>
</tbody>
</table>

**On Ramp Data**

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>141 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1225 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

**Adjacent Ramp Data (if one exists)**

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>850 vph</td>
</tr>
<tr>
<td>Position of adjacent Ramp</td>
<td>Upstream</td>
</tr>
<tr>
<td>Type of adjacent Ramp</td>
<td>Off</td>
</tr>
<tr>
<td>Distance to adjacent Ramp</td>
<td>1475 ft</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>863</td>
<td>141</td>
<td>850</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>240</td>
<td>39</td>
<td>236</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, \(f_{HV}\) 0.743 0.971 0.971
Driver population factor, \(f_{P}\) 1.00 1.00 1.00
Flow rate, \(v_p\) 1290 161 973 pcph

---

**Estimation of V12 Merge Areas**

\[
L = \text{Equation 13-6 or 13-7}
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
v = v_{12} \left( P \frac{F}{FM} \right) = 1290 \text{ pc/h}
\]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual (v)</th>
<th>Maximum (v)</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1451</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\[
v_{3\text{av}34} \text{ or } v_{3\text{av}34} \quad > 2700 \text{ pc/h}\]  \(\text{No}\)

\[
v_{3\text{av}34} \text{ or } v_{3\text{av}34} \quad > 1.5 \frac{v_{12}}{2}\]  \(\text{No}\)

If yes, \(v_{12} = 1290\) \(\text{No}\)  \(\text{Equation 13-15, 13-16, 13-18, or 13-19}\)

---

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>Actual (v)</th>
<th>Max Desirable (v)</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1451</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

---

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

\[
\text{Density, } D = 5.475 + 0.00734 \quad v + 0.0078 \quad v - 0.00627 \quad L = 9.0 \quad \text{pc/mi/ln}
\]

\[
\text{Level of service for ramp-freeway junction areas of influence A}
\]

---

**Speed Estimation**

Intermediate speed variable, \(M = 0.227\)

Space mean speed in ramp influence area, \(S = 67.5\) mph

Space mean speed in outer lanes, \(S = \text{N/A}\) mph

Space mean speed for all vehicles, \(S = 67.5\) mph
HCS 2010: Freeway Merge and Diverge Segments Release 6.65

__________________________________________________________
Merge Analysis
__________________________________________________________

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

__________________________________________________________
Freeway Data
__________________________________________________________

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 977 vph

__________________________________________________________
On Ramp Data
__________________________________________________________

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 45.0 mph
Volume on ramp: 70 vph
Length of first accel/decel lane: 525 ft
Length of second accel/decel lane: ft

_______________________________
Adjacent Ramp Data (if one exists)
_______________________________

Does adjacent ramp exist? Yes
Volume on adjacent Ramp: 27 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 1000 ft

_________________________
Conversion to pc/h Under Base Conditions
_________________________

Junction Components          Freeway     Ramp     Adjacent Ramp
Volume, V (vph)              977         70        27         vph
Peak-hour factor, PHF        0.90        0.90       0.90
Peak 15-min volume, v15      271         19        8          v
Trucks and buses             23          2         2          %
Recreational vehicles        0           0         0          %
Terrain type:
                         Rolling     Rolling     Rolling
Grade                     %           %           %
Length                    mi          mi          mi
Trucks and buses PCE, ET    2.5         2.5        2.5
Recreational vehicle PCE, ER 2.0         2.0        2.0
**Estimation of V12 Merge Areas**

\[
L = \text{EQ}
\]
\[
P = 1.000 \quad \text{Using Equation 0}
\]
\[
v = v \left(\frac{P}{F}\right) = 1460 \quad \text{pc/h}
\]

**Capacity Checks**

<table>
<thead>
<tr>
<th>v (PC)</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1540</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>v or v</th>
<th>0 pc/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 av34</td>
<td></td>
</tr>
</tbody>
</table>

Is v or v > 2700 pc/h? No

<table>
<thead>
<tr>
<th>v or v</th>
<th>&gt; 1.5 v /2</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 av34</td>
<td>12</td>
</tr>
</tbody>
</table>

If yes, v = 1460 (Equation 13-15, 13-16, 13-18, or 13-19)

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>v (PC)</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1540</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

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

Density, \( D = 5.475 + 0.00734 \, v + 0.0078 \, v - 0.00627 \, L = 14.2 \, \text{pc/mi/ln} \)

**Speed Estimation**

Intermediate speed variable, \( M = 0.292 \)

Space mean speed in ramp influence area, \( S = 65.4 \, \text{mph} \)

Space mean speed in outer lanes, \( S = \text{N/A} \, \text{mph} \)

Space mean speed for all vehicles, \( S = 65.4 \, \text{mph} \)
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC-202 EB On-Ramp
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1640 vph

On Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 25.0 mph
Volume on ramp: 37 vph
Length of first accel/decel lane: 400 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp: 74 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 1050 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1640</td>
<td>37</td>
<td>74 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>456</td>
<td>10</td>
<td>21 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV: 0.826 0.971 0.971
Driver population factor, fp: 1.00 1.00 1.00
Flow rate, vp: 2205 42 85 pcph

Estimation of V12 Merge Areas

\[ L = \frac{\text{EQ}}{P} = \frac{1.000}{1.00} \text{ Using Equation 0} \]
\[ v = v_{12} \left( P_{FM} \right) = 2205 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>v</th>
<th>FO</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2247</td>
<td>4800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

\[ v_{3} = v_{av34} \geq 0 \text{ pc/h} \text{ (Equation 13-14 or 13-17)} \]
\[ v_{3} = v_{av34} > 2700 \text{ pc/h? No} \]
\[ v_{3} = v_{av34} > 1.5 \frac{v_{12}}{2} \text{ No} \]
If yes, \[ v_{12A} = 2205 \text{ (Equation 13-15, 13-16, 13-18, or 13-19)} \]

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>v</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2247</td>
<td>4600</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \[ D = 5.475 + 0.00734 v_{R} + 0.0078 v_{0} - 0.00627 L_{A} = 20.5 \text{ pc/mi/ln} \]
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, \[ M = 0.338 \]
Space mean speed in ramp influence area, \[ S_{R} = 63.8 \text{ mph} \]
Space mean speed in outer lanes, \[ S_{0} = \text{N/A} \text{ mph} \]
Space mean speed for all vehicles, \[ S = 63.8 \text{ mph} \]
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB On-Ramp
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1503 vph

On Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 45.0 mph
Volume on ramp: 996 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?: Yes
Volume on adjacent Ramp: 174 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 1725 ft

Conversions to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1503</td>
<td>996</td>
<td>174</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>418</td>
<td>277</td>
<td>48</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type: Rolling</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Grade Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.826 0.971 0.971
Driver population factor, fP 1.00 1.00 1.00
Flow rate, vp 2021 1140 199 pcph

Estimation of V12 Merge Areas

\[ L = \frac{Q}{P} \quad \text{(Equation 13-6 or 13-7)} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = \frac{v}{F} = 2021 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>3161</td>
<td>4800</td>
</tr>
<tr>
<td>FO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ v \quad \text{or} \quad v > 2700 \quad \text{pc/h} \quad \text{(Equation 13-14 or 13-17)} \]
\[ v < \frac{v}{F} \quad \text{or} \quad \text{av34} > 1.5 \frac{v}{R} \quad \text{No} \]
\[ v < \frac{v}{F} \quad \text{or} \quad \text{av34} > 1.5 \frac{v}{R} \quad \text{No} \]

If yes, \( v = 2021 \) \quad \text{(Equation 13-15, 13-16, 13-18, or 13-19)}

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>3161</td>
<td>4600</td>
</tr>
<tr>
<td>R12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.2 \quad \text{pc/mi/ln} \)
Level of service for ramp-freeway junction areas of influence \( C \)

Speed Estimation

Intermediate speed variable, \( M = 0.278 \)
Space mean speed in ramp influence area, \( S = 65.8 \quad \text{mph} \)
Space mean speed in outer lanes, \( S = 0 \quad \text{mph} \)
Space mean speed for all vehicles, \( S = 65.8 \quad \text{mph} \)
**Merge Analysis**

Analyst: AECOM  
Agency/Co.: AECOM  
Date performed: 6/30/2016  
Analysis time period: PM Peak  
Freeway/Dir of Travel: I-26 EB  
Junction: US176 EB On-Ramp  
Jurisdiction:  
Analysis Year: 2020 No-Build  
Description: S-48 IMR

---

**Freeway Data**

Type of analysis: Merge  
Number of lanes in freeway: 2  
Free-flow speed on freeway: 75.0 mph  
Volume on freeway: 2269 vph

---

**On Ramp Data**

Side of freeway: Right  
Number of lanes in ramp: 1  
Free-flow speed on ramp: 25.0 mph  
Volume on ramp: 875 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? Yes  
Volume on adjacent Ramp: 230 vph  
Position of adjacent Ramp: Upstream  
Type of adjacent Ramp: Off  
Distance to adjacent Ramp: 900 ft

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2269</td>
<td>875</td>
<td>230</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>630</td>
<td>243</td>
<td>64</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Level</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v \left( \frac{P}{F} \right) = 3051 \quad \text{pc/h} \]

Capacity Checks

\[
\begin{array}{ccc}
\text{v} & \text{Actual} & \text{Maximum} & \text{LOS F?} \\
\text{FO} & 4052 & 4800 & \text{No} \\
\text{v or v} & 0 \quad \text{pc/h} & (\text{Equation 13-14 or 13-17}) \\
\text{av34} & 3 & & \\
\text{Is v or v} & > 2700 \quad \text{pc/h?} & \text{No} \\
\text{av34} & 3 & & \\
\text{Is v or v} & > 1.5 \frac{v}{2} & \text{No} \\
\text{av34} & 3 & & \\
\text{If yes, v} & = 3051 & (\text{Equation 13-15, 13-16, 13-18, or 13-19}) \\
\text{12A} & & & \\
\end{array}
\]

Flow Entering Merge Influence Area

\[
\begin{array}{ccc}
\text{v} & \text{Actual} & \text{Max Desirable} & \text{Violation?} \\
\text{R12} & 4052 & 4600 & \text{No} \\
\end{array}
\]

Level of Service Determination (if not F)

\[
\begin{align*}
\text{Density, } D &= 5.475 + 0.00734 \text{ v} + 0.0078 \text{ v} - 0.00627 \text{ L} \\
&= 27.2 \quad \text{pc/mi/ln} \\
\text{R} & \quad \text{R} & \quad 12 & \quad \text{A} \\
\text{Level of service for ramp-freeway junction areas of influence} & \text{ C} \\
\end{align*}
\]

Speed Estimation

\[
\begin{array}{ccc}
\text{Intermediate speed variable, } & M &= 0.470 \\
\text{Space mean speed in ramp influence area, } & S &= 59.5 \quad \text{mph} \\
\text{Space mean speed in outer lanes, } & S &= \text{N/A} \quad \text{mph} \\
\text{Space mean speed for all vehicles, } & S &= 59.5 \quad \text{mph} \\
\end{array}
\]
**Merge Analysis**

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 6/30/2016  
**Analysis time period:** PM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** US 176 WB On-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR  

---

**Freeway Data**

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0  mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>2380  vph</td>
</tr>
</tbody>
</table>

---

**On Ramp Data**

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>25.0  mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>143   vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1425  ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

**Adjacent Ramp Data (if one exists)**

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>1410 vph</td>
</tr>
<tr>
<td>Position of adjacent Ramp</td>
<td>Upstream</td>
</tr>
<tr>
<td>Type of adjacent Ramp</td>
<td>Off</td>
</tr>
<tr>
<td>Distance to adjacent Ramp</td>
<td>775 ft</td>
</tr>
</tbody>
</table>

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2380</td>
<td>143</td>
<td>1410 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>661</td>
<td>40</td>
<td>392 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \quad \text{(Equation 13-6 or 13-7)} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v (P) = 3160 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3324</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

Is \( v_{av_{34}} > 2700 \quad \text{pc/h?} \) No

Is \( v_{av_{34}} > 1.5 \frac{v_{12}}{2} \) No

If yes, \( v_{12A} = 3160 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3324</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.4 \quad \text{pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, \( M = 0.358 \)

Space mean speed in ramp influence area, \( S = 63.2 \quad \text{mph} \)

Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \)

Space mean speed for all vehicles, \( S = 63.2 \quad \text{mph} \)
### Merge Analysis

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 6/30/2016  
**Analysis time period:** PM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** S-48 WB On-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR

### Freeway Data

- **Type of analysis:** Merge  
- **Number of lanes in freeway:** 2  
- **Free-flow speed on freeway:** 75.0 mph  
- **Volume on freeway:** 1323 vph

### On Ramp Data

- **Side of freeway:** Right  
- **Number of lanes in ramp:** 1  
- **Free-flow speed on ramp:** 45.0 mph  
- **Volume on ramp:** 196 vph  
- **Length of first accel/decel lane:** 1225 ft  
- **Length of second accel/decel lane:** ft

