# APPENDIX J

## MERGE/DIVERGE ANALYSIS

*APPENDIX J-I*

# EXISTING TRAFFIC CONDITIONS

# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Existing |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☐ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☑ Yes ☑ On |
| ☑ No ☐ Off | Ramp Number of Lanes, N: 1 | ☐ No ☐ Off |
| $L_{up}$ = ft | Acceleration Lane Length, $L_A$ | $L_{down}$ = 450 ft |
| $V_u$ = veh/h | Deceleration Lane Length $L_D$: 90 | $V_D$ = 1061 veh/h |
| | Freeway Volume, $V_F$: 3222 | |
| | Ramp Volume, $V_R$: 74 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3222 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3425 |
| Ramp | 74 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 79 |
| UpStream | | | | | | | | |
| DownStream | 1061 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1128 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3425 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3425 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 3346 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 79 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3425 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 32.9 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.435 (Exhibit 13-12)

$S_R$= 55.0 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 55.0 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Existing |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

Upstream Adj Ramp

☑ Yes ☐ On

☐ No ☑ Off

$L_{up}$ = 450 ft

$V_u$ = 74 veh/h

| | |
|---|---|
| Freeway Number of Lanes, N | 2 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, $L_A$ | 640 |
| Deceleration Lane Length $L_D$ | |
| Freeway Volume, $V_F$ | 3148 |
| Ramp Volume, $V_R$ | 1061 |
| Freeway Free-Flow Speed, $S_{FF}$ | 65.0 |
| Ramp Free-Flow Speed, $S_{FR}$ | 35.0 |

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

$L_{down}$ = ft

$V_D$ = veh/h

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3148 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3347 |
| Ramp | 1061 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1128 |
| UpStream | 74 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 79 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 1.000 using Equation (Exhibit 13-6)

$V_{12}$ = 3347 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 4475 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 4475 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 35.8 (pc/mi/ln)

LOS = E (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.619 (Exibit 13-11)

$S_R$ = 50.8 mph (Exhibit 13-11)

$S_0$ = N/A mph (Exhibit 13-11)

S = 50.8 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$ = mph (Exhibit 13-12)

$S_0$ = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Existing |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
$L_{up}$ = ft
$V_u$ = veh/h

| | |
|---|---|
| Freeway Number of Lanes, N | 2 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, $L_A$ | |
| Deceleration Lane Length $L_D$ | 350 |
| Freeway Volume, $V_F$ | 3193 |
| Ramp Volume, $V_R$ | 764 |
| Freeway Free-Flow Speed, $S_{FF}$ | 65.0 |
| Ramp Free-Flow Speed, $S_{FR}$ | 35.0 |

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
$L_{down}$ = 933 ft
$V_D$ = 83 veh/h

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3193 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3395 |
| Ramp | 764 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 812 |
| UpStream | | | | | | | | |
| DownStream | 83 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 88 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)
$P_{FM}$ = using Equation (Exhibit 13-6)
$V_{12}$ = pc/h
$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)
Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No
Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No
If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)
LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)
$S_R$= mph (Exhibit 13-11)
$S_0$= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)
$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)
$V_{12}$ = 3395 pc/h
$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)
Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No
Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No
If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3395 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2583 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 812 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3395 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 30.3 (pc/mi/ln)
LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.501 (Exhibit 13-12)
$S_R$= 53.5 mph (Exhibit 13-12)
$S_0$= N/A mph (Exhibit 13-12)
S = 53.5 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Existing |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 3 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 933 ft | Acceleration Lane Length, $L_A$: 1500 | $L_{down}$ = ft |
| $V_u$ = 764 veh/h | Deceleration Lane Length $L_D$ | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2429 | |
| | Ramp Volume, $V_R$: 83 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2429 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2582 |
| Ramp | 83 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 88 |
| UpStream | 764 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 812 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = 665.58 (Equation 13-6 or 13-7)

$P_{FM}$ = 0.619 using Equation (Exhibit 13-6)

$V_{12}$ = 1600 pc/h

$V_3$ or $V_{av34}$ 982 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☑ Yes ☐ No

If Yes, $V_{12a}$ = 1600 pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 2670 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 1688 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 9.2 (pc/mi/ln)

LOS = A (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.237 (Exibit 13-11)

$S_R$= 59.5 mph (Exhibit 13-11)

$S_0$= 63.3 mph (Exhibit 13-11)

S = 60.9 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Existing |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

$L_{up}$ = ft

$V_u$ = veh/h

| | |
|---|---|
| Freeway Number of Lanes, N | 2 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, $L_A$ | |
| Deceleration Lane Length $L_D$ | 90 |
| Freeway Volume, $V_F$ | 2854 |
| Ramp Volume, $V_R$ | 90 |
| Freeway Free-Flow Speed, $S_{FF}$ | 65.0 |
| Ramp Free-Flow Speed, $S_{FR}$ | 35.0 |

Downstream Adj Ramp

☑ Yes ☑ On

☐ No ☐ Off

$L_{down}$ = 450 ft

$V_D$ = 1180 veh/h

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2854 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3034 |
| Ramp | 90 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 96 |
| UpStream | | | | | | | | |
| DownStream | 1180 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1255 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3034 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3034 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2938 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 96 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3034 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 29.5 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.437 (Exhibit 13-12)

$S_R$= 55.0 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 55.0 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Existing |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Freeway Number of Lanes, N | 2 | Downstream Adj Ramp |
|---|---|---|---|---|
| ☑ Yes | ☐ On | Ramp Number of Lanes, N | 1 | ☐ Yes ☐ On |
| ☐ No | ☑ Off | Acceleration Lane Length, $L_A$ | 640 | ☑ No ☐ Off |
| | | Deceleration Lane Length $L_D$ | | |
| | | Freeway Volume, $V_F$ | 2764 | |
| $L_{up}$ = | 450 ft | Ramp Volume, $V_R$ | 1180 | $L_{down}$ = ft |
| | | Freeway Free-Flow Speed, $S_{FF}$ | 65.0 | |
| $V_u$ = | 90 veh/h | Ramp Free-Flow Speed, $S_{FR}$ | 35.0 | $V_D$ = veh/h |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2764 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2939 |
| Ramp | 1180 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1255 |
| UpStream | 90 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 96 |
| DownStream | | | | | | | | |

### Merge Areas

#### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 1.000 using Equation (Exhibit 13-6)

$V_{12}$ = 2939 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 4194 | Exhibit 13-8 | | No |

#### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 4194 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 33.6 (pc/mi/ln)

LOS = D (Exhibit 13-2)

#### Speed Determination

$M_S$ = 0.535 (Exibit 13-11)

$S_R$= 52.7 mph (Exhibit 13-11)

$S_0$= N/A mph (Exhibit 13-11)

S = 52.7 mph (Exhibit 13-13)

### Diverge Areas

#### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

#### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

#### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Existing |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Freeway Number of Lanes, N | 2 | Downstream Adj Ramp | |
|---|---|---|---|---|---|
| ☐ Yes | ☐ On | Ramp Number of Lanes, N | 1 | ☑ Yes | ☑ On |
| ☑ No | ☐ Off | Acceleration Lane Length, $L_A$ | | ☐ No | ☐ Off |
| $L_{up}$ = | ft | Deceleration Lane Length $L_D$ | 350 | $L_{down}$ = | 933 ft |
| $V_u$ = | veh/h | Freeway Volume, $V_F$ | 4041 | $V_D$ = | 37 veh/h |
| | | Ramp Volume, $V_R$ | 1481 | | |
| | | Freeway Free-Flow Speed, $S_{FF}$ | 65.0 | | |
| | | Ramp Free-Flow Speed, $S_{FR}$ | 35.0 | | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 4041 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 4296 |
| Ramp | 1481 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1575 |
| UpStream | | | | | | | | |
| DownStream | 37 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 39 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 4296 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 4296 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2721 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 1575 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 4296 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 38.0 (pc/mi/ln)

LOS = E (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.570 (Exhibit 13-12)

$S_R$= 51.9 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 51.9 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Existing |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 3 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 933 ft | Acceleration Lane Length, $L_A$: 1500 | $L_{down}$ = ft |
| $V_u$ = 1481 veh/h | Deceleration Lane Length $L_D$: | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2560 | |
| | Ramp Volume, $V_R$: 37 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2560 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2722 |
| Ramp | 37 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 39 |
| UpStream | 1481 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1575 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = 685.05 (Equation 13-6 or 13-7)

$P_{FM}$ = 0.619 using Equation (Exhibit 13-6)

$V_{12}$ = 1686 pc/h

$V_3$ or $V_{av34}$ 1036 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☑ Yes ☐ No

If Yes, $V_{12a}$ = 1686 pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 2761 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 1725 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 9.5 (pc/mi/ln)

LOS = A (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.238 (Exibit 13-11)

$S_R$= 59.5 mph (Exhibit 13-11)

$S_0$= 63.1 mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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*APPENDIX J-II*

# EXISTING PLUS PROJECT TRAFFIC CONDITIONS

# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Existing Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☐ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☑ Yes ☑ On |
| ☑ No ☐ Off | Ramp Number of Lanes, N: 1 | ☐ No ☐ Off |
| $L_{up}$ = ft | Acceleration Lane Length, $L_A$ | $L_{down}$ = 450 ft |
| $V_u$ = veh/h | Deceleration Lane Length $L_D$: 90 | $V_D$ = 1071 veh/h |
| | Freeway Volume, $V_F$: 3222 | |
| | Ramp Volume, $V_R$: 74 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3222 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3425 |
| Ramp | 74 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 79 |
| UpStream | | | | | | | | |
| DownStream | 1071 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1139 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3425 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3425 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 3346 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 79 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3425 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 32.9 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.435 (Exhibit 13-12)

$S_R$= 55.0 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 55.0 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Existing Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 450 ft | Acceleration Lane Length, $L_A$: 640 | $L_{down}$ = ft |
| $V_u$ = 74 veh/h | Deceleration Lane Length $L_D$ | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 3148 | |
| | Ramp Volume, $V_R$: 1071 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3148 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3347 |
| Ramp | 1071 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1139 |
| UpStream | 74 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 79 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 1.000 using Equation (Exhibit 13-6)

$V_{12}$ = 3347 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 4486 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 4486 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 35.9 (pc/mi/ln)

LOS = E (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.622 (Exibit 13-11)

$S_R$ = 50.7 mph (Exhibit 13-11)

$S_0$ = N/A mph (Exhibit 13-11)

S = 50.7 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$ = mph (Exhibit 13-12)

$S_0$ = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Existing Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Freeway Number of Lanes, N | 2 | Downstream Adj Ramp | |
|---|---|---|---|---|---|
| ☐ Yes | ☐ On | Ramp Number of Lanes, N | 1 | ☑ Yes | ☑ On |
| ☑ No | ☐ Off | Acceleration Lane Length, $L_A$ | | ☐ No | ☐ Off |
| $L_{up}$ = | ft | Deceleration Lane Length $L_D$ | 350 | $L_{down}$ = | 933 ft |
| $V_u$ = | veh/h | Freeway Volume, $V_F$ | 3206 | $V_D$ = | 83 veh/h |
| | | Ramp Volume, $V_R$ | 777 | | |
| | | Freeway Free-Flow Speed, $S_{FF}$ | 65.0 | | |
| | | Ramp Free-Flow Speed, $S_{FR}$ | 35.0 | | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3206 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3408 |
| Ramp | 777 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 826 |
| UpStream | | | | | | | | |
| DownStream | 83 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 88 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3408 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3408 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2582 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 826 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3408 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 30.4 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.502 (Exhibit 13-12)

$S_R$= 53.4 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 53.4 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Existing Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 3 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 933 ft | Acceleration Lane Length, $L_A$: 1500 | $L_{down}$ = ft |
| $V_u$ = 777 veh/h | Deceleration Lane Length $L_D$: | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2429 | |
| | Ramp Volume, $V_R$: 83 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2429 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2582 |
| Ramp | 83 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 88 |
| UpStream | 777 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 826 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = 665.58 (Equation 13-6 or 13-7)

$P_{FM}$ = 0.619 using Equation (Exhibit 13-6)

$V_{12}$ = 1600 pc/h

$V_3$ or $V_{av34}$ 982 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☑ Yes ☐ No

If Yes, $V_{12a}$ = 1600 pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 2670 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 1688 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 9.2 (pc/mi/ln)

LOS = A (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.237 (Exibit 13-11)

$S_R$= 59.5 mph (Exhibit 13-11)

$S_0$= 63.3 mph (Exhibit 13-11)

S = 60.9 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Existing Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Freeway Number of Lanes, N | 2 | Downstream Adj Ramp | |
|---|---|---|---|---|---|
| ☐ Yes | ☐ On | Ramp Number of Lanes, N | 1 | ☑ Yes | ☑ On |
| ☑ No | ☐ Off | Acceleration Lane Length, $L_A$ | | ☐ No | ☐ Off |
| $L_{up}$ = | ft | Deceleration Lane Length $L_D$ | 90 | $L_{down}$ = | 450 ft |
| $V_u$ = | veh/h | Freeway Volume, $V_F$ | 2854 | $V_D$ = | 1207 veh/h |
| | | Ramp Volume, $V_R$ | 90 | | |
| | | Freeway Free-Flow Speed, $S_{FF}$ | 65.0 | | |
| | | Ramp Free-Flow Speed, $S_{FR}$ | 35.0 | | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2854 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3034 |
| Ramp | 90 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 96 |
| UpStream | | | | | | | | |
| DownStream | 1207 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1283 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3034 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3034 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2938 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 96 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3034 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 29.5 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.437 (Exhibit 13-12)

$S_R$= 55.0 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 55.0 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Existing Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