### Adjacent Ramp Data (if one exists)

- **Does adjacent ramp exist?** Yes  
- **Volume on adjacent Ramp:** 1200 vph  
- **Position of adjacent Ramp:** Upstream  
- **Type of adjacent Ramp:** Off  
- **Distance to adjacent Ramp:** 1475 ft

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume, V (vph)</strong></td>
<td>1323</td>
<td>196</td>
<td>1200</td>
</tr>
<tr>
<td><strong>Peak-hour factor, PHF</strong></td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td><strong>Peak 15-min volume, v15</strong></td>
<td>368</td>
<td>54</td>
<td>333</td>
</tr>
<tr>
<td><strong>Trucks and buses</strong></td>
<td>13</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Recreational vehicles</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Terrain type:</strong></td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td><strong>Trucks and buses PCE, ET</strong></td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Recreational vehicle PCE, ER</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v \left( P \right) = \frac{1757}{F} \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

If yes, \( v = 1757 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 L = 13.1 \quad \text{pc/mi/ln} \)

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

Speed Estimation

\( M = 0.239 \)
\( S = 67.1 \quad \text{mph} \)
\( S = N/A \quad \text{mph} \)
\( S = 67.1 \quad \text{mph} \)
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction: 2020 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1405 vph

On Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 45.0 mph
Volume on ramp: 54 vph
Length of first accel/decel lane: 525 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?: Yes
Volume on adjacent Ramp: 114 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 1000 ft

Conversion to pc/h Under Base Conditions

Junction Components

<table>
<thead>
<tr>
<th>Volume, V (vph)</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1405</td>
<td>54</td>
<td>114</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peak-hour factor, PHF</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peak 15-min volume, v15</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>390</td>
<td>15</td>
<td>32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trucks and buses</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recreational vehicles</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terrain type:</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>Freeway</td>
<td>Ramp</td>
<td>Adjacent Ramp</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recreational vehicle PCE, ER</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]

\[ P = 1.000 \text{ Using Equation 0} \]

\[ v = v (P) = 1866 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v FO</td>
<td>1928</td>
<td>4800</td>
</tr>
<tr>
<td>v or v</td>
<td>0</td>
<td>pc/h</td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \) or \( v \) > 2700 pc/h? No

Is \( v \) or \( v \) > 1.5 \( v \) /2 No

If yes, \( v = 1866 \) (Equation 13-15, 13-16, 13-18, or 13-19) 12A

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v R12</td>
<td>1928</td>
<td>4600</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density,

\[ D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.2 \text{ pc/mi/ln} \]

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

Speed Estimation

Intermediate speed variable,

\[ M = 0.301 \]

Space mean speed in ramp influence area,

\[ S = 65.1 \text{ mph} \]

Space mean speed in outer lanes,

\[ S = N/A \text{ mph} \]

Space mean speed for all vehicles,

\[ S = 65.1 \text{ mph} \]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC 202 EB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1385 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: 38 vph
Length of first accel/decel lane: 400 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 199 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1050 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1385</td>
<td>38</td>
<td>199</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>385</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, \( f_{HV} \) 0.806 0.971 0.971
Driver population factor, \( f_P \) 1.00 1.00 1.00
Flow rate, \( v_p \) 1908 43 228 pcph

Estimation of V12 Diverge Areas

\[
L = \quad \text{(Equation 13-12 or 13-13)}
\]
\[
E_Q
\]
\[
P = 1.000 \quad \text{Using Equation 0}
\]
\[
F_D
\]
\[
v = v + (v - v) P = 1908 \quad \text{pc/h}
\]
\[
12 \quad R \quad F \quad R \quad F_D
\]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(v = v)</td>
<td>1908</td>
<td>4800</td>
</tr>
<tr>
<td>(v = v - v)</td>
<td>1865</td>
<td>4800</td>
</tr>
<tr>
<td>(v)</td>
<td>43</td>
<td>2100</td>
</tr>
<tr>
<td>(v) or (v)</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
</tr>
<tr>
<td>(3 \quad a v_{34})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Is \quad v \quad or \quad v) &gt; 2700 pc/h?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>(3 \quad a v_{34})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Is \quad v \quad or \quad v) &gt; 1.5 (v) /2</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>(3 \quad a v_{34})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, (v) = 1908</td>
<td>(Equation 13-15, 13-16, 13-18, or 13-19)</td>
<td></td>
</tr>
<tr>
<td>(12A)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(v)</td>
<td>1908</td>
<td>4400</td>
</tr>
<tr>
<td>(12)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[
D = 4.252 + 0.0086 v - 0.009 L = 17.1 \quad \text{pc/mi/ln}
\]
\[
R \quad 12 \quad D
\]

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

Speed Estimation

Intermediate speed variable, \( S \) = 0.302
Space mean speed in ramp influence area, \( S = 65.0 \) mph
Space mean speed in outer lanes, \( S = N/A \) mph
Space mean speed for all vehicles, \( S = 65.0 \) mph
**Diverge Analysis**

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 7/1/2016  
**Analysis time period:** AM Peak  
**Freeway/Dir of Travel:** I-26 EB  
**Junction:** S-48 EB Off-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR

---

### Freeway Data

- **Type of analysis:** Diverge  
- **Number of lanes in freeway:** 2  
- **Free-flow speed on freeway:** 75.0 mph  
- **Volume on freeway:** 1546 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:** 164 vph  
- **Length of first accel/decel lane:** 975 ft  
- **Length of second accel/decel lane:** ft

---

### Adjacent Ramp Data (if one exists)

- **Does adjacent ramp exist?:** Yes  
- **Volume on adjacent ramp:** 1093 vph  
- **Position of adjacent ramp:** Downstream  
- **Type of adjacent ramp:** On  
- **Distance to adjacent ramp:** 1725 ft

---

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1546</td>
<td>164</td>
<td>1093</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>429</td>
<td>46</td>
<td>304</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00 %</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.806 0.971 0.971  
Driver population factor, fP 1.00 1.00 1.00  
Flow rate, vp 2130 188 1251 pcph

Estimation of V12 Diverge Areas

\[ L = \frac{EQ}{P} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v + (v - v) P = 2130 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = v</td>
<td>2130</td>
<td>4800</td>
</tr>
<tr>
<td>Fi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v = v - v</td>
<td>1942</td>
<td>4800</td>
</tr>
<tr>
<td>FO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>188</td>
<td>2100</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v or v</td>
<td>0</td>
<td>pc/h</td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \) or \( v \) > 2700 pc/h? No

Is \( v \) or \( v \) > 1.5 \( v \)/2? No

If yes, \( v \) = 2130 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>2130</td>
<td>4400</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 4.252 + 0.0086 v - 0.009 \) \( L = 13.8 \) pc/mi/ln

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

Speed Estimation

Intermediate speed variable, \( S = 0.315 \)

Space mean speed in ramp influence area, \( S = 64.6 \) mph

Space mean speed in outer lanes, \( S = N/A \) mph

Space mean speed for all vehicles, \( S = 64.6 \) mph
**Freeway Merge and Diverge Segments**

**Diverge Analysis**

- **Analyst:** AECOM
- **Agency/Co.:** AECOM
- **Date performed:** 7/1/2016
- **Analysis time period:** AM Peak
- **Freeway/Dir of Travel:** I-26 EB
- **Junction:** US 176 EB Off-Ramp
- **Jurisdiction:**
- **Analysis Year:** 2020 No-Build
- **Description:** S-48 IMR

### Freeway Data

- **Type of analysis:** Diverge
- **Number of lanes in freeway:** 2
- **Free-flow speed on freeway:** 75.0 mph
- **Volume on freeway:** 2475 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:** 121 vph
- **Length of first accel/decel lane:** 1000 ft
- **Length of second accel/decel lane:** ft

### Adjacent Ramp Data (if one exists)

- **Does adjacent ramp exist?** Yes
- **Volume on adjacent ramp:** 1555 vph
- **Position of adjacent ramp:** Downstream
- **Type of adjacent ramp:** On
- **Distance to adjacent ramp:** 900 ft

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2475</td>
<td>121</td>
<td>1555</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>688</td>
<td>34</td>
<td>432</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV  0.806       0.971       0.971
Driver population factor, fP         1.00        1.00        1.00
Flow rate, vp                        3410        138        1780  pcph

_________________________Estimation of V12 Diverge Areas_______________________

\[ L = \quad \text{(Equation 13-12 or 13-13)} \]
\[ P =    1.000 \quad \text{Using Equation 0} \]
\[ v = v + (v - v) P = 3410 \quad \text{pc/h} \]
\[ 12 \quad R \quad F \quad R \quad FD \]

_______________________________Capacity Checks_________________________________

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = v</td>
<td>3410</td>
<td>4800</td>
</tr>
<tr>
<td>v = v - v</td>
<td>3272</td>
<td>4800</td>
</tr>
<tr>
<td>v = v</td>
<td>138</td>
<td>2100</td>
</tr>
<tr>
<td>v or v = 0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
<td></td>
</tr>
<tr>
<td>3 \text{ av34}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is v or v &gt; 2700 pc/h?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>v = v</td>
<td>3 \text{ av34}</td>
<td></td>
</tr>
<tr>
<td>Is v or v &gt; 1.5 v /2</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>3 \text{ av34}</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>If yes, v = 3410</td>
<td>(Equation 13-15, 13-16, 13-18, or 13-19)</td>
<td></td>
</tr>
<tr>
<td>12A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

______________________Flow Entering Diverge Influence Area_____________________

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>3410</td>
<td>4400</td>
</tr>
</tbody>
</table>

_____________________________Level of Service Determination (if not F)____________________

Density, \[ D = 4.252 + 0.0086 v - 0.009 L = 24.6 \quad \text{pc/mi/ln} \]
\[ R \quad 12 \quad D \]

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

_______________________________Speed Estimation_____________________________________

Intermediate speed variable, \[ D = 0.310 \]
\[ S \]
Space mean speed in ramp influence area, \[ S = 64.8 \quad \text{mph} \]
\[ R \]
Space mean speed in outer lanes, \[ S = \text{N/A} \quad \text{mph} \]
\[ 0 \]
Space mean speed for all vehicles, \[ S = 64.8 \quad \text{mph} \]
**Diverge Analysis**

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 7/1/2016  
**Analysis time period:** AM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** US 176 WB Off-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>2015 vph</td>
</tr>
</tbody>
</table>

### Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>482 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1225 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

### Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>180 vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td>Downstream</td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td>On</td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>775 ft</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2015</td>
<td>482</td>
<td>180</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>560</td>
<td>134</td>
<td>50</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>% 0.00</td>
<td>% 0.00</td>
<td>% 0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV          0.743       0.971       0.971  
Driver population factor, fP           1.00        1.00        1.00  
Flow rate, vp                          3011        552         206       pcph  

Estimation of V12 Diverge Areas

\[
L = \text{(Equation 13-12 or 13-13)} \\
E = \text{P} = 1.000 \quad \text{Using Equation 0} \\
FD \\
v = v + (v - v) P = 3011 \quad \text{pc/h} \\
12 \quad R \quad F \quad R \quad FD
\]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v Fi</td>
<td>3011</td>
<td>4800</td>
</tr>
<tr>
<td>v FO</td>
<td>2459</td>
<td>4800</td>
</tr>
<tr>
<td>v R</td>
<td>552</td>
<td>2100</td>
</tr>
<tr>
<td>v or v R</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
</tr>
<tr>
<td>av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If yes, v 12A = 3011 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v 12</td>
<td>3011</td>
<td>4400</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[
D = 4.252 + 0.0086 v - 0.009 L = 19.1 \quad \text{pc/mi/ln} \\
R \quad 12 \quad D
\]

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

Speed Estimation

\[
D = 0.348 \\
S = 63.5 \quad \text{mph} \\
S = \text{N/A} \quad \text{mph} \\
S = 63.5 \quad \text{mph}
\]
### Diverge Analysis

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 7/1/2016  
**Analysis time period:** AM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** S-48 WB Off-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2020 No-Build  
**Description:** S-48 IMR

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1713 vph</td>
</tr>
</tbody>
</table>

### Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>850 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1225 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

### Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>141 vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td>Downstream</td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td>On</td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>1475 ft</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1713</td>
<td>850</td>
<td>141</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>476</td>
<td>236</td>
<td>39 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type: Grade</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td></td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>0.00 %</td>
</tr>
<tr>
<td></td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, \( f_{HV} \) 0.743 0.971 0.971
Driver population factor, \( f_P \) 1.00 1.00 1.00
Flow rate, \( \nu_P \) 2560 973 161 pcph