Upstream Adj Ramp

☑ Yes ☐ On

☐ No ☑ Off

$L_{up}$ = 450 ft

$V_u$ = 90 veh/h

| | |
|---|---|
| Freeway Number of Lanes, N | 2 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, $L_A$ | 640 |
| Deceleration Lane Length $L_D$ | |
| Freeway Volume, $V_F$ | 2764 |
| Ramp Volume, $V_R$ | 1207 |
| Freeway Free-Flow Speed, $S_{FF}$ | 65.0 |
| Ramp Free-Flow Speed, $S_{FR}$ | 35.0 |

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

$L_{down}$ = ft

$V_D$ = veh/h

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2764 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2939 |
| Ramp | 1207 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1283 |
| UpStream | 90 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 96 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F(P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 1.000 using Equation (Exhibit 13-6)

$V_{12}$ = 2939 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 4222 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 4222 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 33.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.542 (Exibit 13-11)

$S_R$ = 52.5 mph (Exhibit 13-11)

$S_0$ = N/A mph (Exhibit 13-11)

S = 52.5 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$ = mph (Exhibit 13-12)

$S_0$ = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Existing Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
$L_{up}$ = ft
$V_u$ = veh/h

| | |
|---|---|
| Freeway Number of Lanes, N | 2 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, $L_A$ | |
| Deceleration Lane Length $L_D$ | 350 |
| Freeway Volume, $V_F$ | 4073 |
| Ramp Volume, $V_R$ | 1513 |
| Freeway Free-Flow Speed, $S_{FF}$ | 65.0 |
| Ramp Free-Flow Speed, $S_{FR}$ | 35.0 |

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
$L_{down}$ = 933 ft
$V_D$ = 37 veh/h

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 4073 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 4330 |
| Ramp | 1513 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1609 |
| UpStream | | | | | | | | |
| DownStream | 37 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 39 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)
$P_{FM}$ = using Equation (Exhibit 13-6)
$V_{12}$ = pc/h
$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)
Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No
Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No
If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)
LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)
$S_R$= mph (Exhibit 13-11)
$S_0$= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)
$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)
$V_{12}$ = 4330 pc/h
$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)
Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No
Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No
If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 4330 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2721 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 1609 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 4330 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 38.3 (pc/mi/ln)
LOS = E (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.573 (Exhibit 13-12)
$S_R$= 51.8 mph (Exhibit 13-12)
$S_0$= N/A mph (Exhibit 13-12)
S = 51.8 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Existing Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Freeway Number of Lanes, N | 3 | Downstream Adj Ramp |
|---|---|---|---|---|
| ☑ Yes | ☐ On | Ramp Number of Lanes, N | 1 | ☐ Yes ☐ On |
| ☐ No | ☑ Off | Acceleration Lane Length, $L_A$ | 1500 | ☑ No ☐ Off |
| $L_{up}$ = | 933 ft | Deceleration Lane Length $L_D$ | | $L_{down}$ = ft |
| $V_u$ = | 1513 veh/h | Freeway Volume, $V_F$ | 2560 | $V_D$ = veh/h |
| | | Ramp Volume, $V_R$ | 37 | |
| | | Freeway Free-Flow Speed, $S_{FF}$ | 65.0 | |
| | | Ramp Free-Flow Speed, $S_{FR}$ | 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2560 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2722 |
| Ramp | 37 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 39 |
| UpStream | 1513 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1609 |
| DownStream | | | | | | | | |

### Merge Areas

#### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = 685.05 (Equation 13-6 or 13-7)

$P_{FM}$ = 0.619 using Equation (Exhibit 13-6)

$V_{12}$ = 1686 pc/h

$V_3$ or $V_{av34}$ 1036 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☑ Yes ☐ No

If Yes, $V_{12a}$ = 1686 pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 2761 | Exhibit 13-8 | | No |

#### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 1725 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 9.5 (pc/mi/ln)

LOS = A (Exhibit 13-2)

#### Speed Determination

$M_S$ = 0.238 (Exibit 13-11)

$S_R$= 59.5 mph (Exhibit 13-11)

$S_0$= 63.1 mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

### Diverge Areas

#### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

#### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

#### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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*APPENDIX J-III*

# YEAR 2019 CUMULATIVE TRAFFIC CONDITIONS

# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Year 2019 |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Freeway Number of Lanes, N | 2 | Downstream Adj Ramp | |
|---|---|---|---|---|---|
| ☐ Yes | ☐ On | Ramp Number of Lanes, N | 1 | ☑ Yes | ☑ On |
| ☑ No | ☐ Off | Acceleration Lane Length, $L_A$ | | ☐ No | ☐ Off |
| $L_{up}$ = | ft | Deceleration Lane Length $L_D$ | 90 | $L_{down}$ = | 450 ft |
| $V_u$ = | veh/h | Freeway Volume, $V_F$ | 3323 | $V_D$ = | 1127 veh/h |
| | | Ramp Volume, $V_R$ | 80 | | |
| | | Freeway Free-Flow Speed, $S_{FF}$ | 65.0 | | |
| | | Ramp Free-Flow Speed, $S_{FR}$ | 35.0 | | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3323 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3533 |
| Ramp | 80 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 85 |
| UpStream | | | | | | | | |
| DownStream | 1127 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1198 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3533 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3533 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 3448 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 85 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3533 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 33.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.436 (Exhibit 13-12)

$S_R$= 55.0 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 55.0 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Year 2019 |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

Upstream Adj Ramp

☑ Yes ☐ On

☐ No ☑ Off

$L_{up}$ = 450 ft

$V_u$ = 80 veh/h

| | |
|---|---|
| Freeway Number of Lanes, N | 2 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, $L_A$ | 640 |
| Deceleration Lane Length $L_D$ | |
| Freeway Volume, $V_F$ | 3243 |
| Ramp Volume, $V_R$ | 1127 |
| Freeway Free-Flow Speed, $S_{FF}$ | 65.0 |
| Ramp Free-Flow Speed, $S_{FR}$ | 35.0 |

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

$L_{down}$ = ft

$V_D$ = veh/h

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3243 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3448 |
| Ramp | 1127 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1198 |
| UpStream | 80 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 85 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 1.000 using Equation (Exhibit 13-6)

$V_{12}$ = 3448 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 4646 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 4646 | Exhibit 13-8 | 4600:All | Yes |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 37.1 (pc/mi/ln)

LOS = E (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.682 (Exibit 13-11)

$S_R$= 49.3 mph (Exhibit 13-11)

$S_0$= N/A mph (Exhibit 13-11)

S = 49.3 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Year 2019 |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☐ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☑ Yes ☑ On |
| ☑ No ☐ Off | Ramp Number of Lanes, N: 1 | ☐ No ☐ Off |
| $L_{up}$ = ft | Acceleration Lane Length, $L_A$ | $L_{down}$ = 933 ft |
| $V_u$ = veh/h | Deceleration Lane Length $L_D$: 350 | $V_D$ = 85 veh/h |
| | Freeway Volume, $V_F$: 3354 | |
| | Ramp Volume, $V_R$: 851 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3354 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3566 |
| Ramp | 851 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 905 |
| UpStream | | | | | | | | |
| DownStream | 85 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 90 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3566 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3566 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2661 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 905 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3566 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 31.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.509 (Exhibit 13-12)

$S_R$= 53.3 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 53.3 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Year 2019 |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 3 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 933 ft | Acceleration Lane Length, $L_A$: 1500 | $L_{down}$ = ft |
| $V_u$ = 851 veh/h | Deceleration Lane Length $L_D$ | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2503 | |
| | Ramp Volume, $V_R$: 85 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2503 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2661 |
| Ramp | 85 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 90 |
| UpStream | 851 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 905 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = 682.91 (Equation 13-6 or 13-7)

$P_{FM}$ = 0.619 using Equation (Exhibit 13-6)

$V_{12}$ = 1648 pc/h

$V_3$ or $V_{av34}$ 1013 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☑ Yes ☐ No

If Yes, $V_{12a}$ = 1648 pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 2751 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 1738 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 9.6 (pc/mi/ln)

LOS = A (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.238 (Exibit 13-11)

$S_R$= 59.5 mph (Exhibit 13-11)

$S_0$= 63.2 mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Year 2019 |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☐ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☑ Yes ☑ On |
| ☑ No ☐ Off | Ramp Number of Lanes, N: 1 | ☐ No ☐ Off |
| $L_{up}$ = ft | Acceleration Lane Length, $L_A$ | $L_{down}$ = 450 ft |
| $V_u$ = veh/h | Deceleration Lane Length $L_D$: 90 | $V_D$ = 1281 veh/h |
| | Freeway Volume, $V_F$: 2941 | |
| | Ramp Volume, $V_R$: 94 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2941 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3127 |
| Ramp | 94 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 100 |
| UpStream | | | | | | | | |
| DownStream | 1281 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1362 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3127 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3127 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 3027 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 100 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3127 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 30.3 (pc/mi/ln)

LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.437 (Exhibit 13-12)

$S_R$= 54.9 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 54.9 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Year 2019 |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 450 ft | Acceleration Lane Length, $L_A$: 640 | $L_{down}$ = ft |
| $V_u$ = 94 veh/h | Deceleration Lane Length $L_D$: | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2847 | |
| | Ramp Volume, $V_R$: 1281 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2847 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3027 |
| Ramp | 1281 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1362 |
| UpStream | 94 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 100 |
| DownStream | | | | | | | | |

### Merge Areas

#### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 1.000 using Equation (Exhibit 13-6)

$V_{12}$ = 3027 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 4389 | Exhibit 13-8 | | No |

#### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 4389 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 35.1 (pc/mi/ln)

LOS = E (Exhibit 13-2)

#### Speed Determination

$M_S$ = 0.590 (Exibit 13-11)

$S_R$ = 51.4 mph (Exhibit 13-11)

$S_0$ = N/A mph (Exhibit 13-11)

S = 51.4 mph (Exhibit 13-13)

### Diverge Areas

#### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

#### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

#### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$ = mph (Exhibit 13-12)

$S_0$ = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Year 2019 |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☐ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☑ Yes ☑ On |
| ☑ No ☐ Off | Ramp Number of Lanes, N: 1 | ☐ No ☐ Off |
| $L_{up}$ = ft | Acceleration Lane Length, $L_A$ | $L_{down}$ = 933 ft |
| $V_u$ = veh/h | Deceleration Lane Length $L_D$: 350 | $V_D$ = 38 veh/h |
| | Freeway Volume, $V_F$: 4202 | |
| | Ramp Volume, $V_R$: 1561 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 4202 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 4467 |
| Ramp | 1561 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1660 |
| UpStream | | | | | | | | |
| DownStream | 38 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 40 |

### Merge Areas

#### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

#### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

#### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

### Diverge Areas

#### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 4467 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 4467 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2807 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 1660 | Exhibit 13-10 | 2000 | No |

#### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 4467 | Exhibit 13-8 | 4400:All | Yes |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 39.5 (pc/mi/ln)

LOS = E (Exhibit 13-2)

#### Speed Determination

$D_s$ = 0.577 (Exhibit 13-12)

$S_R$= 51.7 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 51.7 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Year 2019 |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 3 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 933 ft | Acceleration Lane Length, $L_A$: 1500 | $L_{down}$ = ft |
| $V_u$ = 1561 veh/h | Deceleration Lane Length $L_D$ | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2641 | |
| | Ramp Volume, $V_R$: 38 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2641 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2808 |
| Ramp | 38 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 40 |
| UpStream | 1561 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1660 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = 703.67 (Equation 13-6 or 13-7)

$P_{FM}$ = 0.619 using Equation (Exhibit 13-6)

$V_{12}$ = 1740 pc/h

$V_3$ or $V_{av34}$ 1068 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☑ Yes ☐ No

If Yes, $V_{12a}$ = 1740 pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 2848 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 1780 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 9.9 (pc/mi/ln)

LOS = A (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.239 (Exibit 13-11)

$S_R$= 59.5 mph (Exhibit 13-11)

$S_0$= 63.0 mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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*APPENDIX J-IV*

# YEAR 2019 CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS

# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Year 2019 Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
$L_{up}$ = ft
$V_u$ = veh/h

| | |
|---|---|
| Freeway Number of Lanes, N | 2 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, $L_A$ | |
| Deceleration Lane Length $L_D$ | 90 |
| Freeway Volume, $V_F$ | 3323 |
| Ramp Volume, $V_R$ | 80 |
| Freeway Free-Flow Speed, $S_{FF}$ | 65.0 |
| Ramp Free-Flow Speed, $S_{FR}$ | 35.0 |

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
$L_{down}$ = 450 ft
$V_D$ = 1137 veh/h

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3323 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3533 |
| Ramp | 80 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 85 |
| UpStream | | | | | | | | |
| DownStream | 1137 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1209 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)
$P_{FM}$ = using Equation (Exhibit 13-6)
$V_{12}$ = pc/h
$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)
Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No
Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No
If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)
LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)
$S_R$= mph (Exhibit 13-11)
$S_0$= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)
$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)
$V_{12}$ = 3533 pc/h
$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)
Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No
Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No
If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3533 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 3448 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 85 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3533 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 33.8 (pc/mi/ln)
LOS = D (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.436 (Exhibit 13-12)
$S_R$= 55.0 mph (Exhibit 13-12)
$S_0$= N/A mph (Exhibit 13-12)
S = 55.0 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Year 2019 Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 450 ft | Acceleration Lane Length, $L_A$: 640 | $L_{down}$ = ft |
| $V_u$ = 80 veh/h | Deceleration Lane Length $L_D$: | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 3243 | |
| | Ramp Volume, $V_R$: 1137 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3243 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3448 |
| Ramp | 1137 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1209 |
| UpStream | 80 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 85 |
| DownStream | | | | | | | | |

### Merge Areas

#### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 1.000 using Equation (Exhibit 13-6)

$V_{12}$ = 3448 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 4657 | Exhibit 13-8 | | No |

#### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 4657 | Exhibit 13-8 | 4600:All | Yes |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 37.2 (pc/mi/ln)

LOS = E (Exhibit 13-2)

#### Speed Determination

$M_S$ = 0.687 (Exibit 13-11)