---

**Estimation of V12 Diverge Areas**

\[
L = \text{EQ}
\]

\[
P = 1.000 \text{ Using Equation 0}
\]

\[
\nu = \nu + (\nu - \nu) P = 2560 \text{ pc/h}
\]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \nu )</td>
<td>2560</td>
<td>4800</td>
</tr>
<tr>
<td>( \nu ) - ( \nu )</td>
<td>1587</td>
<td>4800</td>
</tr>
<tr>
<td>( \nu )</td>
<td>973</td>
<td>2100</td>
</tr>
</tbody>
</table>

If yes, \( \nu = 2560 \) (Equation 13-15, 13-16, 13-18, or 13-19)

---

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \nu )</td>
<td>2560</td>
<td>4400</td>
</tr>
</tbody>
</table>

---

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

\[
D = 4.252 + 0.0086 \nu - 0.009 \frac{L}{R} = 15.2 \text{ pc/mi/ln}
\]

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

---

**Speed Estimation**

Intermediate speed variable, \( D = 0.386 \) mph
Space mean speed in ramp influence area, \( S = 62.3 \) mph
Space mean speed in outer lanes, \( S = \text{N/A} \) mph
Space mean speed for all vehicles, \( S = 62.3 \) mph
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1004 vph

Off Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-Flow speed on ramp: 25.0 mph
Volume on ramp: 27 vph
Length of first accel/decel lane: 400 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?: Yes
Volume on adjacent ramp: 70 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1000 ft

Conversion to pc/h Under Base Conditions

Junction Components

<table>
<thead>
<tr>
<th>Volume, V (vph)</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1004</td>
<td>27</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>279</td>
<td>8</td>
<td>19 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type: Grade</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
### Heavy vehicle adjustment, \( f_{HV} \)

<table>
<thead>
<tr>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.743</td>
<td>0.971</td>
<td>0.971</td>
</tr>
</tbody>
</table>

### Driver population factor, \( f_P \)

<table>
<thead>
<tr>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

### Flow rate, \( v_p \)

<table>
<thead>
<tr>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500</td>
<td>31</td>
<td>80</td>
</tr>
</tbody>
</table>

---

#### Estimation of V12 Diverge Areas

\[
L = \text{Equation 13-12 or 13-13}
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
v = v_1 + (v_i - v) P = 1500 \quad \text{pc/h}
\]

---

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual, ( v_i )</th>
<th>Maximum, ( v )</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\[
v = v_i - v_F = 1469 \quad 4800 \quad \text{No}
\]

\[
v_R = 31 \quad 1900 \quad \text{No}
\]

\[
v_{\text{av34}} \quad (\text{Equation 13-14 or 13-17})
\]

\[
\text{Is } v_{\text{av34}} > 2700 \, \text{pc/h}? \quad \text{No}
\]

\[
\text{Is } v_{\text{av34}} > 1.5 \frac{v_R}{2} \quad \text{No}
\]

\[
\text{If yes, } v_{12A} = 1500 \quad (\text{Equation 13-15, 13-16, 13-18, or 13-19})
\]

---

#### Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual, ( v_1 )</th>
<th>Max Desirable, ( v )</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

---

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

\[
D = 4.252 + 0.0086 v_R - 0.009 \quad L = 13.6 \quad \text{pc/mi/ln}
\]

#### Speed Estimation

<table>
<thead>
<tr>
<th>Intermediate speed variable, ( S )</th>
<th>( D = 0.561 )</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Space mean speed in ramp influence area, ( S )</th>
<th>( 56.5 ) mph</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Space mean speed in outer lanes, ( S )</th>
<th>( N/A ) mph</th>
</tr>
</thead>
</table>

| Space mean speed for all vehicles, \( S \) | \( 56.5 \) mph |
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC 202 EB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1714</td>
</tr>
</tbody>
</table>

Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>74</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>400 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>37 vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td>Downstream</td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td>On</td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>1050 ft</td>
</tr>
</tbody>
</table>

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1714</td>
<td>74</td>
<td>37 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>476</td>
<td>21</td>
<td>10 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>% 0.00</td>
<td>% 0.00</td>
<td>% 0.00</td>
</tr>
<tr>
<td>Length</td>
<td>mi 0.00</td>
<td>mi 0.00</td>
<td>mi 0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV: 0.826, 0.971, 0.971
Driver population factor, fP: 1.00, 1.00, 1.00
Flow rate, vp: 2304, 85, 42 pcph

---

**Estimation of V12 Diverge Areas**

\[
L = \text{EQ}
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
v = v + (v - v) P = 2304 \quad \text{pc/h}
\]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v  = v</td>
<td>2304</td>
<td>4800</td>
</tr>
<tr>
<td>Fi  F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v  = v - v</td>
<td>2219</td>
<td>4800</td>
</tr>
<tr>
<td>FO  F  R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>85</td>
<td>2100</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v  or v</td>
<td>0</td>
<td>2700 pc/h</td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \text{ or } v \) > 2700 pc/h? No

Is \( v \text{ or } v \) > 1.5 \(v\) /2? No

If yes, \( v = 2304 \) (Equation 13-15, 13-16, 13-18, or 13-19)

---

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v  = 2304</td>
<td>4400</td>
<td>No</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

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

Density, \( D = 4.252 + 0.0086 v - 0.009 L = 20.5 \text{ pc/mi/ln} \)

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

---

**Speed Estimation**

Intermediate speed variable, \( D = 0.306 \)

Space mean speed in ramp influence area, \( S = 64.9 \text{ mph} \)

Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \)

Space mean speed for all vehicles, \( S = 64.9 \text{ mph} \)
Diverge Analysis

Analyst:                AECOM
Agency/Co.:             AECOM
Date performed:         7/1/2016
Analysis time period:   PM Peak
Freeway/Dir of Travel:  I-26 EB
Junction:               S-48 EB Off-Ramp
Jurisdiction:
Analysis Year:          2020 No-Build
Description:  S-48 IMR

Freeway Data

Type of analysis                            Diverge
Number of lanes in freeway                  2
Free-flow speed on freeway                  75.0           mph
Volume on freeway                           1677           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                              174           vph
Length of first accel/decel lane            975           ft
Length of second accel/decel lane           ft

Adjacent Ramp Data (if one exists)____________

Does adjacent ramp exist?                   Yes
Volume on adjacent ramp                     996           vph
Position of adjacent ramp                   Downstream
Type of adjacent ramp                        On
Distance to adjacent ramp                   1725           ft

Conversion to pc/h Under Base Conditions_____

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent</th>
<th>Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1677</td>
<td>174</td>
<td>996</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>466</td>
<td>48</td>
<td>277 v</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, $f_{HV}$          0.826       0.971       0.971
Driver population factor, $f_P$           1.00        1.00        1.00
Flow rate, $v_p$                          2255        199         1140      pcph

Estimation of V12 Diverge Areas

\[ L = \text{Equation 13-12 or 13-13} \]
\[ EQ \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ FD \]
\[ v = v + (v - v) p = 2255 \quad \text{pc/h} \]
\[ 12 \quad F \quad R \quad FD \]

Capacity Checks

\[ v = v \]
\[ 2255 \quad 4800 \quad \text{No} \]
\[ Fi \]
\[ v = v - v \]
\[ 2056 \quad 4800 \quad \text{No} \]
\[ FO \quad F \quad R \]
\[ v \]
\[ 199 \quad 2100 \quad \text{No} \]
\[ R \]
\[ v \text{ or } v \]
\[ 0 \quad \text{pc/h} \quad \text{(Equation 13-14 or 13-17)} \]
\[ 3 \quad av34 \]
\[ Is \quad v \text{ or } v > 2700 \text{ pc/h?} \]
\[ 3 \quad av34 \]
\[ Is \quad v \text{ or } v > 1.5 \frac{v}{2} \]
\[ 3 \quad av34 \quad 12 \]
\[ If \quad yes, \quad v = 2255 \quad \text{(Equation 13-15, 13-16, 13-18, or 13-19)} \]
\[ 12A \]

Flow Entering Diverge Influence Area

\[ v \]
\[ 2255 \quad 4400 \quad \text{No} \]
\[ 12 \]

Level of Service Determination (if not F)

Density,
\[ D = 4.252 + 0.0086 v - 0.009 \quad L = 14.9 \quad \text{pc/mi/ln} \]
\[ R \quad 12 \quad D \]

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

Speed Estimation

Intermediate speed variable,
\[ D = 0.316 \]
\[ S \]

Space mean speed in ramp influence area,
\[ S = 64.6 \quad \text{mph} \]
\[ R \]

Space mean speed in outer lanes,
\[ S = \text{N/A} \quad \text{mph} \]
\[ 0 \]

Space mean speed for all vehicles,
\[ S = 64.6 \quad \text{mph} \]
Diverge Analysis

Analyst:                AECOM
Agency/Co.:             AECOM
Date performed:         7/1/2016
Analysis time period:   PM Peak
Freeway/Dir of Travel:  I-26 EB
Junction:               US 176 EB Off-Ramp
Jurisdiction:
Analysis Year:          2020 No-Build
Description:  S-48 IMR

Freeway Data

Type of analysis                            Diverge
Number of lanes in freeway                  2
Free-flow speed on freeway                  75.0           mph
Volume on freeway                           2499           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            1000           ft
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?                   Yes
Volume on adjacent ramp                     875            vph
Position of adjacent ramp                   Downstream
Type of adjacent ramp                       On
Distance to adjacent ramp                    900            ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2499</td>
<td>230</td>
<td>875</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>694</td>
<td>64</td>
<td>243</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[
L = (\text{Equation 13-12 or 13-13})
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
v = v + (v - v) P = 3360 \quad \text{pc/h}
\]

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity Checks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3360</td>
<td>4800</td>
</tr>
<tr>
<td>3097</td>
<td>4800</td>
</tr>
<tr>
<td>263</td>
<td>2100</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \) or \( v \) > 2700 pc/h? \( \text{No} \)

Is \( v \) or \( v \) > 1.5 \( v \) /2? \( \text{No} \)

If yes, \( v = 3360 \) \( \text{Equation 13-15, 13-16, 13-18, or 13-19} \)

<table>
<thead>
<tr>
<th>Actual</th>
<th>Flow Entering Diverge Influence Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>3360</td>
<td>4400</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[
D = 4.252 + 0.0086 v - 0.009 \quad L = 24.1 \quad \text{pc/mi/ln}
\]

<table>
<thead>
<tr>
<th>Actual</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>3360</td>
<td>4400</td>
</tr>
</tbody>
</table>

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

Speed Estimation

\[
D = 0.322
\]

\[
S = 64.4 \quad \text{mph}
\]

\[
S = N/A \quad \text{mph}
\]

\[
S = 64.4 \quad \text{mph}
\]
Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

**Freeway Data**

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 3790 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: 1410 vph
Length of first accel/decel lane: 1225 ft
Length of second accel/decel lane: ft

**Adjacent Ramp Data (if one exists)**

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 143 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 775 ft

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>3790</td>
<td>1410</td>
<td>143</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>1053</td>
<td>392</td>
<td>40</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v_R + (v_{12} - v_R)P = 5032 \quad \text{pc/h} \]

Capacity Checks

\[ v = v_{Fi} \]
\[ v = v_{FO} + v_{FR} = 3418 \quad 4800 \quad \text{No} \]
\[ v = 1614 \quad 2100 \quad \text{No} \]
\[ v_{av34} = 0 \quad \text{pc/h} \] (Equation 13-14 or 13-17)

If yes, \[ v = 5032 \] (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

\[ v_{12} = 5032 \quad 4400 \quad \text{Yes} \]

Level of Service Determination (if not F)

Density, \[ D = 4.252 + 0.0086v_R - 0.009L_{12} = 36.5 \quad \text{pc/mi/ln} \]

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

Speed Estimation

Intermediate speed variable, \[ S = 0.443 \]
Space mean speed in ramp influence area, \[ S_R = 60.4 \quad \text{mph} \]
Space mean speed in outer lanes, \[ S_0 = \text{N/A} \quad \text{mph} \]
Space mean speed for all vehicles, \[ S = 60.4 \quad \text{mph} \]
HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2523 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: 1200 vph
Length of first accel/decel lane: 1225 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 196 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1475 ft

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp
Volume, V (vph) 2523 1200 196 vph
Peak-hour factor, PHF 0.90 0.90 0.90
Peak 15-min volume, v15 701 333 54 v
Trucks and buses 13 2 2 %
Recreational vehicles 0 0 0 %
Terrain type: Rolling Rolling Rolling
Grade 0.00 % 0.00 % 0.00 %
Length 0.00 mi 0.00 mi 0.00 mi
Trucks and buses PCE, ET 2.5 2.5 2.5
Recreational vehicle PCE, ER 2.0 2.0 2.0
Heavy vehicle adjustment, fHV 0.837 0.971 0.971  
Driver population factor, fP 1.00 1.00 1.00  
Flow rate, vp 3350 1373 224 pcph  

Estimation of V12 Diverge Areas

\[ L = \text{(Equation 13-12 or 13-13)} \]
\[ P = 1.000 \text{ Using Equation 0} \]
\[ v = v + (v - v) P = 3350 \text{ pc/h} \]
\[ 12 \text{ R} \quad \text{F} \quad \text{R} \quad \text{FD} \]

Capacity Checks

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v ) Fi</td>
<td>3350</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>( v ) FO</td>
<td>1977</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>( v ) R</td>
<td>1373</td>
<td>2100</td>
<td>No</td>
</tr>
<tr>
<td>( v ) av34</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
<td></td>
</tr>
</tbody>
</table>

If yes, \( v = 3350 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v ) 12</td>
<td>3350</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ D = 4.252 + 0.0086 v - 0.009 L = 22.0 \text{ pc/mi/ln} \]
\[ R \quad \text{12} \quad D \]

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

Speed Estimation

Intermediate speed variable, \( S = 0.422 \)  
Space mean speed in ramp influence area, \( S = 61.1 \text{ mph} \)  
Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \)  
Space mean speed for all vehicles, \( S = 61.1 \text{ mph} \)
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 1519 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 25.0 mph
Volume on ramp 114 vph
Length of first accel/decel lane 400 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp 54 vph
Position of adjacent ramp Downstream
Type of adjacent ramp On
Distance to adjacent ramp 1000 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1519</td>
<td>114</td>
<td>54</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>422</td>
<td>32</td>
<td>15</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, \( f_{HV} \) & 0.837 & 0.971 & 0.971 \\
Driver population factor, \( f_{P} \) & 1.00 & 1.00 & 1.00 \\
Flow rate, \( v_{p} \) & 2017 & 130 & 62 & pcph \\

Estimation of V12 Diverge Areas

\[
L_{F} = \frac{P_{D}}{1.000} \quad \text{Using Equation 0} \\
\]

\[
v = v_{F} + (v_{R} - v_{F}) P_{D} = 2017 \quad \text{pc/h} \\
\]

Capacity Checks

\[
\begin{align*}
\text{Actual} & \quad \text{Maximum} & \quad \text{LOS F?} \\
v_{Fi} & \quad v_{F} & \quad 2017 & \quad 4800 & \quad \text{No} \\
v_{FO} & \quad v_{F} - v_{R} & \quad 1887 & \quad 4800 & \quad \text{No} \\
v_{R} & \quad 130 & \quad 1900 & \quad \text{No} \\
v_{3} & \quad 0 \quad \text{pc/h} & \quad \text{(Equation 13-14 or 13-17)} \\
\end{align*}
\]

Is \( v_{3} \) or \( v_{3} \) > 2700 pc/h? \( \text{No} \)

Is \( v_{3} \) or \( v_{3} \) > 1.5 \( v_{12} \)/2 \( \text{No} \)

If yes, \( v_{12A} = 2017 \) \( \text{(Equation 13-15, 13-16, 13-18, or 13-19)} \)

Flow Entering Diverge Influence Area

\[
\begin{align*}
\text{Actual} & \quad \text{Max Desirable} & \quad \text{Violation?} \\
v_{12} & \quad 2017 & \quad 4400 & \quad \text{No} \\
\end{align*}
\]

Level of Service Determination (if not F)

\[
D = 4.252 + 0.0086 v_{12} - 0.009 L_{12} = 18.0 \quad \text{pc/mi/ln} \\
\]

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

Speed Estimation

\[
\begin{align*}
\text{Intermediate speed variable,} & \quad D = 0.570 \\
\text{Space mean speed in ramp influence area,} & \quad S = 56.2 \quad \text{mph} \\
\text{Space mean speed in outer lanes,} & \quad S = \text{N/A} \quad \text{mph} \\
\text{Space mean speed for all vehicles,} & \quad S = 56.2 \quad \text{mph} \\
\end{align*}
\]
APPENDIX I

NO-BUILD 2040 HCS REPORTS
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: West of SC 202
Jurisdiction: 2040 No-Build
Analysis Year: S-48 IMR

Flow Inputs and Adjustments

Volume, V: 2003 veh/h
Peak-hour factor, PHF: 0.90
Peak 15-min volume, v15: 556 v
Trucks and buses: 16 %
Recreational vehicles: 0 %
Terrain type: Rolling
Grade: - %
Segment length: - mi
Trucks and buses PCE, ET: 2.5
Recreational vehicle PCE, ER: 2.0
Heavy vehicle adjustment, fHV: 0.806
Driver population factor, fp: 1.00
Flow rate, vp: 1380 pc/h/ln

Speed Inputs and Adjustments

Lane width: 12.0 ft
Right-side lateral clearance: 6.0 ft
Total ramp density, TRD: 0.33 ramps/mi
Number of lanes, N: 2
Free-flow speed: Base
  FFS or BFFS: 75.4 mi/h
Lane width adjustment, fLW: 0.0 mi/h
Lateral clearance adjustment, fLC: 0.0 mi/h
TRD adjustment: 1.3 mi/h
Free-flow speed, FFS: 74.1 mi/h

LOS and Performance Measures

Flow rate, vp: 1380 pc/h/ln
Free-flow speed, FFS: 74.1 mi/h
Average passenger-car speed, S: 73.4 mi/h
Number of lanes, N: 2
Density, D: 18.8 pc/mi/ln
Level of service, LOS: C
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 2202 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 612 v
Trucks and buses 16 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.806
Driver population factor, fp 1.00
Flow rate, vp 1517 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1517 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 72.0 mi/h
Number of lanes, N 2
Density, D 21.1 pc/mi/ln
Level of service, LOS C
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and US 176
Jurisdiction: 
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V                  3396      veh/h
Peak-hour factor, PHF      0.90
Peak 15-min volume, v15    943      v
Trucks and buses           16       %
Recreational vehicles      0        %
Terrain type: Rolling
Grade -                   %
Segment length -          mi
Trucks and buses PCE, ET   2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.806
Driver population factor, fp 1.00
Flow rate, vp              2339      pc/h/ln

Speed Inputs and Adjustments

Lane width                 12.0      ft
Right-side lateral clearance 6.0      ft
Total ramp density, TRD     0.33      ramps/mi
Number of lanes, N          2
Free-flow speed: Base
  FFS or BFFS               75.4      mi/h
Lane width adjustment, fLW  0.0      mi/h
Lateral clearance adjustment, fLC  0.0      mi/h
TRD adjustment              1.3      mi/h
Free-flow speed, FFS        74.1      mi/h

LOS and Performance Measures

Flow rate, vp               2339      pc/h/ln
Free-flow speed, FFS        74.1      mi/h
Average passenger-car speed, S 55.2      mi/h
Number of lanes, N          2
Density, D                  42.4      pc/mi/ln
Level of service, LOS       E
Overall results are not computed when free-flow speed is less than 55 mph.
### Operational Analysis

**Analyst:** AECOM  
**Agency or Company:** AECOM  
**Date Performed:** 6/30/2016  
**Analysis Time Period:** AM Peak  
**Freeway/Direction:** I-26 EB  
**From/To:** East of US176  
**Jurisdiction:**  
**Analysis Year:** 2040 No-Build  
**Description:** S-48 IMR

### Flow Inputs and Adjustments

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V</td>
<td>5164 veh/h</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
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</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>1434 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type: Rolling Grade</td>
<td></td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.806</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>3557 pc/h/ln</td>
</tr>
</tbody>
</table>

### Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base</td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

### LOS and Performance Measures

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>3557 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>2.6 mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>1356.8 pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>F</td>
</tr>
</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: East of US 176
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V: 2790 veh/h
Peak-hour factor, PHF: 0.90
Peak 15-min volume, v15: 775 v
Trucks and buses: 23%
Recreational vehicles: 0%
Terrain type: Rolling
Grade: -%
Segment length: - mi
Trucks and buses PCE, ET: 2.5
Recreational vehicle PCE, ER: 2.0
Heavy vehicle adjustment, fHV: 0.743
Driver population factor, fp: 1.00
Flow rate, vp: 2085 pc/h/ln

Speed Inputs and Adjustments

Lane width: 12.0 ft
Right-side lateral clearance: 6.0 ft
Total ramp density, TRD: 0.33 ramps/mi
Number of lanes, N: 2
Free-flow speed: Base
  FFS or BFFS: 75.4 mi/h
Lane width adjustment, fLW: 0.0 mi/h
Lateral clearance adjustment, fLC: 0.0 mi/h
TRD adjustment: 1.3 mi/h
Free-flow speed, FFS: 74.1 mi/h

LOS and Performance Measures

Flow rate, vp: 2085 pc/h/ln
Free-flow speed, FFS: 74.1 mi/h
Average passenger-car speed, S: 62.0 mi/h
Number of lanes, N: 2
Density, D: 33.6 pc/mi/ln
Level of service, LOS: D
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst:                AECOM
Agency or Company:      AECOM
Date Performed:         6/30/2016
Analysis Time Period:   AM Peak
Freeway/Direction:      I-26 WB
From/To:                Between S-48 and US 176
Jurisdiction:           2040 No-Build
Analysis Year:          2040 No-Build
Description:            S-48 IMR

Flow Inputs and Adjustments

Volume, V        2418     veh/h
Peak-hour factor, PHF    0.90
Peak 15-min volume, v15  672     v
Trucks and buses                     23      %
Recreational vehicles                0      %
Terrain type:                  Rolling
Grade                                -      %
Segment length                   -      mi
Trucks and buses PCE, ET          2.5
Recreational vehicle PCE, ER       2.0
Heavy vehicle adjustment, fHV      0.743
Driver population factor, fp       1.00
Flow rate, vp                    1807     pc/h/ln

Speed Inputs and Adjustments

Lane width             12.0     ft
Right-side lateral clearance  6.0     ft
Total ramp density, TRD  0.33     ramps/mi
Number of lanes, N     2
Free-flow speed:       Base
                        FFS or BFFS  75.4     mi/h
Lane width adjustment, fLW     0.0     mi/h
Lateral clearance adjustment, fLC 0.0     mi/h
TRD adjustment          1.3     mi/h
Free-flow speed, FFS    74.1     mi/h

LOS and Performance Measures

Flow rate, vp          1807     pc/h/ln
Free-flow speed, FFS    74.1     mi/h
Average passenger-car speed, S 67.8     mi/h
Number of lanes, N     2
Density, D             26.7     pc/mi/ln
Level of service, LOS  D
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 1414 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 393 v
Trucks and buses 23 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.743
Driver population factor, fp 1.00
Flow rate, vp 1057 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
    FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 1057 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 75.0 mi/h
Number of lanes, N 2
Density, D 14.1 pc/mi/ln
Level of service, LOS B
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: West of SC 202
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

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<th>Parameter</th>
<th>Value</th>
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<td>Volume, V</td>
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<tr>
<td>Peak 15-min volume, v15</td>
<td>408 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type: Rolling</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>- %</td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
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</tr>
<tr>
<td>Driver population factor, fp</td>
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</tr>
<tr>
<td>Flow rate, vp</td>
<td>1096 pc/h/ln</td>
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</table>

Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed:</td>
<td>Base</td>
</tr>
<tr>
<td>FFS or BFFS</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td>Lane width adjustment, fLW</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>Lateral clearance adjustment, fLC</td>
<td>0.0 mi/h</td>
</tr>
<tr>
<td>TRD adjustment</td>
<td>1.3 mi/h</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

LOS and Performance Measures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>1096 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>74.9 mi/h</td>
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<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>14.6 pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>B</td>
</tr>
</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: West of SC 202
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

| Volume, V | 2415 veh/h |
| Peak-hour factor, PHF | 0.90 |
| Peak 15-min volume, v15 | 671 v |
| Trucks and buses | 14 % |
| Recreational vehicles | 0 % |
| Terrain type: Rolling |
| Grade | - % |
| Segment length | - mi |
| Trucks and buses PCE, ET | 2.5 |
| Recreational vehicle PCE, ER | 2.0 |
| Heavy vehicle adjustment, fHV | 0.826 |
| Driver population factor, fp | 1.00 |
| Flow rate, vp | 1623 pc/h/ln |

Speed Inputs and Adjustments

| Lane width | 12.0 ft |
| Right-side lateral clearance | 6.0 ft |
| Total ramp density, TRD | 0.33 ramps/mi |
| Number of lanes, N | 2 |
| Free-flow speed: Base |
| FFS or BFFS | 75.4 mi/h |
| Lane width adjustment, fLW | 0.0 mi/h |
| Lateral clearance adjustment, fLC | 0.0 mi/h |
| TRD adjustment | 1.3 mi/h |
| Free-flow speed, FFS | 74.1 mi/h |