$S_R$= 49.2 mph (Exhibit 13-11)

$S_0$= N/A mph (Exhibit 13-11)

S = 49.2 mph (Exhibit 13-13)

### Diverge Areas

#### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

#### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

#### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Year 2019 Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | | Downstream Adj Ramp |
|---|---|---|---|
| ☐ Yes ☐ On | Freeway Number of Lanes, N | 2 | ☑ Yes ☑ On |
| ☑ No ☐ Off | Ramp Number of Lanes, N | 1 | ☐ No ☐ Off |
| $L_{up}$ = ft | Acceleration Lane Length, $L_A$ | | $L_{down}$ = 933 ft |
| $V_u$ = veh/h | Deceleration Lane Length $L_D$ | 350 | $V_D$ = 85 veh/h |
| | Freeway Volume, $V_F$ | 3367 | |
| | Ramp Volume, $V_R$ | 864 | |
| | Freeway Free-Flow Speed, $S_{FF}$ | 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$ | 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 3367 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3580 |
| Ramp | 864 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 919 |
| UpStream | | | | | | | | |
| DownStream | 85 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 90 |

### Merge Areas

#### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

#### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

#### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

### Diverge Areas

#### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3580 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3580 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2661 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 919 | Exhibit 13-10 | 2000 | No |

#### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3580 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 31.9 (pc/mi/ln)

LOS = D (Exhibit 13-2)

#### Speed Determination

$D_s$ = 0.511 (Exhibit 13-12)

$S_R$= 53.3 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 53.3 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | AM Peak Hour | Analysis Year | Year 2019 Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 3 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 933 ft | Acceleration Lane Length, $L_A$: 1500 | $L_{down}$ = ft |
| $V_u$ = 864 veh/h | Deceleration Lane Length $L_D$ | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2503 | |
| | Ramp Volume, $V_R$: 85 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2503 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2661 |
| Ramp | 85 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 90 |
| UpStream | 864 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 919 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = 682.91 (Equation 13-6 or 13-7)

$P_{FM}$ = 0.619 using Equation (Exhibit 13-6)

$V_{12}$ = 1648 pc/h

$V_3$ or $V_{av34}$ 1013 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☑ Yes ☐ No

If Yes, $V_{12a}$ = 1648 pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 2751 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 1738 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 9.6 (pc/mi/ln)

LOS = A (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.238 (Exibit 13-11)

$S_R$= 59.5 mph (Exhibit 13-11)

$S_0$= 63.2 mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Year 2019 Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☐ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☑ Yes ☑ On |
| ☑ No ☐ Off | Ramp Number of Lanes, N: 1 | ☐ No ☐ Off |
| $L_{up}$ = ft | Acceleration Lane Length, $L_A$ | $L_{down}$ = 450 ft |
| $V_u$ = veh/h | Deceleration Lane Length $L_D$: 90 | $V_D$ = 1308 veh/h |
| | Freeway Volume, $V_F$: 2941 | |
| | Ramp Volume, $V_R$: 94 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2941 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3127 |
| Ramp | 94 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 100 |
| UpStream | | | | | | | | |
| DownStream | 1308 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1391 |

### Merge Areas

#### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = using Equation (Exhibit 13-6)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

#### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

#### Speed Determination

$M_S$ = (Exibit 13-11)

$S_R$= mph (Exhibit 13-11)

$S_0$= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

### Diverge Areas

#### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)

$V_{12}$ = 3127 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 3127 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 3027 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 100 | Exhibit 13-10 | 2000 | No |

#### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 3127 | Exhibit 13-8 | 4400:All | No |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 30.3 (pc/mi/ln)

LOS = D (Exhibit 13-2)

#### Speed Determination

$D_s$ = 0.437 (Exhibit 13-12)

$S_R$= 54.9 mph (Exhibit 13-12)

$S_0$= N/A mph (Exhibit 13-12)

S = 54.9 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 EB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Year 2019 Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 2 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 450 ft | Acceleration Lane Length, $L_A$: 640 | $L_{down}$ = ft |
| $V_u$ = 94 veh/h | Deceleration Lane Length $L_D$: | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2847 | |
| | Ramp Volume, $V_R$: 1308 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2847 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 3027 |
| Ramp | 1308 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1391 |
| UpStream | 94 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 100 |
| DownStream | | | | | | | | |

### Merge Areas

#### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 1.000 using Equation (Exhibit 13-6)

$V_{12}$ = 3027 pc/h

$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 4418 | Exhibit 13-8 | | No |

#### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 4418 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 35.3 (pc/mi/ln)

LOS = E (Exhibit 13-2)

#### Speed Determination

$M_S$ = 0.600 (Exibit 13-11)

$S_R$ = 51.2 mph (Exhibit 13-11)

$S_0$ = N/A mph (Exhibit 13-11)

S = 51.2 mph (Exhibit 13-13)

### Diverge Areas

#### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

#### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

#### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$ = mph (Exhibit 13-12)

$S_0$ = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | Off-Ramp to Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Year 2019 Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
$L_{up}$ = ft
$V_u$ = veh/h

| | |
|---|---|
| Freeway Number of Lanes, N | 2 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, $L_A$ | |
| Deceleration Lane Length $L_D$ | 350 |
| Freeway Volume, $V_F$ | 4234 |
| Ramp Volume, $V_R$ | 1593 |
| Freeway Free-Flow Speed, $S_{FF}$ | 65.0 |
| Ramp Free-Flow Speed, $S_{FR}$ | 35.0 |

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
$L_{down}$ = 933 ft
$V_D$ = 38 veh/h

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 4234 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 4501 |
| Ramp | 1593 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1694 |
| UpStream | | | | | | | | |
| DownStream | 38 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 40 |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = (Equation 13-6 or 13-7)
$P_{FM}$ = using Equation (Exhibit 13-6)
$V_{12}$ = pc/h
$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)
Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No
Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☐ No
If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | | Exhibit 13-8 | | |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | | Exhibit 13-8 | | |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = (pc/mi/ln)
LOS = (Exhibit 13-2)

### Speed Determination

$M_S$ = (Exibit 13-11)
$S_R$= mph (Exhibit 13-11)
$S_0$= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)
$P_{FD}$ = 1.000 using Equation (Exhibit 13-7)
$V_{12}$ = 4501 pc/h
$V_3$ or $V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)
Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No
Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}$/2 ☐ Yes ☑ No
If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | 4501 | Exhibit 13-8 | 4700 | No |
| $V_{FO} = V_F - V_R$ | 2807 | Exhibit 13-8 | 4700 | No |
| $V_R$ | 1694 | Exhibit 13-10 | 2000 | No |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | 4501 | Exhibit 13-8 | 4400:All | Yes |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = 39.8 (pc/mi/ln)
LOS = E (Exhibit 13-2)

### Speed Determination

$D_s$ = 0.580 (Exhibit 13-12)
$S_R$= 51.6 mph (Exhibit 13-12)
$S_0$= N/A mph (Exhibit 13-12)
S = 51.6 mph (Exhibit 13-13)

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# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | ML | Freeway/Dir of Travel | SR-22 WB |
| Agency or Company | LLG | Junction | On-Ramp from Studebaker Rd |
| Date Performed | 1/18/17 | Jurisdiction | |
| Analysis Time Period | PM Peak Hour | Analysis Year | Year 2019 Plus Project |

Project Description 2-16-3779 2nd & PCH Project, Long Beach

## Inputs

| Upstream Adj Ramp | | Downstream Adj Ramp |
|---|---|---|
| ☑ Yes ☐ On | Freeway Number of Lanes, N: 3 | ☐ Yes ☐ On |
| ☐ No ☑ Off | Ramp Number of Lanes, N: 1 | ☑ No ☐ Off |
| $L_{up}$ = 933 ft | Acceleration Lane Length, $L_A$: 1500 | $L_{down}$ = ft |
| $V_u$ = 1593 veh/h | Deceleration Lane Length $L_D$ | $V_D$ = veh/h |
| | Freeway Volume, $V_F$: 2641 | |
| | Ramp Volume, $V_R$: 38 | |
| | Freeway Free-Flow Speed, $S_{FF}$: 65.0 | |
| | Ramp Free-Flow Speed, $S_{FR}$: 35.0 | |

## Conversion to pc/h Under Base Conditions

| (pc/h) | V (Veh/hr) | PHF | Terrain | %Truck | %Rv | $f_{HV}$ | $f_p$ | $v = V/PHF \times f_{HV} \times f_p$ |
|---|---|---|---|---|---|---|---|---|
| Freeway | 2641 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 2808 |
| Ramp | 38 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 40 |
| UpStream | 1593 | 0.95 | Level | 2 | 0 | 0.990 | 1.00 | 1694 |
| DownStream | | | | | | | | |

## Merge Areas

### Estimation of $v_{12}$

$V_{12} = V_F (P_{FM})$

$L_{EQ}$ = 703.67 (Equation 13-6 or 13-7)

$P_{FM}$ = 0.619 using Equation (Exhibit 13-6)

$V_{12}$ = 1740 pc/h

$V_3$ or $V_{av34}$ 1068 pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☑ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☑ Yes ☐ No

If Yes, $V_{12a}$ = 1740 pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_{FO}$ | 2848 | Exhibit 13-8 | | No |

### Flow Entering Merge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{R12}$ | 1780 | Exhibit 13-8 | 4600:All | No |

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

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

$D_R$ = 9.9 (pc/mi/ln)

LOS = A (Exhibit 13-2)

### Speed Determination

$M_S$ = 0.239 (Exibit 13-11)

$S_R$= 59.5 mph (Exhibit 13-11)

$S_0$= 63.0 mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

## Diverge Areas

### Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = using Equation (Exhibit 13-7)

$V_{12}$ = pc/h

$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17)

Is $V_3$ or $V_{av34}$ > 2,700 pc/h? ☐ Yes ☐ No

Is $V_3$ or $V_{av34}$ > 1.5 * $V_{12}/2$ ☐ Yes ☐ No

If Yes, $V_{12a}$ = pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| | Actual | Capacity | | LOS F? |
|---|---|---|---|---|
| $V_F$ | | Exhibit 13-8 | | |
| $V_{FO} = V_F - V_R$ | | Exhibit 13-8 | | |
| $V_R$ | | Exhibit 13-10 | | |

### Flow Entering Diverge Influence Area

| | Actual | Max Desirable | | Violation? |
|---|---|---|---|---|
| $V_{12}$ | | Exhibit 13-8 | | |

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

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

$D_R$ = (pc/mi/ln)

LOS = (Exhibit 13-2)

### Speed Determination

$D_s$ = (Exhibit 13-12)

$S_R$= mph (Exhibit 13-12)

$S_0$= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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# APPENDIX K

## EXISTING PLUS CONSTRUCTION TRAFFIC LEVEL OF SERVICE CALCULATION WORKSHEETS

AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Bellflower Boulevard at Atherton Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.795 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 81 | Level Of Service: | C |

| Street Name: | Bellflower Boulevard | | | | | | Atherton Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 3 0 | 1 | 2 0 | 2 1 | 0 | 1 0 | 2 0 | 1 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 65 | 573 | 223 | 467 | 1165 | 103 | 78 | 650 | 173 | 177 | 341 | 92 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 65 | 573 | 223 | 467 | 1165 | 103 | 78 | 650 | 173 | 177 | 341 | 92 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 65 | 573 | 223 | 467 | 1165 | 103 | 78 | 650 | 173 | 177 | 341 | 92 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 65 | 573 | 223 | 467 | 1165 | 103 | 78 | 650 | 173 | 177 | 341 | 92 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 65 | 573 | 223 | 467 | 1165 | 103 | 78 | 650 | 173 | 177 | 341 | 92 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 65 | 573 | 223 | 467 | 1165 | 103 | 78 | 650 | 173 | 177 | 341 | 92 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 3.00 | 1.00 | 2.00 | 2.76 | 0.24 | 1.00 | 2.00 | 1.00 | 1.00 | 1.58 | 0.42 |
| Final Sat.: | 1600 | 4800 | 1600 | 2880 | 4410 | 390 | 1600 | 3200 | 1600 | 1600 | 2520 | 680 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.12 | 0.14 | 0.16 | 0.26 | 0.26 | 0.05 | 0.20 | 0.11 | 0.11 | 0.14 | 0.14 |
| Crit Moves: | | | **** | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Pacific Coast Highway at Clark Avenue

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.854 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 91 | Level Of Service: | D |

| Street Name: | Pacific Coast Highway | | | | | | Clark Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 0 1 | 0 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 5 | 1245 | 159 | 87 | 761 | 24 | 7 | 503 | 13 | 76 | 405 | 43 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 5 | 1245 | 159 | 87 | 761 | 24 | 7 | 503 | 13 | 76 | 405 | 43 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 5 | 1245 | 159 | 87 | 761 | 24 | 7 | 503 | 13 | 76 | 405 | 43 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 5 | 1245 | 159 | 87 | 761 | 24 | 7 | 503 | 13 | 76 | 405 | 43 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 5 | 1245 | 159 | 87 | 761 | 24 | 7 | 503 | 13 | 76 | 405 | 43 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 5 | 1245 | 159 | 87 | 761 | 24 | 7 | 503 | 13 | 76 | 405 | 43 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.77 | 0.23 | 1.00 | 1.94 | 0.06 | 0.03 | 1.92 | 0.05 | 1.00 | 1.81 | 0.19 |
| Final Sat.: | 1600 | 2838 | 362 | 1600 | 3102 | 98 | 43 | 3078 | 80 | 1600 | 2893 | 307 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.44 | 0.44 | 0.05 | 0.25 | 0.25 | 0.00 | 0.16 | 0.16 | 0.05 | 0.14 | 0.14 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Pacific Coast Highway at Anaheim Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.765 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 70 | Level Of Service: | C |

| Street Name: | Pacific Coast Highway | | | | | | Anaheim Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Ovl | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 0 1 | 1 0 | 1 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 391 | 1325 | 49 | 86 | 763 | 20 | 23 | 205 | 554 | 38 | 109 | 56 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 391 | 1325 | 49 | 86 | 763 | 20 | 23 | 205 | 554 | 38 | 109 | 56 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 391 | 1325 | 49 | 86 | 763 | 20 | 23 | 205 | 554 | 38 | 109 | 56 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 391 | 1325 | 49 | 86 | 763 | 20 | 23 | 205 | 554 | 38 | 109 | 56 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 391 | 1325 | 49 | 86 | 763 | 20 | 23 | 205 | 554 | 38 | 109 | 56 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 391 | 1325 | 49 | 86 | 763 | 20 | 23 | 205 | 554 | 38 | 109 | 56 |
| OvlAdjVol: | | | | | | | | | 163 | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.93 | 0.07 | 1.00 | 1.95 | 0.05 | 0.20 | 1.80 | 1.00 | 0.52 | 1.48 | 1.00 |
| Final Sat.: | 1600 | 3086 | 114 | 1600 | 3118 | 82 | 323 | 2877 | 1600 | 827 | 2373 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.24 | 0.43 | 0.43 | 0.05 | 0.24 | 0.24 | 0.01 | 0.07 | 0.35 | 0.02 | 0.05 | 0.04 |
| OvlAdjV/S: | | | | | | | | | 0.10 | | | |
| Crit Moves: | **** | | | | **** | | | | **** | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Studebaker Road at Anaheim Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.777 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 72 | Level Of Service: | C |

| Street Name: | Studebaker Road | | | | | | Anaheim Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 2 0 | 1 | 1 0 | 0 1 | 1 | 0 0 | 1! 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 387 | 791 | 12 | 23 | 925 | 179 | 61 | 11 | 142 | 53 | 17 | 22 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 387 | 791 | 12 | 23 | 925 | 179 | 61 | 11 | 142 | 53 | 17 | 22 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 387 | 791 | 12 | 23 | 925 | 179 | 61 | 11 | 142 | 53 | 17 | 22 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 387 | 791 | 12 | 23 | 925 | 179 | 61 | 11 | 142 | 53 | 17 | 22 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 387 | 791 | 12 | 23 | 925 | 179 | 61 | 11 | 142 | 53 | 17 | 22 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 387 | 791 | 12 | 23 | 925 | 179 | 61 | 11 | 142 | 53 | 17 | 22 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.97 | 0.03 | 1.00 | 2.00 | 1.00 | 1.00 | 0.14 | 1.86 | 0.58 | 0.18 | 0.24 |
| Final Sat.: | 1600 | 3152 | 48 | 1600 | 3200 | 1600 | 1600 | 230 | 2970 | 922 | 296 | 383 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.24 | 0.25 | 0.25 | 0.01 | 0.29 | 0.11 | 0.04 | 0.05 | 0.05 | 0.03 | 0.06 | 0.06 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Park Avenue at 7th Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.954 |
| Loss Time (sec): | 12 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 138 | Level Of Service: | E |

| Street Name: | Park Avenue | | | | | | 7th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Permitted | | | Permitted | | | Permitted | | | Prot+Permit | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 19 | 304 | 343 | 96 | 171 | 72 | 52 | 1533 | 35 | 112 | 1140 | 64 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 19 | 304 | 343 | 96 | 171 | 72 | 52 | 1533 | 35 | 112 | 1140 | 64 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 19 | 304 | 343 | 96 | 171 | 72 | 52 | 1533 | 35 | 112 | 1140 | 64 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 19 | 304 | 343 | 96 | 171 | 72 | 52 | 1533 | 35 | 112 | 1140 | 64 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 19 | 304 | 343 | 96 | 171 | 72 | 52 | 1533 | 35 | 112 | 1140 | 64 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 19 | 304 | 343 | 96 | 171 | 72 | 52 | 1533 | 35 | 112 | 1140 | 64 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.96 | 0.04 | 1.00 | 1.89 | 0.11 |
| Final Sat.: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 3129 | 71 | 1600 | 3030 | 170 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.19 | 0.21 | 0.06 | 0.11 | 0.05 | 0.03 | 0.49 | 0.49 | 0.07 | 0.38 | 0.38 |
| Crit Moves: | | | **** | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Pacific Coast Highway at 7th Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.980 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 159 | Level Of Service: | E |

| Street Name: | Pacific Coast Highway | | | | | | 7th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 | 1 0 | 2 0 | 2 | 1 0 | 0 0 | 2 | 1 0 | 0 0 | 2 | 0 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 125 | 1130 | 3 | 522 | 863 | 4 | 0 | 1801 | 181 | 0 | 1210 | 462 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 125 | 1130 | 3 | 522 | 863 | 4 | 0 | 1801 | 181 | 0 | 1210 | 462 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 125 | 1130 | 3 | 522 | 863 | 4 | 0 | 1801 | 181 | 0 | 1210 | 462 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 125 | 1130 | 3 | 522 | 863 | 4 | 0 | 1801 | 181 | 0 | 1210 | 462 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 125 | 1130 | 3 | 522 | 863 | 4 | 0 | 1801 | 181 | 0 | 1210 | 462 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 125 | 1130 | 3 | 522 | 863 | 4 | 0 | 1801 | 181 | 0 | 1210 | 462 |
| OvlAdjVol: | | | | | | | | | | | | 172 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.99 | 0.01 | 2.00 | 2.99 | 0.01 | 0.00 | 2.73 | 0.27 | 0.00 | 2.00 | 1.00 |
| Final Sat.: | 1600 | 4787 | 13 | 2880 | 4778 | 22 | 0 | 4362 | 438 | 0 | 3200 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.24 | 0.24 | 0.18 | 0.18 | 0.18 | 0.00 | 0.41 | 0.41 | 0.00 | 0.38 | 0.29 |
| OvlAdjV/S: | | | | | | | | | | | | 0.11 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Bellflower Boulevard at 7th Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.917 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 119 | Level Of Service: | E |

| Street Name: | Bellflower Boulevard | | | | | | 7th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Protected | | | Protected | | | Protected | | |
| Rights: | Ignore | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 3 0 | 1 | 2 0 | 2 0 | 1 | 1 0 | 2 1 | 0 | 1 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 567 | 143 | 208 | 305 | 161 | 270 | 1988 | 9 | 29 | 1560 | 254 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 567 | 143 | 208 | 305 | 161 | 270 | 1988 | 9 | 29 | 1560 | 254 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 567 | 143 | 208 | 305 | 161 | 270 | 1988 | 9 | 29 | 1560 | 254 |
| User Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 567 | 0 | 208 | 305 | 161 | 270 | 1988 | 9 | 29 | 1560 | 254 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 567 | 0 | 208 | 305 | 161 | 270 | 1988 | 9 | 29 | 1560 | 254 |
| PCE Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 567 | 0 | 208 | 305 | 161 | 270 | 1988 | 9 | 29 | 1560 | 254 |
| OvlAdjVol: | | | | | | 0 | | | | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 3.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 2.99 | 0.01 | 1.00 | 2.58 | 0.42 |
| Final Sat.: | 0 | 4800 | 1600 | 2880 | 3200 | 1600 | 1600 | 4778 | 22 | 1600 | 4128 | 672 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.12 | 0.00 | 0.07 | 0.10 | 0.10 | 0.17 | 0.42 | 0.42 | 0.02 | 0.38 | 0.38 |
| OvlAdjV/S: | | | | | | 0.00 | | | | | | |
| Crit Moves: | | **** | | **** | | | **** | | | | **** | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Studebaker Road at SR-22 Westbound Ramps

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.698 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 136 | Level Of Service: | B |

| Street Name: | Studebaker Road | | | | | | SR-22 Westbound Ramps | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Ignore | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 1 1 | 0 | 1 0 | 2 0 | 0 | 0 0 | 0 0 | 0 | 2 0 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 771 | 42 | 53 | 1099 | 0 | 0 | 0 | 0 | 589 | 0 | 456 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 771 | 42 | 53 | 1099 | 0 | 0 | 0 | 0 | 589 | 0 | 456 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 771 | 42 | 53 | 1099 | 0 | 0 | 0 | 0 | 589 | 0 | 456 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| PHF Volume: | 0 | 771 | 42 | 53 | 1099 | 0 | 0 | 0 | 0 | 589 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 771 | 42 | 53 | 1099 | 0 | 0 | 0 | 0 | 589 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| FinalVolume: | 0 | 771 | 42 | 53 | 1099 | 0 | 0 | 0 | 0 | 589 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 |
| Lanes: | 0.00 | 1.90 | 0.10 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 3035 | 165 | 1600 | 3200 | 0 | 0 | 0 | 0 | 2880 | 0 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.25 | 0.25 | 0.03 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 |
| Crit Moves: | | | | | **** | | | | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Bellflower Boulevard at Pacific Coast Highway

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.664 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 56 | Level Of Service: | B |

| Street Name: | Bellflower Boulevard | | | | | | Pacific Coast Highway | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 0 | 1 | 1 1 | 2 0 | 1 | 1 0 | 2 1 | 0 | 1 0 | 3 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 87 | 409 | 70 | 235 | 117 | 0 | 75 | 941 | 34 | 24 | 1235 | 304 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 87 | 409 | 70 | 235 | 117 | 0 | 75 | 941 | 34 | 24 | 1235 | 304 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 87 | 409 | 70 | 235 | 117 | 0 | 75 | 941 | 34 | 24 | 1235 | 304 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 87 | 409 | 70 | 235 | 117 | 0 | 75 | 941 | 34 | 24 | 1235 | 304 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 87 | 409 | 70 | 235 | 117 | 0 | 75 | 941 | 34 | 24 | 1235 | 304 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 87 | 409 | 70 | 235 | 117 | 0 | 75 | 941 | 34 | 24 | 1235 | 304 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 2.90 | 0.10 | 1.00 | 3.00 | 1.00 |
| Final Sat.: | 1600 | 3200 | 1600 | 2880 | 3200 | 1600 | 1600 | 4633 | 167 | 1600 | 4800 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.13 | 0.04 | 0.08 | 0.04 | 0.00 | 0.05 | 0.20 | 0.20 | 0.02 | 0.26 | 0.19 |
| Crit Moves: | | **** | | **** | | | **** | | | | **** | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 Studebaker Road at SR-22 Eastbound Ramps

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | ~~0.648~~ 0.864 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 86 | Level Of Service: | ~~B~~ D |

| Street Name: | Studebaker Road | | | | | | SR-22 Eastbound Ramps | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Permitted | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 2 0 | 1 | 1 0 | 2 0 | 0 | 0 0 | 0 0 | 0 | 1 0 | 1! 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 603 | 884 | 195 | 1468 | 0 | 0 | 0 | 0 | 11 | 0 | 63 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 603 | 884 | 195 | 1468 | 0 | 0 | 0 | 0 | 11 | 0 | 63 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 603 | 884 | 195 | 1468 | 0 | 0 | 0 | 0 | 11 | 0 | 63 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 603 | 884 | 195 | 1468 | 0 | 0 | 0 | 0 | 11 | 0 | 63 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 603 | 884 | 195 | 1468 | 0 | 0 | 0 | 0 | 11 | 0 | 63 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 603 | 884 | 195 | 1468 | 0 | 0 | 0 | 0 | 11 | 0 | 63 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 2.00 | 1.00 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 3200 | 1600 | 1600 | 3200 | 0 | 0 | 0 | 0 | 1600 | 0 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.19 | 0.55 | 0.12 | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.04 |
| Crit Moves: | | | *** | *** | | | | | | | | **** |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 Pacific Coast Highway at Loynes Drive

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.677 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 57 | Level Of Service: | B |

| Street Name: | Pacific Coast Highway | | | | | | Loynes Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 1 | 0 | 1 0 | 3 0 | 1 | 1 0 | 1 1 | 0 | 1 0 | 2 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 34 | 1486 | 77 | 44 | 1141 | 10 | 14 | 260 | 114 | 91 | 136 | 65 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 34 | 1486 | 77 | 44 | 1141 | 10 | 14 | 260 | 114 | 91 | 136 | 65 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 34 | 1486 | 77 | 44 | 1141 | 10 | 14 | 260 | 114 | 91 | 136 | 65 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 34 | 1486 | 77 | 44 | 1141 | 10 | 14 | 260 | 114 | 91 | 136 | 65 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 34 | 1486 | 77 | 44 | 1141 | 10 | 14 | 260 | 114 | 91 | 136 | 65 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 34 | 1486 | 77 | 44 | 1141 | 10 | 14 | 260 | 114 | 91 | 136 | 65 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.85 | 0.15 | 1.00 | 3.00 | 1.00 | 1.00 | 1.39 | 0.61 | 1.00 | 2.00 | 1.00 |
| Final Sat.: | 1600 | 4564 | 236 | 1600 | 4800 | 1600 | 1600 | 2225 | 975 | 1600 | 3200 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.33 | 0.33 | 0.03 | 0.24 | 0.01 | 0.01 | 0.12 | 0.12 | 0.06 | 0.04 | 0.04 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #12 Studebaker Road at Loynes Drive