LOS and Performance Measures

| Flow rate, vp | 1623 pc/h/ln |
| Free-flow speed, FFS | 74.1 mi/h |
| Average passenger-car speed, S | 70.7 mi/h |
| Number of lanes, N | 2 |
| Density, D | 23.0 pc/mi/ln |
| Level of service, LOS | C |
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and SC 202
Jurisdiction: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V: 2370 veh/h
Peak-hour factor, PHF: 0.90
Peak 15-min volume, v15: 658 v
Trucks and buses: 14 %
Recreational vehicles: 0 %
Terrain type: Rolling
Grade: - %
Segment length: - mi
Trucks and buses PCE, ET: 2.5
Recreational vehicle PCE, ER: 2.0
Heavy vehicle adjustment, fHV: 0.826
Driver population factor, fp: 1.00
Flow rate, vp: 1593 pc/h/ln

Speed Inputs and Adjustments

Lane width: 12.0 ft
Right-side lateral clearance: 6.0 ft
Total ramp density, TRD: 0.33 ramps/mi
Number of lanes, N: 2
Free-flow speed: Base
    FFS or BFFS: 75.4 mi/h
Lane width adjustment, fLW: 0.0 mi/h
Lateral clearance adjustment, fLC: 0.0 mi/h
TRD adjustment: 1.3 mi/h
Free-flow speed, FFS: 74.1 mi/h

LOS and Performance Measures

Flow rate, vp: 1593 pc/h/ln
Free-flow speed, FFS: 74.1 mi/h
Average passenger-car speed, S: 71.1 mi/h
Number of lanes, N: 2
Density, D: 22.4 pc/mi/ln
Level of service, LOS: C
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and US 176
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 3502 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 973 v
Trucks and buses 14 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 2354 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 2354 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 54.7 mi/h
Number of lanes, N 2
Density, D 43.0 pc/mi/ln
Level of service, LOS E
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: East of US176
Jurisdiction: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 4257 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 1183 v
Trucks and buses 14 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.826
Driver population factor, fp 1.00
Flow rate, vp 2862 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 2862 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 36.6 mi/h
Number of lanes, N 2
Density, D 78.2 pc/mi/ln
Level of service, LOS F
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: East of US 176
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 5028 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 1397 v
Trucks and buses 13 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.837
Driver population factor, fp 1.00
Flow rate, vp 3338 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
  FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 3338 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 14.5 mi/h
Number of lanes, N 2
Density, D 230.4 pc/mi/ln
Level of service, LOS F
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and US 176
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V 3467 veh/h
Peak-hour factor, PHF 0.90
Peak 15-min volume, v15 963 v
Trucks and buses 13 %
Recreational vehicles 0 %
Terrain type: Rolling
Grade - %
Segment length - mi
Trucks and buses PCE, ET 2.5
Recreational vehicle PCE, ER 2.0
Heavy vehicle adjustment, fHV 0.837
Driver population factor, fp 1.00
Flow rate, vp 2302 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
Right-side lateral clearance 6.0 ft
Total ramp density, TRD 0.33 ramps/mi
Number of lanes, N 2
Free-flow speed: Base
    FFS or BFFS 75.4 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
TRD adjustment 1.3 mi/h
Free-flow speed, FFS 74.1 mi/h

LOS and Performance Measures

Flow rate, vp 2302 pc/h/ln
Free-flow speed, FFS 74.1 mi/h
Average passenger-car speed, S 56.2 mi/h
Number of lanes, N 2
Density, D 40.9 pc/mi/ln
Level of service, LOS E
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

Volume, V: 2158 veh/h
Peak-hour factor, PHF: 0.90
Peak 15-min volume, v15: 599 v
Trucks and buses: 13 %
Recreational vehicles: 0 %
Terrain type: Rolling
Grade: - %
Segment length: - mi
Trucks and buses PCE, ET: 2.5
Recreational vehicle PCE, ER: 2.0
Heavy vehicle adjustment, fHV: 0.837
Driver population factor, fp: 1.00
Flow rate, vp: 1433 pc/h/ln

Speed Inputs and Adjustments

Lane width: 12.0 ft
Right-side lateral clearance: 6.0 ft
Total ramp density, TRD: 0.33 ramps/mi
Number of lanes, N: 2
Free-flow speed: Base
  FFS or BFFS: 75.4 mi/h
Lane width adjustment, fLW: 0.0 mi/h
Lateral clearance adjustment, fLC: 0.0 mi/h
TRD adjustment: 1.3 mi/h
Free-flow speed, FFS: 74.1 mi/h

LOS and Performance Measures

Flow rate, vp: 1433 pc/h/ln
Free-flow speed, FFS: 74.1 mi/h
Average passenger-car speed, S: 72.9 mi/h
Number of lanes, N: 2
Density, D: 19.7 pc/mi/ln
Level of service, LOS: C
Overall results are not computed when free-flow speed is less than 55 mph.
Operational Analysis

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: West of SC 202
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Flow Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V</td>
<td>2084</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>579 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>- %</td>
</tr>
<tr>
<td>Segment length</td>
<td>- mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
</tr>
<tr>
<td>Heavy vehicle adjustment, fHV</td>
<td>0.837</td>
</tr>
<tr>
<td>Driver population factor, fp</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>1384 pc/h/ln</td>
</tr>
</tbody>
</table>

Speed Inputs and Adjustments

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane width</td>
<td>12.0 ft</td>
</tr>
<tr>
<td>Right-side lateral clearance</td>
<td>6.0 ft</td>
</tr>
<tr>
<td>Total ramp density, TRD</td>
<td>0.33 ramps/mi</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed: Base</td>
<td>75.4 mi/h</td>
</tr>
<tr>
<td></td>
<td>74.1 mi/h</td>
</tr>
</tbody>
</table>

LOS and Performance Measures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate, vp</td>
<td>1384 pc/h/ln</td>
</tr>
<tr>
<td>Free-flow speed, FFS</td>
<td>74.1 mi/h</td>
</tr>
<tr>
<td>Average passenger-car speed, S</td>
<td>73.4 mi/h</td>
</tr>
<tr>
<td>Number of lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Density, D</td>
<td>18.9 pc/mi/ln</td>
</tr>
<tr>
<td>Level of service, LOS</td>
<td>C</td>
</tr>
</tbody>
</table>
Overall results are not computed when free-flow speed is less than 55 mph.
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC-202 EB On-Ramp
Jurisdiction: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 1957 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 245 vph
Length of first accel/decel lane 400 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp 46 vph
Position of adjacent Ramp Upstream
Type of adjacent Ramp Off
Distance to adjacent Ramp 1050 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1957</td>
<td>245</td>
<td>46</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>544</td>
<td>68</td>
<td>13</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, $f_{HV}$

Driver population factor, $f_P$

Flow rate, $v_p$

---

**Estimation of $V_{12}$ Merge Areas**

\[ L = \text{(Equation 13-6 or 13-7)} \]

\[ P = 1.00 \quad \text{Using Equation 0} \]

\[ v = v \left( P \right) = 2696 \quad \text{pc/h} \]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual $v$</th>
<th>Maximum $v$</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2976</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

Is $v$ or $v$ or $v$ > 2700 pc/h? No

Is $v$ or $v$ > $1.5 \frac{v}{2}$ No

If yes, $v = 2696$ (Equation 13-15, 13-16, 13-18, or 13-19)

---

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>Actual $v$</th>
<th>Max Desirable $v$</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2976</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

---

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

**Density**

\[ D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.1 \quad \text{pc/mi/ln} \]

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

---

**Speed Estimation**

\[ M = 0.377 \]

\[ S_R = 62.5 \quad \text{mph} \]

\[ S_0 = \text{N/A} \quad \text{mph} \]

\[ S = 62.5 \quad \text{mph} \]
Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB On-Ramp
Jurisdiction: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 1979 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 1417 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? Yes
Volume on adjacent Ramp 223 vph
Position of adjacent Ramp Upstream
Type of adjacent Ramp Off
Distance to adjacent Ramp 1725 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1979</td>
<td>1417</td>
<td>223 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>550</td>
<td>394</td>
<td>62 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v (P) = 2727 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>4349</td>
<td>4800</td>
</tr>
<tr>
<td>FO v</td>
<td>0 pc/h</td>
<td></td>
</tr>
<tr>
<td>v or v</td>
<td>&gt; 2700 pc/h</td>
<td>No</td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is \( v > 2700 \) pc/h? No

If yes, \( v = 2727 \)  

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>4349</td>
<td>4600</td>
</tr>
<tr>
<td>R12</td>
<td>4349</td>
<td></td>
</tr>
</tbody>
</table>

Density, \( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 29.2 \quad \text{pc/mi/ln} \)

Level of service for ramp-freeway junction areas of influence \( D \)

Intermediate speed variable, \( M = 0.488 \)

Space mean speed in ramp influence area, \( S = 58.9 \quad \text{mph} \)

Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \)

Space mean speed for all vehicles, \( S = 58.9 \quad \text{mph} \)
--- Merge Analysis ---

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 6/30/2016  
**Analysis time period:** AM Peak  
**Freeway/Dir of Travel:** I-26 EB  
**Junction:** US176 EB On-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2040 No-Build  
**Description:** S-48 IMR

--- Freeway Data ---

**Type of analysis:** Merge  
**Number of lanes in freeway:** 2  
**Free-flow speed on freeway:** 75.0 mph  
**Volume on freeway:** 3248 vph

--- On Ramp Data ---

**Side of freeway:** Right  
**Number of lanes in ramp:** 1  
**Free-flow speed on ramp:** 25.0 mph  
**Volume on ramp:** 1916 vph  
**Length of first accel/decel lane:** 1500 ft

--- Adjacent Ramp Data (if one exists) ---

**Does adjacent ramp exist?** Yes  
**Volume on adjacent Ramp:** 148 vph  
**Position of adjacent Ramp:** Upstream  
**Type of adjacent Ramp:** Off  
**Distance to adjacent Ramp:** 900 ft

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>3248</td>
<td>1916</td>
<td>148 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>902</td>
<td>532</td>
<td>41 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Level</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \text{ Using Equation 0} \]
\[ v_{12} = v_{12} (P) = 4475 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>6668</td>
<td>4800</td>
<td>Yes</td>
</tr>
</tbody>
</table>

\[ v_{3} \text{ or } v_{34} > 2700 \text{ pc/h} \]
\[ \text{No} \]

\[ v_{3} \text{ or } v_{34} > 1.5 \frac{v_{12}}{2} \]
\[ \text{No} \]

If yes, \[ v_{12} = 4475 \text{ pc/h} \] (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>6668</td>
<td>4600</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ \text{Density, } D = 5.475 + 0.00734 v_{R} + 0.0078 v_{R} - 0.00627 L_{12} = 47.1 \text{ pc/mi/ln} \]

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

Speed Estimation

\[ M = 3.315 \]
\[ S_{R} = -34.4 \text{ mph} \]
\[ S_{0} = \text{N/A} \text{ mph} \]
\[ S = \text{mph} \]
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB On-Ramp
Jurisdiction: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2196 vph

On Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 25.0 mph
Volume on ramp: 222 vph
Length of first accel/decel lane: 1425 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp: 594 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 775 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2196</td>
<td>222</td>
<td>594</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>610</td>
<td>62</td>
<td>165</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, \( f_{HV} \) & 0.743 & 0.971 & 0.971 \\
Driver population factor, \( f_P \) & 1.00 & 1.00 & 1.00 \\
Flow rate, \( v_p \) & 3282 & 254 & 680 pcph

_________________________Estimation of V12 Merge Areas_________________________

\[
L = EQ \\
P = 1.000 \quad \text{Using Equation 0} \\
v = v (P) = 3282 \quad \text{pc/h}
\]

_______________________________Capacity Checks_________________________________

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Maximum ( v )</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3536 pc/h</td>
<td>4800 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

\[
is \quad v \quad \text{or} \quad v \quad > 2700 \quad \text{pc/h} \quad \text{(Equation 13-14 or 13-17)} \\
is \quad v \quad \text{or} \quad v \quad > 1.5 \frac{v}{2} \quad \text{(Equation 13-15, 13-16, 13-18, or 13-19)}
\]

If yes, \( v_{12} = 3282 \) pc/h

________________________Flow Entering Merge Influence Area_____________________

<table>
<thead>
<tr>
<th>Actual ( v )</th>
<th>Max Desirable ( v )</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3536 pc/h</td>
<td>4600 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

_____________________________Level of Service Determination (if not F)_____________________

Density, \( D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_{12A} = 24.0 \quad \text{pc/mi/ln} \)

Level of service for ramp-freeway junction areas of influence \( C \)

_______________________________Speed Estimation_____________________________________

Intermediate speed variable, \( M = 0.384 \) \\
Space mean speed in ramp influence area, \( S_R = 62.3 \quad \text{mph} \) \\
Space mean speed in outer lanes, \( S_0 = \text{N/A} \quad \text{mph} \) \\
Space mean speed for all vehicles, \( S = 62.3 \quad \text{mph} \)
After conducting an analysis of the S-48 WB On-Ramp for the jurisdiction of 2040 No-Build, the following data was obtained:

**Freeway Data**
- **Type of analysis**: Merge
- **Number of lanes in freeway**: 2
- **Free-flow speed on freeway**: 75.0 mph
- **Volume on freeway**: 1230 vph

**On Ramp Data**
- **Side of freeway**: Right
- **Number of lanes in ramp**: 1
- **Free-flow speed on ramp**: 45.0 mph
- **Volume on ramp**: 184 vph
- **Length of first accel/decel lane**: 1225 ft

**Adjacent Ramp Data (if one exists)**
- **Does adjacent ramp exist?**: Yes
- **Volume on adjacent Ramp**: 1188 vph
- **Position of adjacent Ramp**: Upstream
- **Type of adjacent Ramp**: Off
- **Distance to adjacent Ramp**: 1475 ft

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1230</td>
<td>184</td>
<td>1188</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>342</td>
<td>51</td>
<td>330</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

L = \frac{\text{EQ}}{P = 1.000 \text{ Using Equation 0}}
\quad v = v_{12} (P_{FM}) = 1838 \text{ pc/h}

Capacity Checks

<table>
<thead>
<tr>
<th>v</th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>FO</td>
<td>2049</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>v or v_{3}</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
<td></td>
</tr>
<tr>
<td>\text{av34}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is v_{3} or v_{av34} &gt; 2700 pc/h?</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is v_{3} or v_{av34} &gt; 1.5 v_{12} /2</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, v_{12A} = 1838</td>
<td>(Equation 13-15, 13-16, 13-18, or 13-19)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>v</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>R12</td>
<td>2049</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 L = 13.7 \text{ pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, \( M = 0.241 \)
Space mean speed in ramp influence area, \( S = 67.0 \text{ mph} \)
Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \)
Space mean speed for all vehicles, \( S = 67.0 \text{ mph} \)
HCS 2010: Freeway Merge and Diverge Segments Release 6.65

---

**Merge Analysis**

Analyst: AECOM  
Agency/Co.: AECOM  
Date performed: 6/30/2016  
Analysis time period: AM Peak  
Freeway/Dir of Travel: I-26 WB  
Junction: SC-202 WB On-Ramp  
Jurisdiction:  
Analysis Year: 2040 No-Build  
Description: S-48 IMR

---

**Freeway Data**

Type of analysis: Merge  
Number of lanes in freeway: 2  
Free-flow speed on freeway: 75.0 mph  
Volume on freeway: 1381 vph

---

**On Ramp Data**

Side of freeway: Right  
Number of lanes in ramp: 1  
Free-flow speed on ramp: 45.0 mph  
Volume on ramp: 86 vph  
Length of first accel/decel lane: 525 ft  
Length of second accel/decel lane: ft

---

**Adjacent Ramp Data (if one exists)**

Does adjacent ramp exist? Yes  
Volume on adjacent Ramp: 33 vph  
Position of adjacent Ramp: Upstream  
Type of adjacent Ramp: Off  
Distance to adjacent Ramp: 1000 ft

---

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

Junction Components  
Volume, V (vph) | Freeway | Ramp | Adjacent Ramp | vph  
--- | --- | --- | --- | ---  
1381 | 86 | 33 | vph  
Peak-hour factor, PHF | 0.90 | 0.90 | 0.90  
Peak 15-min volume, v15 | 384 | 24 | 9 | v  
Trucks and buses | 23 | 2 | 2 | %  
Recreational vehicles | 0 | 0 | 0 | %  
Terrain type: Rolling  
Grade | % | %  
Length | mi | mi | mi  
Trucks and buses PCE, ET | 2.5 | 2.5 | 2.5  
Recreational vehicle PCE, ER | 2.0 | 2.0 | 2.0
Estimation of V12 Merge Areas

\[ L = \frac{1}{1 + \frac{v_1}{v_{max}}} \]  
Using Equation 6-7

**Capacity Checks**

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>2162</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>( v_{av34} )</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
<td></td>
</tr>
<tr>
<td>Is ( v_{av34} ) &gt; 2700 pc/h?</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is ( v_{av34} ) &gt; ( \frac{1.5 v_1}{2} )?</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, ( v_{12} = 2064 )</td>
<td>(Equation 13-15, 13-16, 13-18, or 13-19)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>2162</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 L = 19.0 \text{ pc/mi/ln} \]

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

Speed Estimation

<table>
<thead>
<tr>
<th></th>
<th>( M = 0.308 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( S )</td>
<td>( 64.8 \text{ mph} )</td>
</tr>
<tr>
<td>( S )</td>
<td>N/A mph</td>
</tr>
<tr>
<td>( S )</td>
<td>64.8 mph</td>
</tr>
</tbody>
</table>
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC-202 EB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 2325 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 45 vph
Length of first accel/decel lane 400 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp 90 vph
Position of adjacent Ramp Upstream
Type of adjacent Ramp Off
Distance to adjacent Ramp 1050 ft

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp
Volume, V (vph) 2325 45 90 vph
Peak-hour factor, PHF 0.90 0.90 0.90
Peak 15-min volume, v15 646 13 25 v
Trucks and buses 14 2 2 %
Recreational vehicles 0 0 0 %
Terrain type: Rolling Rolling Rolling
Grade % % %
Length mi mi mi
Trucks and buses PCE, ET 2.5 2.5 2.5
Recreational vehicle PCE, ER 2.0 2.0 2.0
Heavy vehicle adjustment, \( f_{HV} \) 0.826 0.971 0.971  
Driver population factor, \( f_p \) 1.00 1.00 1.00  
Flow rate, \( v_p \) 3126 52 103  pc/h

Estimation of V12 Merge Areas

\[
L = \text{EQ} \\
P = 1.000 \quad \text{Using Equation 0} \\
v = v (P) = 3126 \quad \text{pc/h} \\
\]

Capacity Checks

\[
\begin{array}{ccc}
\text{Actual} & \text{Maximum} & \text{LOS F?} \\
v & 3178 & 4800 & \text{No} \\
\end{array}
\]

Flow Entering Merge Influence Area

\[
\begin{array}{ccc}
\text{Actual} & \text{Max Desirable} & \text{Violation?} \\
v & 3178 & 4600 & \text{No} \\
\end{array}
\]

Level of Service Determination (if not F)

\[
\text{Density, } D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 L = 27.7 \quad \text{pc/mi/ln} \\
\]

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

Speed Estimation

\[
\begin{array}{ccc}
\text{Intermediate speed variable, } M & = 0.395 \\
\text{Space mean speed in ramp influence area, } S & = 62.0 \quad \text{mph} \\
\text{Space mean speed in outer lanes, } S & = \text{N/A} \quad \text{mph} \\
\text{Space mean speed for all vehicles, } S & = 62.0 \quad \text{mph} \\
\end{array}
\]
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB On-Ramp
Jurisdiction: 2040 No-Build
Analysis Year: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2140 vph

On Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 45.0 mph
Volume on ramp: 1362 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? Yes
Volume on adjacent Ramp: 230 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 1725 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2140</td>
<td>1362</td>
<td>230</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>594</td>
<td>378</td>
<td>64</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0 (Equation 13-6 or 13-7)} \]
\[ v = v (P) = 2877 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4436</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\[ v \quad \text{or} \quad v > 2700 \quad \text{pc/h} \quad (\text{Equation 13-14 or 13-17}) \]
\[ v \quad \text{or} \quad 1.5 \frac{v}{2} \quad (\text{Equation 13-15, 13-16, 13-18, or 13-19}) \]

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4436</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 \frac{v}{2} - 0.00627 L = 30.0 \quad \text{pc/mi/ln} \)

Level of service for ramp-freeway junction areas of influence \( D \)

Speed Estimation

Intermediate speed variable, \( M = 0.515 \quad \text{mph} \)
Space mean speed in ramp influence area, \( S = 58.0 \quad \text{mph} \)
Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \)
Space mean speed for all vehicles, \( S = 58.0 \quad \text{mph} \)
Merge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US176 EB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 75.0 mph
Volume on freeway 3218 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 1079 vph
Length of first accel/decel lane 1500 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent Ramp 284 vph
Position of adjacent Ramp Upstream
Type of adjacent Ramp Off
Distance to adjacent Ramp 900 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>3218</td>
<td>1079</td>
<td>284 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>894</td>
<td>300</td>
<td>79 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Level</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, $f_{HV}$ & 0.826 & 0.971 & 0.990 \\
Driver population factor, $f_P$ & 1.00 & 1.00 & 1.00 \\
Flow rate, $v_p$ & 4326 & 1235 & 319 pc/h \\

---

**Estimation of V12 Merge Areas**

$L = \text{EQ}$  \\
$P = 1.000$ Using Equation 0  \\
$FM$  \\
$v = v \left( P \right) = 4326$ pc/h  \\
$12 \ F \ FM$

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>$v$</th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>FO</td>
<td>5561</td>
<td>4800</td>
<td>Yes</td>
</tr>
</tbody>
</table>

$\frac{v}{3} \ \text{or} \ \frac{v}{av34} > 2700 \ \text{pc/h}$? No  \\
$\frac{v}{3} \ \text{or} \ \frac{v}{av34} > \frac{1.5 \ v}{2}$? No

If yes, $v = 4326$ (Equation 13-15, 13-16, 13-18, or 13-19)  \\
$12A$

---

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>$v$</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>R12</td>
<td>5561</td>
<td>4600</td>
<td>Yes</td>
</tr>
</tbody>
</table>

---

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

Density, $D = 5.475 + 0.00734 \ v + 0.0078 \ v - 0.00627 \ L = 38.9$ pc/mi/ln  \\
$R \ R \ 12 \ A$

Level of service for ramp-freeway junction areas of influence $F$

---

**Speed Estimation**

Intermediate speed variable, $M = 1.260$  \\
Space mean speed in ramp influence area, $S = 33.4$ mph  \\
Space mean speed in outer lanes, $S = \text{N/A}$ mph  \\
Space mean speed for all vehicles, $S = 33.4$ mph
### Merge Analysis

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 6/30/2016  
**Analysis time period:** PM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** US 176 WB On-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2040 No-Build  
**Description:** S-48 IMR  

### Freeway Data

- **Type of analysis:** Merge  
- **Number of lanes in freeway:** 2  
- **Free-flow speed on freeway:** 75.0 mph  
- **Volume on freeway:** 3290 vph  

### On Ramp Data

- **Side of freeway:** Right  
- **Number of lanes in ramp:** 1  
- **Free-flow speed on ramp:** 25.0 mph  
- **Volume on ramp:** 177 vph  
- **Length of first accel/decel lane:** 1425 ft  
- **Length of second accel/decel lane:** ft  

### Adjacent Ramp Data (if one exists)

- **Does adjacent ramp exist?** Yes  
- **Volume on adjacent Ramp:** 1738 vph  
- **Position of adjacent Ramp:** Upstream  
- **Type of adjacent Ramp:** Off  
- **Distance to adjacent Ramp:** 775 ft  

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume, V (vph)</strong></td>
<td>3290</td>
<td>177</td>
<td>1738 vph</td>
</tr>
<tr>
<td><strong>Peak-hour factor, PHF</strong></td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td><strong>Peak 15-min volume, v15</strong></td>
<td>914</td>
<td>49</td>
<td>483 v</td>
</tr>
<tr>
<td><strong>Trucks and buses</strong></td>
<td>13</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td><strong>Recreational vehicles</strong></td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td><strong>Terrain type:</strong></td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td><strong>Trucks and buses PCE, ET</strong></td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Recreational vehicle PCE, ER</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]

\[ P = 1.00 \quad \text{Using Equation 0} \]

\[ v = v \left( P \right) = 4368 \quad \text{pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4571</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\[ v_{3} \text{ or } v_{av34} > 2700 \text{ pc/h?} \quad \text{No} \]

\[ v_{3} \text{ or } v_{av34} > 1.5 \frac{v_{12}}{2} \quad \text{No} \]

If yes, \[ v_{12A} = 4368 \quad \text{(Equation 13-15, 13-16, 13-18, or 13-19)} \]

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4571</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ D = 5.475 + 0.00734 \frac{v}{R} + 0.0078 \frac{v}{R} - 0.00627 \frac{L}{A} = 32.1 \quad \text{pc/mi/ln} \]

Level of service for ramp-freeway junction areas of influence \( D \)

Speed Estimation

Intermediate speed variable, \( M = 0.627 \)

Space mean speed in ramp influence area, \( S_{R} = 54.3 \quad \text{mph} \)

Space mean speed in outer lanes, \( S_{0} = \text{N/A} \quad \text{mph} \)

Space mean speed for all vehicles, \( S = 54.3 \quad \text{mph} \)
HCS 2010: Freeway Merge and Diverge Segments Release 6.65

---

**Merge Analysis**

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB On-Ramp
Jurisdiction: 2040 No-Build
Description: S-48 IMR