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.697 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 60 | Level Of Service: | B |

| Street Name: | Studebaker Road | | | | | | Loynes Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Permitted | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 0 | 0 | 0 0 | 2 0 | 1 | 2 0 | 0 0 | 2 | 0 0 | 0 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 63 | 1340 | 0 | 0 | 1268 | 243 | 321 | 0 | 90 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 63 | 1340 | 0 | 0 | 1268 | 243 | 321 | 0 | 90 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 63 | 1340 | 0 | 0 | 1268 | 243 | 321 | 0 | 90 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 63 | 1340 | 0 | 0 | 1268 | 243 | 321 | 0 | 90 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 63 | 1340 | 0 | 0 | 1268 | 243 | 321 | 0 | 90 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 63 | 1340 | 0 | 0 | 1268 | 243 | 321 | 0 | 90 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 2.00 | 1.00 | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1600 | 3200 | 0 | 0 | 3200 | 1600 | 2880 | 0 | 3200 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.42 | 0.00 | 0.00 | 0.40 | 0.15 | 0.11 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | **** | | **** | | | | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Livingston Drive at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.626 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 51 | Level Of Service: | B |

| Street Name: | Livingston Drive | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Permitted | | | Permitted | | | Split Phase | | | Split Phase | | |
| Rights: | | Ovl | | | Include | | | Include | | | Include | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 1 | 0 0 | 2 | 0 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 1 1 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 92 | 644 | 0 | 64 | 8 | 15 | 159 | 0 | 1003 | 161 | 2 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 92 | 644 | 0 | 64 | 8 | 15 | 159 | 0 | 1003 | 161 | 2 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 92 | 644 | 0 | 64 | 8 | 15 | 159 | 0 | 1003 | 161 | 2 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 92 | 644 | 0 | 64 | 8 | 15 | 159 | 0 | 1003 | 161 | 2 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 92 | 644 | 0 | 64 | 8 | 15 | 159 | 0 | 1003 | 161 | 2 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 92 | 644 | 0 | 64 | 8 | 15 | 159 | 0 | 1003 | 161 | 2 |
| OvlAdjVol: | | | 0 | | | | | | | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 1.00 | 2.00 | 0.00 | 0.89 | 0.11 | 0.17 | 1.83 | 0.00 | 1.72 | 0.28 | 1.00 |
| Final Sat.: | 0 | 1600 | 3200 | 0 | 1422 | 178 | 276 | 2924 | 0 | 2757 | 443 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.06 | 0.20 | 0.00 | 0.05 | 0.04 | 0.05 | 0.05 | 0.00 | 0.36 | 0.36 | 0.00 |
| OvlAdjV/S: | | | 0.00 | | | | | | | | | |
| Crit Moves: | | **** | | **** | | | | **** | | | **** | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Bay Shore Avenue at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.848 |
| Loss Time (sec): | 12 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 84 | Level Of Service: | D |

| Street Name: | Bay Shore Avenue | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Permitted | | | Permitted | | | Prot+Permit | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 1! 0 | 0 | 0 0 | 1! 0 | 0 | 1 0 | 1 | 1 0 | 1 0 | 2 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 5 | 21 | 293 | 152 | 10 | 10 | 9 | 1185 | 12 | 96 | 1227 | 134 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 5 | 21 | 293 | 152 | 10 | 10 | 9 | 1185 | 12 | 96 | 1227 | 134 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 5 | 21 | 293 | 152 | 10 | 10 | 9 | 1185 | 12 | 96 | 1227 | 134 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 5 | 21 | 293 | 152 | 10 | 10 | 9 | 1185 | 12 | 96 | 1227 | 134 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 5 | 21 | 293 | 152 | 10 | 10 | 9 | 1185 | 12 | 96 | 1227 | 134 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 5 | 21 | 293 | 152 | 10 | 10 | 9 | 1185 | 12 | 96 | 1227 | 134 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.01 | 0.07 | 0.92 | 0.88 | 0.06 | 0.06 | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 |
| Final Sat.: | 25 | 105 | 1470 | 1414 | 93 | 93 | 1600 | 3168 | 32 | 1600 | 3200 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.20 | 0.20 | 0.10 | 0.11 | 0.11 | 0.01 | 0.37 | 0.37 | 0.06 | 0.38 | 0.08 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Naples Plaza at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.700 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 60 | Level Of Service: | B |

| Street Name: | Naples Plaza | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Protected | | |
| Rights: | Include | | | Include | | | Ignore | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 0 0 | 1 | 0 0 | 0 0 | 0 | 0 0 | 2 0 | 1 | 1 0 | 2 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 1622 | 33 | 51 | 1338 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 1622 | 33 | 51 | 1338 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 1622 | 33 | 51 | 1338 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 1622 | 0 | 51 | 1338 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 1622 | 0 | 51 | 1338 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 1622 | 0 | 51 | 1338 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 1.00 | 1.00 | 2.00 | 0.00 |
| Final Sat.: | 1600 | 0 | 1600 | 0 | 0 | 0 | 0 | 3200 | 1600 | 1600 | 3200 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.51 | 0.00 | 0.03 | 0.42 | 0.00 |
| Crit Moves: | **** | | | | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Marina Drive at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.665 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 61 | Level Of Service: | B |

| Street Name: | Marina Drive | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Split Phase | | | Split Phase | | | Protected | | | Protected | | |
| Rights: | Ignore | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 1 | 1 0 | 1 | 1 1 | 0 0 | 1 | 1 0 | 3 0 | 1 | 1 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 188 | 9 | 101 | 67 | 16 | 50 | 20 | 1715 | 386 | 50 | 1398 | 19 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 188 | 9 | 101 | 67 | 16 | 50 | 20 | 1715 | 386 | 50 | 1398 | 19 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 188 | 9 | 101 | 67 | 16 | 50 | 20 | 1715 | 386 | 50 | 1398 | 19 |
| User Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 188 | 9 | 0 | 67 | 16 | 50 | 20 | 1715 | 386 | 50 | 1398 | 19 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 188 | 9 | 0 | 67 | 16 | 50 | 20 | 1715 | 386 | 50 | 1398 | 19 |
| PCE Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 188 | 9 | 0 | 67 | 16 | 50 | 20 | 1715 | 386 | 50 | 1398 | 19 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.61 | 0.39 | 1.00 | 1.00 | 3.00 | 1.00 | 1.00 | 2.96 | 0.04 |
| Final Sat.: | 2880 | 1600 | 1600 | 2583 | 617 | 1600 | 1600 | 4800 | 1600 | 1600 | 4736 | 64 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.07 | 0.01 | 0.00 | 0.03 | 0.03 | 0.03 | 0.01 | 0.36 | 0.24 | 0.03 | 0.30 | 0.30 |
| Crit Moves: | **** | | | | | **** | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Pacific Coast Highway at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.997 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 171 | Level Of Service: | E |

| Street Name: | Pacific Coast Highway | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Ovl | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 2 0 | 2 1 | 0 | 2 0 | 3 0 | 1 | 2 0 | 2 1 | 1 | 2 0 | 3 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 392 | 1131 | 313 | 242 | 931 | 166 | 227 | 1249 | 418 | 495 | 927 | 306 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 392 | 1131 | 313 | 242 | 931 | 166 | 227 | 1249 | 418 | 495 | 927 | 306 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 392 | 1131 | 313 | 242 | 931 | 166 | 227 | 1249 | 418 | 495 | 927 | 306 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 392 | 1131 | 313 | 242 | 931 | 166 | 227 | 1249 | 418 | 495 | 927 | 306 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 392 | 1131 | 313 | 242 | 931 | 166 | 227 | 1249 | 418 | 495 | 927 | 306 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 392 | 1131 | 313 | 242 | 931 | 166 | 227 | 1249 | 418 | 495 | 927 | 306 |
| OvlAdjVol: | | | | | | 40 | | | | | | 172 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 0.90 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 |
| Lanes: | 2.00 | 2.35 | 0.65 | 2.00 | 3.00 | 1.00 | 2.00 | 3.00 | 1.00 | 2.00 | 3.00 | 1.00 |
| Final Sat.: | 2880 | 3760 | 1040 | 2880 | 4800 | 1600 | 2880 | 4795 | 1605 | 2880 | 4800 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.14 | 0.30 | 0.30 | 0.08 | 0.19 | 0.10 | 0.08 | 0.26 | 0.26 | 0.17 | 0.19 | 0.19 |
| OvlAdjV/S: | | | | | | 0.02 | | | | | | 0.11 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #18 Shopkeeper Road at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.652 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 54 | Level Of Service: | B |

| Street Name: | Shopkeeper Road | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 1! 0 | 0 | 0 0 | 0 1 | 0 | 1 0 | 2 1 | 0 | 1 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 37 | 2 | 55 | 0 | 2 | 1 | 9 | 1760 | 21 | 115 | 1666 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 37 | 2 | 55 | 0 | 2 | 1 | 9 | 1760 | 21 | 115 | 1666 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 37 | 2 | 55 | 0 | 2 | 1 | 9 | 1760 | 21 | 115 | 1666 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 37 | 2 | 55 | 0 | 2 | 1 | 9 | 1760 | 21 | 115 | 1666 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 37 | 2 | 55 | 0 | 2 | 1 | 9 | 1760 | 21 | 115 | 1666 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 37 | 2 | 55 | 0 | 2 | 1 | 9 | 1760 | 21 | 115 | 1666 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.39 | 0.02 | 0.59 | 0.00 | 0.67 | 0.33 | 1.00 | 2.96 | 0.04 | 1.00 | 3.00 | 0.00 |
| Final Sat.: | 630 | 34 | 936 | 0 | 1067 | 533 | 1600 | 4743 | 57 | 1600 | 4800 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.01 | 0.37 | 0.37 | 0.07 | 0.35 | 0.00 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #19 Studebaker Road at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.864 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 94 | Level Of Service: | D |

| Street Name: | Studebaker Road | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Split Phase | | | Split Phase | | | Protected | | | Protected | | |
| Rights: | Include | | | Ovl | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 0 0 | 0 | 2 0 | 0 0 | 2 | 2 0 | 2 0 | 0 | 0 0 | 3 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 532 | 0 | 837 | 952 | 879 | 0 | 0 | 955 | 487 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 532 | 0 | 837 | 952 | 879 | 0 | 0 | 955 | 487 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 532 | 0 | 837 | 952 | 879 | 0 | 0 | 955 | 487 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 532 | 0 | 837 | 952 | 879 | 0 | 0 | 955 | 487 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 532 | 0 | 837 | 952 | 879 | 0 | 0 | 955 | 487 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 532 | 0 | 837 | 952 | 879 | 0 | 0 | 955 | 487 |
| OvlAdjVol: | | | | | | 0 | | | | | | 191 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 3.00 | 1.00 |
| Final Sat.: | 0 | 0 | 0 | 2880 | 0 | 3200 | 2880 | 3200 | 0 | 0 | 4800 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.18 | 0.00 | 0.26 | 0.33 | 0.27 | 0.00 | 0.00 | 0.20 | 0.30 |
| OvlAdjV/S: | | | | | | 0.00 | | | | | | 0.12 |
| Crit Moves: | | | | **** | | | **** | | | | **** | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #20 Seal Beach Boulevard at Westminster Avenue

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.938 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 123 | Level Of Service: | E |

| Street Name: | Seal Beach Boulevard | | | | | | Westminster Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 1 | 0 | 2 0 | 3 0 | 1 | 2 0 | 3 0 | 1 | 2 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 54 | 737 | 217 | 392 | 1006 | 423 | 206 | 841 | 33 | 256 | 1218 | 229 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 54 | 737 | 217 | 392 | 1006 | 423 | 206 | 841 | 33 | 256 | 1218 | 229 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 54 | 737 | 217 | 392 | 1006 | 423 | 206 | 841 | 33 | 256 | 1218 | 229 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 54 | 737 | 217 | 392 | 1006 | 423 | 206 | 841 | 33 | 256 | 1218 | 229 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 54 | 737 | 217 | 392 | 1006 | 423 | 206 | 841 | 33 | 256 | 1218 | 229 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 54 | 737 | 217 | 392 | 1006 | 423 | 206 | 841 | 33 | 256 | 1218 | 229 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.05 | 1.00 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 | 1.00 | 1.04 | 1.00 |
| Lanes: | 1.00 | 2.32 | 0.68 | 2.00 | 3.00 | 1.00 | 2.00 | 3.00 | 1.00 | 2.00 | 1.68 | 0.32 |
| Final Sat.: | 1600 | 3908 | 1092 | 3200 | 5100 | 1700 | 3200 | 5100 | 1700 | 3200 | 2794 | 506 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.19 | 0.20 | 0.12 | 0.20 | 0.25 | 0.06 | 0.16 | 0.02 | 0.08 | 0.44 | 0.45 |
| Crit Moves: | | | **** | **** | | | **** | | | | | **** |