---

**Freeway Data**

Type of analysis: Merge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1891 vph

---

**On Ramp Data**

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 45.0 mph
Volume on ramp: 267 vph
Length of first accel/decel lane: 1225 ft
Length of second accel/decel lane: ft

---

**Adjacent Ramp Data (if one exists)**

Does adjacent ramp exist?: Yes
Volume on adjacent Ramp: 1576 vph
Position of adjacent Ramp: Upstream
Type of adjacent Ramp: Off
Distance to adjacent Ramp: 1475 ft

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1891</td>
<td>267</td>
<td>1576 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>525</td>
<td>74</td>
<td>438 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Merge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v (P) = 2511 \text{ pc/h} \]

------------------- Capacity Checks -------------------

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2817</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\( v \) or \( v \) > 2700 pc/h? No
\( v \) or \( v \) > \( \frac{1.5 v}{2} \) No

If yes, \( v = 2511 \) (Equation 13-15, 13-16, 13-18, or 13-19)

------------- Flow Entering Merge Influence Area -------------

\[ v \]
\[ \text{Actual} \]
\[ 2817 \]
\[ \text{Max Desirable} \]
\[ 4600 \]
\[ \text{Violation?} \]
\[ \text{No} \]

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

\( \text{Density} \)
\( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.6 \text{ pc/mi/ln} \)

\( \text{R} \)
\( R \)
\( 12 \)
\( A \)

\( \text{Level of service for ramp-freeway junction areas of influence B} \)

------------- Speed Estimation -------------

\( \text{Intermediate speed variable} \)
\( M = 0.276 \)

\( S \)
\( \text{Space mean speed in ramp influence area} \)
\( 65.9 \text{ mph} \)

\( S \)
\( \text{Space mean speed in outer lanes} \)
\( \text{N/A} \text{ mph} \)

\( S \)
\( \text{Space mean speed for all vehicles} \)
\( 65.9 \text{ mph} \)
### Merge Analysis

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 6/30/2016  
**Analysis time period:** PM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** SC-202 WB On-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2040 No-Build  
**Description:** S-48 IMR

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
</tbody>
</table>
| Free-flow speed on freeway | 75.0   | mph  
| Volume on freeway          | 2018   | vph |

### On Ramp Data

| Side of freeway | Right |  
| Number of lanes in ramp | 1 |  
| Free-flow speed on ramp  | 45.0 | mph  
| Volume on ramp          | 66   | vph |  
| Length of first accel/decel lane | 525 | ft |  
| Length of second accel/decel lane | ft |  |

### Adjacent Ramp Data (if one exists)

| Does adjacent ramp exist? | Yes |  
| Volume on adjacent Ramp   | 140 | vph |  
| Position of adjacent Ramp | Upstream |  
| Type of adjacent Ramp     | Off |  
| Distance to adjacent Ramp | 1000 | ft |

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2018</td>
<td>66</td>
<td>140</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>561</td>
<td>18</td>
<td>39</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terrain type:</th>
<th>Rolling</th>
<th>Rolling</th>
<th>Rolling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV  
Driver population factor, fP  
Flow rate, vp  

---

**Estimation of V12 Merge Areas**

\[ L = \quad \text{Equation 13-6 or 13-7} \]

\[ P = 1.00 \quad \text{Using Equation 0} \]

\[ v = v_{12} (P_{FM}) = 2679 \text{ pc/h} \]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual v</th>
<th>Maximum v</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2755 pc/h</td>
<td>4800 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

\[ v_{av34} \]

\[ v_{av34} > 2700 \text{ pc/h?} \]

\[ v_{av34} > 1.5 v_{12} /2 \]

If yes, \( v_{12A} = 2679 \text{ pc/h} \)

---

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>Actual v</th>
<th>Max Desirable v</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2755 pc/h</td>
<td>4600 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

---

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

\[ D = 5.475 + 0.00734 v^R + 0.0078 v^R - 0.00627 L \]

\[ \text{Density, } D = 23.6 \text{ pc/mi/ln} \]

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

---

**Speed Estimation**

Intermediate speed variable, \( M = 0.335 \)

Space mean speed in ramp influence area, \( S^R = 63.9 \text{ mph} \)

Space mean speed in outer lanes, \( S^0 = \text{N/A} \text{ mph} \)

Space mean speed for all vehicles, \( S = 63.9 \text{ mph} \)
HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC 202 EB Off-Ramp
Jurisdiction: 2040 No-Build
Analysis Year: Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2003 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: 46 vph
Length of first accel/decel lane: 400 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 245 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1050 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2003</td>
<td>46</td>
<td>245 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>556</td>
<td>13</td>
<td>68 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type: Grade</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td></td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>0.00 %</td>
</tr>
<tr>
<td></td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \] (Equation 13-12 or 13-13)

\[ P = 1.000 \] Using Equation 0

\[ v = v + (v - v) P = 2760 \text{ pc/h} \]

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2760</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \[ D = 4.252 + 0.0086 v - 0.009 L = 24.4 \text{ pc/mi/ln} \]

Intermediate speed variable, \[ S = 0.303 \]

Space mean speed in ramp influence area, \[ S = 65.0 \text{ mph} \]

Space mean speed in outer lanes, \[ S = \text{N/A} \text{ mph} \]

Space mean speed for all vehicles, \[ S = 65.0 \text{ mph} \]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2202 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: 223 vph
Length of first accel/decel lane: 975 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 1417 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1725 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2202</td>
<td>223</td>
<td>1417</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>612</td>
<td>62</td>
<td>394</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV  0.806  0.971  0.971
Driver population factor, fP  1.00  1.00  1.00
Flow rate, vp  3034  255  1622  pcph

Estimation of V12 Diverge Areas

\[ L = \quad \text{(Equation 13-12 or 13-13)} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v + (v - v) P = 3034 \quad \text{pc/h} \]
\[ 12 \quad R \quad F \quad R \quad FD \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = v</td>
<td>3034</td>
<td>4800</td>
</tr>
<tr>
<td>Fi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v = v - v</td>
<td>2779</td>
<td>4800</td>
</tr>
<tr>
<td>FO F R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>255</td>
<td>2100</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v or v</td>
<td>0</td>
<td>pc/h</td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \) or \( v \) > 2700 pc/h? No

Is \( v \) or \( v \) > 1.5 \( v \)/2 No

If yes, \( v = 3034 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>3034</td>
<td>4400</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \[ D = 4.252 + 0.0086 v - 0.009 L = 21.6 \quad \text{pc/mi/ln} \]
\[ R \quad 12 \quad D \]

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

Speed Estimation

Intermediate speed variable, \[ D = 0.321 \]
\[ S \]
Space mean speed in ramp influence area, \[ S = 64.4 \quad \text{mph} \]
\[ R \]
Space mean speed in outer lanes, \[ S = \text{N/A} \quad \text{mph} \]
\[ 0 \]
Space mean speed for all vehicles, \[ S = 64.4 \quad \text{mph} \]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US 176 EB Off-Ramp
Jurisdiction: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 3396 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: 148 vph
Length of first accel/decel lane: 1000 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 1916 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 900 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>3396</td>
<td>148</td>
<td>1916 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>943</td>
<td>41</td>
<td>532 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>16</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{Equation 13-12 or 13-13} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v + (v - v) P = 4679 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4679</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

| v = v - v | 4510 | 4800 | No |
| Fi FO F R | 169  | 2100 | No |

<table>
<thead>
<tr>
<th>v or v ( v_{av34} )</th>
<th>0 pc/h</th>
<th>(Equation 13-14 or 13-17)</th>
</tr>
</thead>
</table>

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4679</td>
<td>4400</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 4.252 + 0.0086 v - 0.009 \frac{L}{R} = 35.5 \text{ pc/mi/ln} \)

Intermediate speed variable, \( D = 0.313 \text{ mph} \)

Space mean speed in ramp influence area, \( S = 64.7 \text{ mph} \)

Space mean speed in outer lanes, \( 0 \text{ mph} \)

Space mean speed for all vehicles, \( S = 64.7 \text{ mph} \)
Phone:                                    Fax:
E-mail:

_________________________________Diverge Analysis______________________________
Analyst:                AECOM
Agency/Co.:             AECOM
Date performed:         7/1/2016
Analysis time period:   AM Peak
Freeway/Dir of Travel:  I-26 WB
Junction:               US 176 WB Off-Ramp
Jurisdiction:
Analysis Year:          2040 No-Build
Description:  S-48 IMR

__________________________________Freeway Data_________________________________
Type of analysis                            Diverge
Number of lanes in freeway                  2
Free-flow speed on freeway                  75.0           mph
Volume on freeway                           2790           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                              594           vph
Length of first accel/decel lane            1225           ft
Length of second accel/decel lane                          ft

_________________________Adjacent Ramp Data (if one exists)____________________
Does adjacent ramp exist?                   Yes
Volume on adjacent ramp                     222           vph
Position of adjacent ramp                   Downstream
Type of adjacent ramp                       On
Distance to adjacent ramp                   775           ft

____________________Conversion to pc/h Under Base Conditions___________________
Junction Components                    Freeway     Ramp        Adjacent
Volume, V (vph)                        2790        594         222       vph
Peak-hour factor, PHF                  0.90        0.90        0.90
Peak 15-min volume, v15              775         165         62        v
Trucks and buses                       23          2           2         %
Recreational vehicles                  0           0           0         %
Terrain type:                          Rolling     Rolling     Rolling
Grade                             0.00    %   0.00    %   0.00    %
Length                            0.00    mi  0.00    mi  0.00    mi
Trucks and buses PCE, ET            2.5         2.5         2.5
Recreational vehicle PCE, ER        2.0         2.0         2.0
### Estimation of V12 Diverge Areas

\[ L = \text{(Equation 13-12 or 13-13)} \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ v = v + (v - v) P = 4169 \quad \text{pc/h} \]

\[ 12 \quad R \quad F \quad R \quad FD \]

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4169</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>3489</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>680</td>
<td>2100</td>
<td>No</td>
</tr>
</tbody>
</table>

\[ v > 2700 \quad \text{pc/h?} \]

\[ 3 \quad \text{av34} \]

\[ v > 1.5 \frac{v}{2} \]

\[ 3 \quad \text{av34} \]

\[ D = 4.252 + 0.0086 v - 0.009 \]

\[ L = 29.1 \quad \text{pc/mi/ln} \]

\[ D = 0.359 \]

\[ S = 63.1 \quad \text{mph} \]

\[ S = \text{N/A} \quad \text{mph} \]

\[ S = 63.1 \quad \text{mph} \]
Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2418 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: 1188 vph
Length of first accel/decel lane: 1225 ft
Length of second accel/decel lane:

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?: Yes
Volume on adjacent ramp: 184 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1475 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2418</td>
<td>1188</td>
<td>184</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>672</td>
<td>330</td>
<td>51</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, $f_{HV}$  0.743   0.971   0.971  
Driver population factor, $f_{P}$   1.00   1.00   1.00  
Flow rate, $v_p$  3614   1360   211 pcph

--------------Estimation of V12 Diverge Areas--------------

$$L = \quad \text{(Equation 13-12 or 13-13)}$$

$P = 1.000$ Using Equation 0

$$v = v + (v - v) P = 3614 \text{ pc/h}$$

____________Capacity Checks____________________________

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v_{Fi}$</td>
<td>3614</td>
<td>4800</td>
</tr>
<tr>
<td>$v_{FO}$</td>
<td>2254</td>
<td>4800</td>
</tr>
<tr>
<td>$v_{R}$</td>
<td>1360</td>
<td>2100</td>
</tr>
</tbody>
</table>

$$v_{3\text{av34}}$$

Is $v_{3\text{av34}} > 2700 \text{ pc/h}$? No

Is $v_{3\text{av34}} > 1.5 v_{12}/2$? No

If yes, $v_{12} = 3614$ (Equation 13-15, 13-16, 13-18, or 13-19)

____________Flow Entering Diverge Influence Area____________

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v_{12}$</td>
<td>3614</td>
<td>4400</td>
</tr>
</tbody>
</table>

____________Level of Service Determination (if not F)_____________

$$D = 4.252 + 0.0086 v - 0.009 L = 24.3 \text{ pc/mi/ln}$$

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

____________Speed Estimation__________________________

Intermediate speed variable, $D = 0.420$

Space mean speed in ramp influence area, $S_{R} = 61.1 \text{ mph}$

Space mean speed in outer lanes, $S_{0} = \text{N/A} \text{ mph}$

Space mean speed for all vehicles, $S = 61.1 \text{ mph}$
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 1414 vph

Off Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-Flow speed on ramp: 25.0 mph
Volume on ramp: 33 vph
Length of first accel/decel lane: 400 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 86 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1000 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1414</td>
<td>33</td>
<td>86 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>393</td>
<td>9</td>
<td>24 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>23</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>fHV</td>
<td>0.743</td>
<td>0.971</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Driver population factor, fP</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Flow rate, vp</td>
<td>2113</td>
<td>38</td>
<td>98</td>
</tr>
</tbody>
</table>