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| Intersection | |
|---|---|
| Intersection Delay, s/veh | 13.6 |
| Intersection LOS | B |

| Movement | EBU | EBL | EBT | EBR | WBU | WBL | WBT | WBR | NBU | NBL | NBT | NBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 3 | 0 | 56 | 20 | 240 | 0 | 2 | 103 | 57 |
| Future Vol, veh/h | 0 | 0 | 0 | 3 | 0 | 56 | 20 | 240 | 0 | 2 | 103 | 57 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 0 | 0 | 3 | 0 | 61 | 22 | 261 | 0 | 2 | 112 | 62 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|---|---|---|---|
| Opposing Approach | WB | EB | SB |
| Opposing Lanes | 3 | 1 | 2 |
| Conflicting Approach Left | SB | NB | EB |
| Conflicting Lanes Left | 2 | 2 | 1 |
| Conflicting Approach Right | NB | SB | WB |
| Conflicting Lanes Right | 2 | 2 | 3 |
| HCM Control Delay | 9.5 | 11.7 | 12.1 |
| HCM LOS | A | B | B |

| Lane | NBLn1 | NBLn2 | EBLn1 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 64% | 0% | 0% | 100% | 0% | 0% | 93% |
| Vol Right, % | 0% | 36% | 100% | 0% | 0% | 100% | 0% | 7% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 2 | 160 | 3 | 56 | 20 | 240 | 290 | 116 |
| LT Vol | 2 | 0 | 0 | 56 | 0 | 0 | 290 | 0 |
| Through Vol | 0 | 103 | 0 | 0 | 20 | 0 | 0 | 108 |
| RT Vol | 0 | 57 | 3 | 0 | 0 | 240 | 0 | 8 |
| Lane Flow Rate | 2 | 174 | 3 | 61 | 22 | 261 | 315 | 126 |
| Geometry Grp | 8 | 8 | 8 | 7 | 7 | 7 | 8 | 8 |
| Degree of Util (X) | 0.004 | 0.312 | 0.006 | 0.115 | 0.038 | 0.407 | 0.577 | 0.211 |
| Departure Headway (Hd) | 7.214 | 6.455 | 6.685 | 6.828 | 6.323 | 5.615 | 6.587 | 6.034 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 495 | 557 | 533 | 525 | 566 | 639 | 548 | 595 |
| Service Time | 4.967 | 4.207 | 4.459 | 4.574 | 4.068 | 3.36 | 4.326 | 3.774 |
| HCM Lane V/C Ratio | 0.004 | 0.312 | 0.006 | 0.116 | 0.039 | 0.408 | 0.575 | 0.212 |
| HCM Control Delay | 10 | 12.1 | 9.5 | 10.5 | 9.3 | 12.2 | 18 | 10.4 |
| HCM Lane LOS | A | B | A | B | A | B | C | B |
| HCM 95th-tile Q | 0 | 1.3 | 0 | 0.4 | 0.1 | 2 | 3.6 | 0.8 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | |
| Intersection LOS | |

| Movement | SBU | SBL | SBT | SBR |
|---|---|---|---|---|
| Lane Configurations | | ↰ | ↑ | |
| Traffic Vol, veh/h | 0 | 290 | 108 | 8 |
| Future Vol, veh/h | 0 | 290 | 108 | 8 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 315 | 117 | 9 |
| Number of Lanes | 0 | 1 | 1 | 0 |

| Approach | SB |
|---|---|
| Opposing Approach | NB |
| Opposing Lanes | 2 |
| Conflicting Approach Left | WB |
| Conflicting Lanes Left | 3 |
| Conflicting Approach Right | EB |
| Conflicting Lanes Right | 1 |
| HCM Control Delay | 15.8 |
| HCM LOS | C |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 3 | 56 | 20 | 240 | 2 | 103 | 57 | 290 | 108 | 8 |
| Future Volume (vph) | 0 | 0 | 3 | 56 | 20 | 240 | 2 | 103 | 57 | 290 | 108 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.865 | | | | 0.850 | | 0.947 | | | 0.989 | |
| Flt Protected | | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1611 | 0 | 1770 | 1863 | 1583 | 1770 | 1764 | 0 | 1770 | 1842 | 0 |
| Flt Permitted | | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1611 | 0 | 1770 | 1863 | 1583 | 1770 | 1764 | 0 | 1770 | 1842 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 330 | | | 322 | | | 311 | | | 284 | |
| Travel Time (s) | | 7.5 | | | 7.3 | | | 7.1 | | | 6.5 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 0 | 3 | 61 | 22 | 261 | 2 | 112 | 62 | 315 | 117 | 9 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 3 | 0 | 61 | 22 | 261 | 2 | 174 | 0 | 315 | 126 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |

**Intersection Summary**

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 44.7% ICU Level of Service A
Analysis Period (min) 15

AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #22 Pacific Coast Highway at Studebaker Road

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.797 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 82 | Level Of Service: | C |

| Street Name: | Pacific Coast Highway | | | | | | Studebaker Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Protected | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Ovl | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 3 0 | 1 | 1 0 | 2 0 | 1 | 1 1 | 0 0 | 1 | 0 0 | 1! 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 39 | 1848 | 16 | 4 | 1434 | 282 | 48 | 9 | 251 | 12 | 4 | 4 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 39 | 1848 | 16 | 4 | 1434 | 282 | 48 | 9 | 251 | 12 | 4 | 4 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 39 | 1848 | 16 | 4 | 1434 | 282 | 48 | 9 | 251 | 12 | 4 | 4 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 39 | 1848 | 16 | 4 | 1434 | 282 | 48 | 9 | 251 | 12 | 4 | 4 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 39 | 1848 | 16 | 4 | 1434 | 282 | 48 | 9 | 251 | 12 | 4 | 4 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 39 | 1848 | 16 | 4 | 1434 | 282 | 48 | 9 | 251 | 12 | 4 | 4 |
| OvlAdjVol: | | | | | | | | | 212 | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 3.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.68 | 0.32 | 1.00 | 0.60 | 0.20 | 0.20 |
| Final Sat.: | 1600 | 4800 | 1600 | 1600 | 3200 | 1600 | 2695 | 505 | 1600 | 960 | 320 | 320 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.39 | 0.01 | 0.00 | 0.45 | 0.18 | 0.02 | 0.02 | 0.16 | 0.01 | 0.01 | 0.01 |
| OvlAdjV/S: | | | | | | | | | 0.13 | | | |
| Crit Moves: | **** | | | | **** | | | | **** | | **** | |

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**Intersection Level Of Service Report**
**Intersection 23: Pacific Coast Highway at Marina Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 39.1 |
| Analysis Method: | HCM 2010 | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.589 |

**Intersection Setup**

| Name | Pacific Coast Highway | | Pacific Coast Highway | | Marina Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Pacific Coast Highway | | Pacific Coast Highway | | Marina Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 122 | 1817 | 1814 | 13 | 0 | 130 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Rate | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 122 | 1817 | 1814 | 13 | 0 | 130 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 1.0000 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 34 | 499 | 498 | 0 | 0 | 36 |
| Total Analysis Volume [veh/h] | 134 | 1997 | 1993 | 0 | 0 | 143 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.47 | 0.02 | 0.02 | 0.00 | 0.00 | 0.59 |
| d_M, Delay for Movement [s/veh] | 28.40 | 0.00 | 0.00 | 0.00 | 0.00 | 39.07 |
| Movement LOS | D | A | A | A | | E |
| 95th-Percentile Queue Length [veh] | 2.37 | 0.00 | 0.00 | 0.00 | 0.00 | 3.38 |
| 95th-Percentile Queue Length [ft] | 59.22 | 0.00 | 0.00 | 0.00 | 0.00 | 84.54 |
| d_A, Approach Delay [s/veh] | 1.79 | | 0.00 | | 39.07 | |
| Approach LOS | A | | A | | E | |
| d_I, Intersection Delay [s/veh] | 2.20 | | | | | |
| Intersection LOS | E | | | | | |

AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #24 Pacific Coast Highway at Main Street/Bolsa Avenue

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.731 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 54 | Level Of Service: | C |

| Street Name: | Pacific Coast Highway | | | | | | Main Street/Bolsa Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 2 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 45 | 1688 | 8 | 66 | 1728 | 52 | 58 | 45 | 60 | 13 | 40 | 112 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 45 | 1688 | 8 | 66 | 1728 | 52 | 58 | 45 | 60 | 13 | 40 | 112 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 45 | 1688 | 8 | 66 | 1728 | 52 | 58 | 45 | 60 | 13 | 40 | 112 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 45 | 1688 | 8 | 66 | 1728 | 52 | 58 | 45 | 60 | 13 | 40 | 112 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 45 | 1688 | 8 | 66 | 1728 | 52 | 58 | 45 | 60 | 13 | 40 | 112 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 45 | 1688 | 8 | 66 | 1728 | 52 | 58 | 45 | 60 | 13 | 40 | 112 |
| OvlAdjVol: | | | | | | | | | | | | 42 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.03 | 1.00 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 |
| Lanes: | 1.00 | 1.99 | 0.01 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1600 | 3285 | 15 | 1600 | 3400 | 1700 | 1600 | 1700 | 1700 | 1600 | 1700 | 1700 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.51 | 0.53 | 0.04 | 0.51 | 0.03 | 0.04 | 0.03 | 0.04 | 0.01 | 0.02 | 0.07 |
| OvlAdjV/S: | | | | | | | | | | | | 0.02 |
| Crit Moves: | | | **** | **** | | | **** | | | | **** | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #25 Seal Beach Boulevard at Pacific Coast Highway

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.886 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 94 | Level Of Service: | D |

| Street Name: | Seal Beach Boulevard | | | | | | Pacific Coast Highway | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Split Phase | | | Split Phase | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 2 0 | 1 0 | 1 | 1 0 | 2 0 | 1 | 1 0 | 2 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 11 | 213 | 89 | 480 | 99 | 176 | 145 | 1789 | 38 | 25 | 1476 | 488 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 11 | 213 | 89 | 480 | 99 | 176 | 145 | 1789 | 38 | 25 | 1476 | 488 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 11 | 213 | 89 | 480 | 99 | 176 | 145 | 1789 | 38 | 25 | 1476 | 488 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 11 | 213 | 89 | 480 | 99 | 176 | 145 | 1789 | 38 | 25 | 1476 | 488 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 11 | 213 | 89 | 480 | 99 | 176 | 145 | 1789 | 38 | 25 | 1476 | 488 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 11 | 213 | 89 | 480 | 99 | 176 | 145 | 1789 | 38 | 25 | 1476 | 488 |
| OvlAdjVol: | | | | | | | | | | | | 233 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.04 | 1.00 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 |
| Lanes: | 1.00 | 1.41 | 0.59 | 2.00 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 |
| Final Sat.: | 1600 | 2357 | 943 | 3200 | 1700 | 1700 | 1600 | 3400 | 1700 | 1600 | 3400 | 1700 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.09 | 0.09 | 0.15 | 0.06 | 0.10 | 0.09 | 0.53 | 0.02 | 0.02 | 0.43 | 0.29 |
| OvlAdjV/S: | | | | | | | | | | | | 0.14 |
| Crit Moves: | | | **** | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #26 Seal Beach Boulevard at Bolsa Avenue

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.548 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 36 | Level Of Service: | A |

| Street Name: | Seal Beach Boulevard | | | | | | Bolsa Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 1 | 0 | 1 0 | 2 1 | 0 | 0 0 | 1! 0 | 0 | 1 0 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 18 | 830 | 4 | 12 | 738 | 205 | 274 | 4 | 73 | 9 | 4 | 36 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 18 | 830 | 4 | 12 | 738 | 205 | 274 | 4 | 73 | 9 | 4 | 36 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 18 | 830 | 4 | 12 | 738 | 205 | 274 | 4 | 73 | 9 | 4 | 36 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 18 | 830 | 4 | 12 | 738 | 205 | 274 | 4 | 73 | 9 | 4 | 36 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 18 | 830 | 4 | 12 | 738 | 205 | 274 | 4 | 73 | 9 | 4 | 36 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 18 | 830 | 4 | 12 | 738 | 205 | 274 | 4 | 73 | 9 | 4 | 36 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.04 | 1.00 | 1.00 | 1.05 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.06 | 1.06 |
| Lanes: | 1.00 | 2.99 | 0.01 | 1.00 | 2.35 | 0.65 | 0.78 | 0.01 | 0.21 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1600 | 4977 | 23 | 1600 | 3957 | 1043 | 1249 | 18 | 333 | 1600 | 1700 | 1700 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.17 | 0.17 | 0.01 | 0.19 | 0.20 | 0.22 | 0.22 | 0.22 | 0.01 | 0.00 | 0.02 |
| Crit Moves: | **** | | | | | **** | | | **** | | | **** |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #27 Santiago Avenue at 7th Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.675 |
| Loss Time (sec): | 12 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 51 | Level Of Service: | B |

| Street Name: | Santiago Avenue | | | | | | 7th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Permitted | | | Permitted | | | Prot+Permit | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 1! 0 | 0 | 0 0 | 1! 0 | 0 | 1 0 | 2 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 36 | 79 | 59 | 9 | 29 | 13 | 8 | 1987 | 8 | 40 | 1329 | 5 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 36 | 79 | 59 | 9 | 29 | 13 | 8 | 1987 | 8 | 40 | 1329 | 5 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 36 | 79 | 59 | 9 | 29 | 13 | 8 | 1987 | 8 | 40 | 1329 | 5 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 36 | 79 | 59 | 9 | 29 | 13 | 8 | 1987 | 8 | 40 | 1329 | 5 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 36 | 79 | 59 | 9 | 29 | 13 | 8 | 1987 | 8 | 40 | 1329 | 5 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 36 | 79 | 59 | 9 | 29 | 13 | 8 | 1987 | 8 | 40 | 1329 | 5 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.21 | 0.45 | 0.34 | 0.18 | 0.57 | 0.25 | 1.00 | 2.99 | 0.01 | 1.00 | 1.99 | 0.01 |
| Final Sat.: | 331 | 726 | 543 | 282 | 910 | 408 | 1600 | 4781 | 19 | 1600 | 3188 | 12 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.11 | 0.11 | 0.01 | 0.03 | 0.03 | 0.01 | 0.42 | 0.42 | 0.03 | 0.42 | 0.42 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #28 Pacific Coast Highway at Channel Drive

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.518 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 43 | Level Of Service: | A |

| Street Name: | Pacific Coast Highway | | | | | | Channel Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Permitted | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 3 0 | 1 | 1 0 | 3 0 | 0 | 0 0 | 0 0 | 0 | 2 0 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1488 | 90 | 17 | 1228 | 0 | 0 | 0 | 0 | 71 | 0 | 75 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1488 | 90 | 17 | 1228 | 0 | 0 | 0 | 0 | 71 | 0 | 75 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1488 | 90 | 17 | 1228 | 0 | 0 | 0 | 0 | 71 | 0 | 75 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1488 | 90 | 17 | 1228 | 0 | 0 | 0 | 0 | 71 | 0 | 75 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1488 | 90 | 17 | 1228 | 0 | 0 | 0 | 0 | 71 | 0 | 75 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1488 | 90 | 17 | 1228 | 0 | 0 | 0 | 0 | 71 | 0 | 75 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 |
| Lanes: | 0.00 | 3.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 4800 | 1600 | 1600 | 4800 | 0 | 0 | 0 | 0 | 2880 | 0 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.31 | 0.06 | 0.01 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.05 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |

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AM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #29 Pacific Coast Highway at 1st Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.699 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 50 | Level Of Service: | B |

| Street Name: | Pacific Coast Highway | | | | | | 1st Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 2 0 | 0 | 1 0 | 0 0 | 1! | 0 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 14 | 1714 | 2 | 2 | 1631 | 64 | 188 | 1 | 49 | 2 | 0 | 1 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 14 | 1714 | 2 | 2 | 1631 | 64 | 188 | 1 | 49 | 2 | 0 | 1 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 14 | 1714 | 2 | 2 | 1631 | 64 | 188 | 1 | 49 | 2 | 0 | 1 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 14 | 1714 | 2 | 2 | 1631 | 64 | 188 | 1 | 49 | 2 | 0 | 1 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 14 | 1714 | 2 | 2 | 1631 | 64 | 188 | 1 | 49 | 2 | 0 | 1 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 14 | 1714 | 2 | 2 | 1631 | 64 | 188 | 1 | 49 | 2 | 0 | 1 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.03 | 1.00 | 1.00 | 1.03 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.99 | 0.01 | 1.00 | 1.92 | 0.08 | 2.00 | 0.02 | 0.98 | 0.67 | 0.00 | 0.33 |
| Final Sat.: | 1600 | 3296 | 4 | 1600 | 3179 | 121 | 3200 | 32 | 1568 | 1067 | 0 | 533 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.52 | 0.54 | 0.00 | 0.51 | 0.53 | 0.06 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | | **** | **** | | | | | **** |

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**Intersection Level Of Service Report**
**Intersection 36: Studebaker Road/SR-22 WB Ramps at College Park Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 15.5 |
| Analysis Method: | HCM 2010 | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | SR-22 WB Ramps | | Studebaker Road | | College Park Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | SR-22 WB Ramps | | Studebaker Road | | College Park Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 749 | 28 | 29 | 73 | 10 | 140 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Rate | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 749 | 28 | 29 | 73 | 10 | 140 |
| Peak Hour Factor | 0.8580 | 0.8580 | 0.8580 | 0.8580 | 0.8580 | 0.8580 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 |
| Total 15-Minute Volume [veh/h] | 218 | 8 | 8 | 21 | 3 | 0 |
| Total Analysis Volume [veh/h] | 873 | 33 | 34 | 85 | 12 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | Yes |
| Number of Storage Spaces in Median | 0 | 0 | 2 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.05 | 0.00 | 0.03 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 10.02 | 0.00 | 15.41 | 15.53 |
| Movement LOS | A | A | B | A | C | C |
| 95th-Percentile Queue Length [veh] | 0.00 | 0.00 | 0.14 | 0.00 | 0.10 | 0.00 |
| 95th-Percentile Queue Length [ft] | 0.00 | 0.00 | 3.55 | 0.00 | 2.60 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | | 2.86 | | 15.41 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 0.51 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 37: 1st Street at Marina Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 9.2 |
| Analysis Method: | HCM 2010 | Level Of Service: | A |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | 1st Street | | | 1st Street | | | Marina Drive | | | Marina Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 1st Street | | | 1st Street | | | Marina Drive | | | Marina Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 54 | 44 | 9 | 32 | 28 | 25 | 13 | 80 | 60 | 19 | 107 | 60 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Rate | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 54 | 44 | 9 | 32 | 28 | 25 | 13 | 80 | 60 | 19 | 107 | 60 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 14 | 12 | 2 | 8 | 7 | 7 | 3 | 21 | 16 | 5 | 28 | 16 |
| Total Analysis Volume [veh/h] | 57 | 46 | 9 | 34 | 29 | 26 | 14 | 84 | 63 | 20 | 113 | 63 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

**Lanes**

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.33 | 0.12 | 0.12 | 0.04 | 0.19 | 0.07 | 0.07 | 0.12 | 0.07 | 0.79 | 0.10 | 0.99 |
| 95th-Percentile Queue Length [ft] | 8.33 | 2.90 | 2.90 | 0.97 | 4.81 | 1.82 | 1.82 | 2.91 | 1.77 | 19.74 | 2.52 | 24.73 |
| Approach Delay [s/veh] | 9.20 | | | | 8.84 | | | | 9.17 | | 9.46 | |
| Approach LOS | A | | | | A | | | | A | | A | |
| Intersection Delay [s/veh] | 9.23 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |

PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Bellflower Boulevard at Atherton Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.851 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 95 | Level Of Service: | D |

| Street Name: | Bellflower Boulevard | | | | | | Atherton Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 3 0 | 1 | 2 0 | 2 1 | 0 | 1 0 | 2 0 | 1 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 156 | 1021 | 207 | 169 | 842 | 164 | 164 | 477 | 149 | 205 | 591 | 246 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 156 | 1021 | 207 | 169 | 842 | 164 | 164 | 477 | 149 | 205 | 591 | 246 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 156 | 1021 | 207 | 169 | 842 | 164 | 164 | 477 | 149 | 205 | 591 | 246 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 156 | 1021 | 207 | 169 | 842 | 164 | 164 | 477 | 149 | 205 | 591 | 246 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 156 | 1021 | 207 | 169 | 842 | 164 | 164 | 477 | 149 | 205 | 591 | 246 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 156 | 1021 | 207 | 169 | 842 | 164 | 164 | 477 | 149 | 205 | 591 | 246 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 3.00 | 1.00 | 2.00 | 2.51 | 0.49 | 1.00 | 2.00 | 1.00 | 1.00 | 1.41 | 0.59 |
| Final Sat.: | 1600 | 4800 | 1600 | 2880 | 4017 | 783 | 1600 | 3200 | 1600 | 1600 | 2259 | 941 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.21 | 0.13 | 0.06 | 0.21 | 0.21 | 0.10 | 0.15 | 0.09 | 0.13 | 0.26 | 0.26 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Pacific Coast Highway at Clark Avenue

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.820 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 82 | Level Of Service: | D |

| Street Name: | Pacific Coast Highway | | | | | | Clark Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 0 1 | 0 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 21 | 837 | 137 | 112 | 929 | 12 | 33 | 616 | 42 | 128 | 426 | 113 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 21 | 837 | 137 | 112 | 929 | 12 | 33 | 616 | 42 | 128 | 426 | 113 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 21 | 837 | 137 | 112 | 929 | 12 | 33 | 616 | 42 | 128 | 426 | 113 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 21 | 837 | 137 | 112 | 929 | 12 | 33 | 616 | 42 | 128 | 426 | 113 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 21 | 837 | 137 | 112 | 929 | 12 | 33 | 616 | 42 | 128 | 426 | 113 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 21 | 837 | 137 | 112 | 929 | 12 | 33 | 616 | 42 | 128 | 426 | 113 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.72 | 0.28 | 1.00 | 1.97 | 0.03 | 0.10 | 1.78 | 0.12 | 1.00 | 1.58 | 0.42 |
| Final Sat.: | 1600 | 2750 | 450 | 1600 | 3159 | 41 | 153 | 2853 | 195 | 1600 | 2529 | 671 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.30 | 0.30 | 0.07 | 0.29 | 0.29 | 0.02 | 0.22 | 0.22 | 0.08 | 0.17 | 0.17 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Pacific Coast Highway at Anaheim Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.845 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 88 | Level Of Service: | D |

| Street Name: | Pacific Coast Highway | | | | | | Anaheim Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Ovl | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 0 1 | 1 0 | 1 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 388 | 866 | 64 | 53 | 1042 | 26 | 56 | 184 | 504 | 49 | 218 | 84 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 388 | 866 | 64 | 53 | 1042 | 26 | 56 | 184 | 504 | 49 | 218 | 84 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 388 | 866 | 64 | 53 | 1042 | 26 | 56 | 184 | 504 | 49 | 218 | 84 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 388 | 866 | 64 | 53 | 1042 | 26 | 56 | 184 | 504 | 49 | 218 | 84 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 388 | 866 | 64 | 53 | 1042 | 26 | 56 | 184 | 504 | 49 | 218 | 84 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 388 | 866 | 64 | 53 | 1042 | 26 | 56 | 184 | 504 | 49 | 218 | 84 |
| OvlAdjVol: | | | | | | | | | 116 | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.86 | 0.14 | 1.00 | 1.95 | 0.05 | 0.47 | 1.53 | 1.00 | 0.37 | 1.63 | 1.00 |
| Final Sat.: | 1600 | 2980 | 220 | 1600 | 3122 | 78 | 747 | 2453 | 1600 | 587 | 2613 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.24 | 0.29 | 0.29 | 0.03 | 0.33 | 0.33 | 0.04 | 0.08 | 0.32 | 0.03 | 0.08 | 0.05 |
| OvlAdjV/S: | | | | | | | | | 0.07 | | | |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Studebaker Road at Anaheim Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.706 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 61 | Level Of Service: | C |

| Street Name: | Studebaker Road | | | | | | Anaheim Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 2 0 | 1 | 1 0 | 0 1 | 1 | 0 0 | 1! 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 222 | 1139 | 18 | 46 | 713 | 43 | 98 | 52 | 379 | 50 | 16 | 35 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 222 | 1139 | 18 | 46 | 713 | 43 | 98 | 52 | 379 | 50 | 16 | 35 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 222 | 1139 | 18 | 46 | 713 | 43 | 98 | 52 | 379 | 50 | 16 | 35 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 222 | 1139 | 18 | 46 | 713 | 43 | 98 | 52 | 379 | 50 | 16 | 35 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 222 | 1139 | 18 | 46 | 713 | 43 | 98 | 52 | 379 | 50 | 16 | 35 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 222 | 1139 | 18 | 46 | 713 | 43 | 98 | 52 | 379 | 50 | 16 | 35 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.97 | 0.03 | 1.00 | 2.00 | 1.00 | 1.00 | 0.24 | 1.76 | 0.49 | 0.16 | 0.35 |
| Final Sat.: | 1600 | 3150 | 50 | 1600 | 3200 | 1600 | 1600 | 386 | 2814 | 792 | 253 | 554 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.14 | 0.36 | 0.36 | 0.03 | 0.22 | 0.03 | 0.06 | 0.13 | 0.13 | 0.03 | 0.06 | 0.06 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Park Avenue at 7th Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.883 |
| Loss Time (sec): | 12 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 96 | Level Of Service: | D |

| Street Name: | Park Avenue | | | | | | 7th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Permitted | | | Permitted | | | Permitted | | | Prot+Permit | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 32 | 275 | 242 | 76 | 292 | 29 | 36 | 1354 | 58 | 164 | 1414 | 83 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 32 | 275 | 242 | 76 | 292 | 29 | 36 | 1354 | 58 | 164 | 1414 | 83 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 32 | 275 | 242 | 76 | 292 | 29 | 36 | 1354 | 58 | 164 | 1414 | 83 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 32 | 275 | 242 | 76 | 292 | 29 | 36 | 1354 | 58 | 164 | 1414 | 83 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 32 | 275 | 242 | 76 | 292 | 29 | 36 | 1354 | 58 | 164 | 1414 | 83 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 32 | 275 | 242 | 76 | 292 | 29 | 36 | 1354 | 58 | 164 | 1414 | 83 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.92 | 0.08 | 1.00 | 1.89 | 0.11 |
| Final Sat.: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 3069 | 131 | 1600 | 3023 | 177 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.17 | 0.15 | 0.05 | 0.18 | 0.02 | 0.02 | 0.44 | 0.44 | 0.10 | 0.47 | 0.47 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Pacific Coast Highway at 7th Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.981 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 160 | Level Of Service: | E |

| Street Name: | Pacific Coast Highway | | | | | | 7th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 | 1 0 | 2 0 | 2 | 1 0 | 0 0 | 2 | 1 0 | 0 0 | 2 | 0 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 208 | 905 | 9 | 533 | 913 | 9 | 0 | 1388 | 118 | 0 | 1459 | 409 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 208 | 905 | 9 | 533 | 913 | 9 | 0 | 1388 | 118 | 0 | 1459 | 409 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 208 | 905 | 9 | 533 | 913 | 9 | 0 | 1388 | 118 | 0 | 1459 | 409 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 208 | 905 | 9 | 533 | 913 | 9 | 0 | 1388 | 118 | 0 | 1459 | 409 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 208 | 905 | 9 | 533 | 913 | 9 | 0 | 1388 | 118 | 0 | 1459 | 409 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 208 | 905 | 9 | 533 | 913 | 9 | 0 | 1388 | 118 | 0 | 1459 | 409 |
| OvlAdjVol: | | | | | | | | | | | | 113 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.97 | 0.03 | 2.00 | 2.97 | 0.03 | 0.00 | 2.76 | 0.24 | 0.00 | 2.00 | 1.00 |
| Final Sat.: | 1600 | 4753 | 47 | 2880 | 4753 | 47 | 0 | 4424 | 376 | 0 | 3200 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.13 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.00 | 0.31 | 0.31 | 0.00 | 0.46 | 0.26 |
| OvlAdjV/S: | | | | | | | | | | | | 0.07 |
| Crit Moves: | | **** | | **** | | | **** | | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Bellflower Boulevard at 7th Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.848 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 94 | Level Of Service: | D |

| Street Name: | Bellflower Boulevard | | | | | | 7th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Protected | | | Protected | | | Protected | | |
| Rights: | Ignore | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 3 0 | 1 | 2 0 | 2 0 | 1 | 1 0 | 2 1 | 0 | 1 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 520 | 128 | 322 | 609 | 376 | 149 | 1742 | 17 | 41 | 1550 | 151 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 520 | 128 | 322 | 609 | 376 | 149 | 1742 | 17 | 41 | 1550 | 151 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 520 | 128 | 322 | 609 | 376 | 149 | 1742 | 17 | 41 | 1550 | 151 |
| User Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 520 | 0 | 322 | 609 | 376 | 149 | 1742 | 17 | 41 | 1550 | 151 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 520 | 0 | 322 | 609 | 376 | 149 | 1742 | 17 | 41 | 1550 | 151 |
| PCE Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 520 | 0 | 322 | 609 | 376 | 149 | 1742 | 17 | 41 | 1550 | 151 |
| OvlAdjVol: | | | | | | 227 | | | | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 3.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 2.97 | 0.03 | 1.00 | 2.73 | 0.27 |
| Final Sat.: | 0 | 4800 | 1600 | 2880 | 3200 | 1600 | 1600 | 4754 | 46 | 1600 | 4374 | 426 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.11 | 0.00 | 0.11 | 0.19 | 0.24 | 0.09 | 0.37 | 0.37 | 0.03 | 0.35 | 0.35 |
| OvlAdjV/S: | | | | | | 0.14 | | | | | | |
| Crit Moves: | | **** | | **** | | | **** | | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Studebaker Road at SR-22 Westbound Ramps