### Estimation of V12 Diverge Areas

\[
L = \text{(Equation 13-12 or 13-13)}
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
v = v + (v - v) P = 2113 \quad \text{pc/h}
\]

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2113</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>2075</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>38</td>
<td>1900</td>
<td>No</td>
</tr>
</tbody>
</table>

If yes, \( v = 2113 \) (Equation 13-15, 13-16, 13-18, or 13-19)

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2113</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

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

\[
D = 4.252 + 0.0086 v - 0.009 L = 18.8 \quad \text{pc/mi/ln}
\]

### Speed Estimation

- Intermediate speed variable, \( D = 0.561 \)
- Space mean speed in ramp influence area, \( S = 56.5 \) mph
- Space mean speed in outer lanes, \( S = \text{N/A} \) mph
- Space mean speed for all vehicles, \( S = 56.5 \) mph
**Diverge Analysis**

- **Analyst:** AECOM  
- **Agency/Co.:** AECOM  
- **Date performed:** 7/1/2016  
- **Analysis time period:** PM Peak  
- **Freeway/Dir of Travel:** I-26 EB  
- **Junction:** SC 202 EB Off-Ramp  
- **Jurisdiction:**  
- **Analysis Year:** 2040 No-Build  
- **Description:** S-48 IMR

---

**Freeway Data**

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>2415 vph</td>
</tr>
</tbody>
</table>

---

**Off Ramp Data**

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>90 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>400 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

**Adjacent Ramp Data (if one exists)**

- **Does adjacent ramp exist?** Yes  
- **Volume on adjacent ramp:** 45 vph  
- **Position of adjacent ramp:** Downstream  
- **Type of adjacent ramp:** On  
- **Distance to adjacent ramp:** 1050 ft

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2415</td>
<td>90</td>
<td>45 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90 vph</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>671</td>
<td>25</td>
<td>13 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, \( f_{HV} \) & 0.826 & 0.971 & 0.971 \\
Driver population factor, \( f_{P} \) & 1.00 & 1.00 & 1.00 \\
Flow rate, \( v_p \) & 3247 & 103 & 52 & pcph \\

---

**Estimation of V12 Diverge Areas**

\[
L = \quad \text{(Equation 13-12 or 13-13)}
\]

\[
P = 1.000 \quad \text{Using Equation 0}
\]

\[
v = v + (v - v) P = 3247, \quad \text{pc/h}
\]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>3247</td>
<td>4800</td>
</tr>
<tr>
<td>( v )</td>
<td>3144</td>
<td>4800</td>
</tr>
<tr>
<td>( v )</td>
<td>103</td>
<td>2100</td>
</tr>
</tbody>
</table>

---

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v )</td>
<td>3247</td>
<td>4400</td>
</tr>
</tbody>
</table>

---

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

Density, \( D = 4.252 + 0.0086 v - 0.009 L = 28.6, \quad \text{pc/mi/ln} \)

Level of service for ramp-freeway junction areas of influence \( D \)

---

**Speed Estimation**

Intermediate speed variable, \( D = 0.307 \)

Space mean speed in ramp influence area, \( S = 64.9, \quad \text{mph} \)

Space mean speed in outer lanes, \( S = \text{N/A}, \quad \text{mph} \)

Space mean speed for all vehicles, \( S = 64.9, \quad \text{mph} \)
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction: 
Analysis Year: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2370 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: 975 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 1362 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1725 ft

Conversion to pc/h Under Base Conditions

Junction Components

<table>
<thead>
<tr>
<th></th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent</th>
<th>Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2370</td>
<td>230</td>
<td>1362</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>658</td>
<td>64</td>
<td>378</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>%</td>
<td>0.00</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>mi</td>
<td>0.00</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, $f_{HV}$ 0.826 0.971 0.971
Driver population factor, $f_P$ 1.00 1.00 1.00
Flow rate, $v_p$ 3186 263 1559 pcph

---

**Estimation of V12 Diverge Areas**

\[ L = \text{(Equation 13-12 or 13-13)} \]
\[ P = 1.00 \quad \text{Using Equation 0} \]
\[ v = v + (v - v) P = 3186 \quad \text{pc/h} \]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v$</td>
<td>3186</td>
<td>4800</td>
</tr>
<tr>
<td>$v_F$</td>
<td>2923</td>
<td>4800</td>
</tr>
<tr>
<td>$v_R$</td>
<td>263</td>
<td>2100</td>
</tr>
<tr>
<td>$v_{av34}$</td>
<td>0 pc/h</td>
<td>(Equation 13-14 or 13-17)</td>
</tr>
</tbody>
</table>

If yes, $v_{12A} = 3186$ (Equation 13-15, 13-16, 13-18, or 13-19)

---

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v_{12}$</td>
<td>3186</td>
<td>4400</td>
</tr>
</tbody>
</table>

---

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

Density, \[ D = 4.252 + 0.0086 v - 0.009 \quad L = 22.9 \quad \text{pc/mi/ln} \]

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

---

**Speed Estimation**

Intermediate speed variable, \[ D = 0.322 \]

Space mean speed in ramp influence area, \[ S = 64.4 \quad \text{mph} \]

Space mean speed in outer lanes, \[ S = \text{N/A} \quad \text{mph} \]

Space mean speed for all vehicles, \[ S = 64.4 \quad \text{mph} \]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US 176 EB Off-Ramp
Jurisdiction: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 3502 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: 284 vph
Length of first accel/decel lane: 1000 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?: Yes
Volume on adjacent ramp: 1079 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 900 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>3502</td>
<td>284</td>
<td>1079 vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>973</td>
<td>79</td>
<td>300 v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>14</td>
<td>2</td>
<td>2 %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>%</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, $f_{HV}$

Driver population factor, $f_P$

Flow rate, $v_F$

<table>
<thead>
<tr>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.826</td>
<td>0.971</td>
<td>0.971</td>
</tr>
<tr>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>4708</td>
<td>325</td>
<td>1235</td>
</tr>
</tbody>
</table>

---

**Estimation of V12 Diverge Areas**

\[ L = \text{(Equation 13-12 or 13-13)} \]

\[ P = 1.000 \quad \text{Using Equation 13-13} \]

\[ v = v + (v - v) P = 4708 \quad \text{pc/h} \]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v$ Fi</td>
<td>4708</td>
<td>4800</td>
</tr>
<tr>
<td>$v$ FO</td>
<td>4383</td>
<td>4800</td>
</tr>
<tr>
<td>$v$ R</td>
<td>325</td>
<td>2100</td>
</tr>
</tbody>
</table>

Is $v$ or $v$ > 2700 pc/h? No

Is $v$ or $v$ > $1.5 \frac{v}{2}$? No

If yes, $v = 4708$ (Equation 13-14, 13-16, 13-18, or 13-19)

---

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$v$ 12</td>
<td>4708</td>
<td>4400</td>
</tr>
</tbody>
</table>

---

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

Density,

\[ D = 4.252 + 0.0086 v - 0.009 L = 35.7 \quad \text{pc/mi/ln} \]

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

---

**Speed Estimation**

Intermediate speed variable,

\[ D = 0.327 \]

Space mean speed in ramp influence area,

\[ S = 64.2 \quad \text{mph} \]

Space mean speed in outer lanes,

\[ S = \text{N/A} \quad \text{mph} \]

Space mean speed for all vehicles,

\[ S = 64.2 \quad \text{mph} \]
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB Off-Ramp
Jurisdiction: 2040 No-Build
Analysis Year: Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 5028 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: 1738 vph
Length of first accel/decel lane: 1225 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? Yes
Volume on adjacent ramp: 177 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 775 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>5028</td>
<td>1738</td>
<td>177</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>1397</td>
<td>483</td>
<td>49</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV          0.837       0.971       0.971
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          6676        1989        203 pcph

Estimation of V12 Diverge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \text{ Using Equation 0} \]
\[ v = v + (v - v_p) P = 6676 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>6676</td>
<td></td>
</tr>
<tr>
<td>Fi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v - v</td>
<td>4687</td>
<td>4800</td>
</tr>
<tr>
<td>FO</td>
<td>F R</td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>1989</td>
<td>2100</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v or v</td>
<td>0 pc/h</td>
<td></td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is \( v > 2700 \text{ pc/h?} \) No
Is \( v > 1.5 v_{av34}/2 \) No

If yes, \( v_{12A} = 6676 \) (Equation 13-14, 13-17)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>6676</td>
<td>4400</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density,
\[ D = 4.252 + 0.0086 v - 0.009 \]
\[ L = 50.6 \text{ pc/mi/ln} \]

Space mean speed in ramp influence area,
\[ S = 59.3 \text{ mph} \]

Space mean speed in outer lanes,
\[ S = \text{N/A} \text{ mph} \]

Space mean speed for all vehicles,
\[ S = 59.3 \text{ mph} \]

Intermediate speed variable,
\[ D = 0.477 \]

Speed Estimation

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

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>6676</td>
<td>4400</td>
</tr>
</tbody>
</table>
**Freeway Merge and Diverge Segments**

**Release 6.65**

---

**Analyst:** AECOM  
**Agency/Co.:** AECOM  
**Date performed:** 7/1/2016  
**Analysis time period:** PM Peak  
**Freeway/Dir of Travel:** I-26 WB  
**Junction:** S-48 WB Off-Ramp  
**Jurisdiction:**  
**Analysis Year:** 2040 No-Build  
**Description:** S-48 IMR

---

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>75.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>3467 vph</td>
</tr>
</tbody>
</table>

### Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>1576 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1225 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

### Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>267 vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td>Downstream</td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td>On</td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>1475 ft</td>
</tr>
</tbody>
</table>

---

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>3467</td>
<td>1576</td>
<td>267           vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>963</td>
<td>438</td>
<td>74            v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2             %</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0             %</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00          %</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00          mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \text{ Using Equation 0} \]
\[ v = v + (v - v) P = 4603 \text{ pc/h} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = v</td>
<td>4603</td>
<td>4800</td>
</tr>
<tr>
<td>Fi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v = v - v</td>
<td>2799</td>
<td>4800</td>
</tr>
<tr>
<td>FO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>1804</td>
<td>2100</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v or v</td>
<td>0 pc/h</td>
<td></td>
</tr>
<tr>
<td>3 av34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \text{ or } v > 2700 \text{ pc/h?} \) No

Is \( v \text{ or } v > 1.5 v /2 \) No

If yes, \( v = 4603 \) (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>4603</td>
<td>4400</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 4.252 + 0.0086 v - 0.009 L = 32.8 \text{ pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, \( D = 0.460 \)

Space mean speed in ramp influence area, \( S = 59.8 \text{ mph} \)

Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \)

Space mean speed for all vehicles, \( S = 59.8 \text{ mph} \)
Diverge Analysis

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 75.0 mph
Volume on freeway: 2158 vph

Off Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-Flow speed on ramp: 25.0 mph
Volume on ramp: 140 vph
Length of first accel/decel lane: 400 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist: Yes
Volume on adjacent ramp: 66 vph
Position of adjacent ramp: Downstream
Type of adjacent ramp: On
Distance to adjacent ramp: 1000 ft

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2158</td>
<td>140</td>
<td>66</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>599</td>
<td>39</td>
<td>18</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>13</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Rolling</td>
<td>Rolling</td>
<td>Rolling</td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, f_{HV} \quad 0.837 \quad 0.971 \quad 0.971
Driver population factor, f_{P} \quad 1.00 \quad 1.00 \quad 1.00
Flow rate, v_p \quad 2865 \quad 160 \quad 76 \quad pc/h

---

Estimation of V12 Diverge Areas

\[
L = \text{EQ}
\]
\[
P = 1.00 \quad \text{Using Equation 0}
\]
\[
v = v_{12} + (v - v_{12}) P = 2865 \quad \text{pc/h}
\]

---

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v_{F}</td>
<td>v_{F}</td>
<td>No</td>
</tr>
<tr>
<td>v_{R}</td>
<td>v_{R}</td>
<td>No</td>
</tr>
</tbody>
</table>

If yes, v = 2865

---

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v_{12}</td>
<td>v_{12}</td>
<td>No</td>
</tr>
</tbody>
</table>

---

Level of Service Determination (if not F)

\[
D = 4.252 + 0.0086 v_{12} - 0.009 \quad L = 25.3 \quad \text{pc/mi/ln}
\]

---

Speed Estimation

Intermediate speed variable, \quad D = 0.572
Space mean speed in ramp influence area, \quad S = 56.1 \quad \text{mph}
Space mean speed in outer lanes, \quad S = N/A \quad \text{mph}
Space mean speed for all vehicles, \quad S = 56.1 \quad \text{mph}