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.914 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 115 | Level Of Service: | E |

| Street Name: | Studebaker Road | | | | | | SR-22 Westbound Ramps | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Ignore | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 1 1 | 0 | 1 0 | 2 0 | 0 | 0 0 | 0 0 | 0 | 2 0 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1061 | 53 | 41 | 1107 | 0 | 0 | 0 | 0 | 1125 | 0 | 255 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1061 | 53 | 41 | 1107 | 0 | 0 | 0 | 0 | 1125 | 0 | 255 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1061 | 53 | 41 | 1107 | 0 | 0 | 0 | 0 | 1125 | 0 | 255 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| PHF Volume: | 0 | 1061 | 53 | 41 | 1107 | 0 | 0 | 0 | 0 | 1125 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1061 | 53 | 41 | 1107 | 0 | 0 | 0 | 0 | 1125 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| FinalVolume: | 0 | 1061 | 53 | 41 | 1107 | 0 | 0 | 0 | 0 | 1125 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 |
| Lanes: | 0.00 | 1.90 | 0.10 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 3048 | 152 | 1600 | 3200 | 0 | 0 | 0 | 0 | 2880 | 0 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.35 | 0.35 | 0.03 | 0.35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.00 | 0.00 |
| Crit Moves: | | **** | | **** | | | | | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Bellflower Boulevard at Pacific Coast Highway

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.668 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 56 | Level Of Service: | B |

| Street Name: | Bellflower Boulevard | | | | | | Pacific Coast Highway | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 0 | 1 | 1 1 | 2 0 | 1 | 1 0 | 2 1 | 0 | 1 0 | 3 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 56 | 341 | 104 | 388 | 303 | 5 | 82 | 975 | 54 | 99 | 993 | 291 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 56 | 341 | 104 | 388 | 303 | 5 | 82 | 975 | 54 | 99 | 993 | 291 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 56 | 341 | 104 | 388 | 303 | 5 | 82 | 975 | 54 | 99 | 993 | 291 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 56 | 341 | 104 | 388 | 303 | 5 | 82 | 975 | 54 | 99 | 993 | 291 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 56 | 341 | 104 | 388 | 303 | 5 | 82 | 975 | 54 | 99 | 993 | 291 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 56 | 341 | 104 | 388 | 303 | 5 | 82 | 975 | 54 | 99 | 993 | 291 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 2.84 | 0.16 | 1.00 | 3.00 | 1.00 |
| Final Sat.: | 1600 | 3200 | 1600 | 2880 | 3200 | 1600 | 1600 | 4548 | 252 | 1600 | 4800 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.11 | 0.07 | 0.13 | 0.09 | 0.00 | 0.05 | 0.21 | 0.21 | 0.06 | 0.21 | 0.18 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 Studebaker Road at SR-22 Eastbound Ramps

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | ~~0.793~~ 1.037 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 180 | Level Of Service: | ~~C~~ F |

| Street Name: | Studebaker Road | | | | | | SR-22 Eastbound Ramps | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Permitted | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 2 0 | 1 | 1 0 | 2 0 | 0 | 0 0 | 0 0 | 0 | 1 0 | 1! 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1011 | 1082 | 268 | 1920 | 0 | 0 | 0 | 0 | 22 | 0 | 68 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1011 | 1082 | 268 | 1920 | 0 | 0 | 0 | 0 | 22 | 0 | 68 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1011 | 1082 | 268 | 1920 | 0 | 0 | 0 | 0 | 22 | 0 | 68 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1011 | 1082 | 268 | 1920 | 0 | 0 | 0 | 0 | 22 | 0 | 68 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1011 | 1082 | 268 | 1920 | 0 | 0 | 0 | 0 | 22 | 0 | 68 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1011 | 1082 | 268 | 1920 | 0 | 0 | 0 | 0 | 22 | 0 | 68 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 2.00 | 1.00 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 3200 | 1600 | 1600 | 3200 | 0 | 0 | 0 | 0 | 1600 | 0 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.32 | 0.68 | 0.17 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.04 |
| Crit Moves: | | | *** | *** | | | | | | | | **** |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 Pacific Coast Highway at Loynes Drive

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.809 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 79 | Level Of Service: | D |

| Street Name: | Pacific Coast Highway | | | | | | Loynes Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 1 | 0 | 1 0 | 3 0 | 1 | 1 0 | 1 1 | 0 | 1 0 | 2 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 161 | 1270 | 161 | 72 | 1353 | 32 | 29 | 334 | 159 | 196 | 513 | 97 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 161 | 1270 | 161 | 72 | 1353 | 32 | 29 | 334 | 159 | 196 | 513 | 97 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 161 | 1270 | 161 | 72 | 1353 | 32 | 29 | 334 | 159 | 196 | 513 | 97 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 161 | 1270 | 161 | 72 | 1353 | 32 | 29 | 334 | 159 | 196 | 513 | 97 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 161 | 1270 | 161 | 72 | 1353 | 32 | 29 | 334 | 159 | 196 | 513 | 97 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 161 | 1270 | 161 | 72 | 1353 | 32 | 29 | 334 | 159 | 196 | 513 | 97 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.66 | 0.34 | 1.00 | 3.00 | 1.00 | 1.00 | 1.35 | 0.65 | 1.00 | 2.00 | 1.00 |
| Final Sat.: | 1600 | 4260 | 540 | 1600 | 4800 | 1600 | 1600 | 2168 | 1032 | 1600 | 3200 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.30 | 0.30 | 0.05 | 0.28 | 0.02 | 0.02 | 0.15 | 0.15 | 0.12 | 0.16 | 0.06 |
| Crit Moves: | **** | | | | **** | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #12 Studebaker Road at Loynes Drive

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.831 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 180 | Level Of Service: | D |

| Street Name: | Studebaker Road | | | | | | Loynes Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Protected | | | Permitted | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 0 | 0 | 0 0 | 2 0 | 1 | 2 0 | 0 0 | 2 | 0 0 | 0 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 141 | 1770 | 0 | 0 | 1315 | 679 | 369 | 0 | 95 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 141 | 1770 | 0 | 0 | 1315 | 679 | 369 | 0 | 95 | 0 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 141 | 1770 | 0 | 0 | 1315 | 679 | 369 | 0 | 95 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 141 | 1770 | 0 | 0 | 1315 | 679 | 369 | 0 | 95 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 141 | 1770 | 0 | 0 | 1315 | 679 | 369 | 0 | 95 | 0 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 141 | 1770 | 0 | 0 | 1315 | 679 | 369 | 0 | 95 | 0 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 2.00 | 0.00 | 0.00 | 2.00 | 1.00 | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| Final Sat.: | 1600 | 3200 | 0 | 0 | 3200 | 1600 | 2880 | 0 | 3200 | 0 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.09 | 0.55 | 0.00 | 0.00 | 0.41 | 0.42 | 0.13 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | | **** | | | | | **** | | | | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

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Intersection #13 Livingston Drive at 2nd Street

**********

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.584 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 48 | Level Of Service: | A |

**********

| Street Name: | Livingston Drive | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Permitted | | | Split Phase | | | Split Phase | | |
| Rights: | Ovl | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 1 | 0 0 | 2 | 0 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 1 1 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 153 | 1010 | 0 | 104 | 35 | 34 | 172 | 0 | 684 | 192 | 14 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 153 | 1010 | 0 | 104 | 35 | 34 | 172 | 0 | 684 | 192 | 14 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 153 | 1010 | 0 | 104 | 35 | 34 | 172 | 0 | 684 | 192 | 14 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 153 | 1010 | 0 | 104 | 35 | 34 | 172 | 0 | 684 | 192 | 14 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 153 | 1010 | 0 | 104 | 35 | 34 | 172 | 0 | 684 | 192 | 14 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 153 | 1010 | 0 | 104 | 35 | 34 | 172 | 0 | 684 | 192 | 14 |
| OvlAdjVol: | | | 134 | | | | | | | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 1.00 | 2.00 | 0.00 | 0.75 | 0.25 | 0.33 | 1.67 | 0.00 | 1.56 | 0.44 | 1.00 |
| Final Sat.: | 0 | 1600 | 3200 | 0 | 1197 | 403 | 528 | 2672 | 0 | 2499 | 701 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.10 | 0.32 | 0.00 | 0.09 | 0.09 | 0.06 | 0.06 | 0.00 | 0.27 | 0.27 | 0.01 |
| OvlAdjV/S: | | | 0.04 | | | | | | | | | |
| Crit Moves: | | **** | | **** | | | | **** | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Bay Shore Avenue at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 1.009 |
| Loss Time (sec): | 12 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 180 | Level Of Service: | F |

| Street Name: | Bay Shore Avenue | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Permitted | | | Permitted | | | Permitted | | | Prot+Permit | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 1! 0 | 0 | 0 0 | 1! 0 | 0 | 1 0 | 1 | 1 0 | 1 0 | 2 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 9 | 27 | 292 | 181 | 29 | 13 | 12 | 1300 | 28 | 250 | 1159 | 254 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 9 | 27 | 292 | 181 | 29 | 13 | 12 | 1300 | 28 | 250 | 1159 | 254 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 9 | 27 | 292 | 181 | 29 | 13 | 12 | 1300 | 28 | 250 | 1159 | 254 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 9 | 27 | 292 | 181 | 29 | 13 | 12 | 1300 | 28 | 250 | 1159 | 254 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 9 | 27 | 292 | 181 | 29 | 13 | 12 | 1300 | 28 | 250 | 1159 | 254 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 9 | 27 | 292 | 181 | 29 | 13 | 12 | 1300 | 28 | 250 | 1159 | 254 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.03 | 0.08 | 0.89 | 0.81 | 0.13 | 0.06 | 1.00 | 1.96 | 0.04 | 1.00 | 2.00 | 1.00 |
| Final Sat.: | 44 | 132 | 1424 | 1299 | 208 | 93 | 1600 | 3133 | 67 | 1600 | 3200 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.20 | 0.21 | 0.11 | 0.14 | 0.14 | 0.01 | 0.42 | 0.41 | 0.16 | 0.36 | 0.16 |
| Crit Moves: | | | **** | **** | | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Naples Plaza at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.746 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 67 | Level Of Service: | C |

| Street Name: | Naples Plaza | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Protected | | |
| Rights: | Include | | | Include | | | Ignore | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 0 0 | 1 | 0 0 | 0 0 | 0 | 0 0 | 2 0 | 1 | 1 0 | 2 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 36 | 0 | 21 | 0 | 0 | 0 | 0 | 1681 | 72 | 77 | 1672 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 36 | 0 | 21 | 0 | 0 | 0 | 0 | 1681 | 72 | 77 | 1672 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 36 | 0 | 21 | 0 | 0 | 0 | 0 | 1681 | 72 | 77 | 1672 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 36 | 0 | 21 | 0 | 0 | 0 | 0 | 1681 | 0 | 77 | 1672 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 36 | 0 | 21 | 0 | 0 | 0 | 0 | 1681 | 0 | 77 | 1672 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 36 | 0 | 21 | 0 | 0 | 0 | 0 | 1681 | 0 | 77 | 1672 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 1.00 | 1.00 | 2.00 | 0.00 |
| Final Sat.: | 1600 | 0 | 1600 | 0 | 0 | 0 | 0 | 3200 | 1600 | 1600 | 3200 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 0.00 | 0.05 | 0.52 | 0.00 |
| Crit Moves: | **** | | | | | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Marina Drive at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.793 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 81 | Level Of Service: | C |

| Street Name: | Marina Drive | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Protected | | | Protected | | |
| Rights: | Ignore | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 1 | 1 0 | 1 | 1 1 | 0 0 | 1 | 1 0 | 3 0 | 1 | 1 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 315 | 26 | 288 | 88 | 21 | 88 | 66 | 1495 | 512 | 51 | 1900 | 56 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 315 | 26 | 288 | 88 | 21 | 88 | 66 | 1495 | 512 | 51 | 1900 | 56 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 315 | 26 | 288 | 88 | 21 | 88 | 66 | 1495 | 512 | 51 | 1900 | 56 |
| User Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 315 | 26 | 0 | 88 | 21 | 88 | 66 | 1495 | 512 | 51 | 1900 | 56 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 315 | 26 | 0 | 88 | 21 | 88 | 66 | 1495 | 512 | 51 | 1900 | 56 |
| PCE Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 315 | 26 | 0 | 88 | 21 | 88 | 66 | 1495 | 512 | 51 | 1900 | 56 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 2.00 | 1.00 | 1.00 | 1.61 | 0.39 | 1.00 | 1.00 | 3.00 | 1.00 | 1.00 | 2.91 | 0.09 |
| Final Sat.: | 2880 | 1600 | 1600 | 2583 | 617 | 1600 | 1600 | 4800 | 1600 | 1600 | 4663 | 137 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.02 | 0.00 | 0.03 | 0.03 | 0.06 | 0.04 | 0.31 | 0.32 | 0.03 | 0.41 | 0.41 |
| Crit Moves: | **** | | | | | **** | **** | | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Pacific Coast Highway at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.918 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 119 | Level Of Service: | E |

| Street Name: | Pacific Coast Highway | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Ovl | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 2 0 | 2 1 | 0 | 2 0 | 3 0 | 1 | 2 0 | 2 1 | 1 | 2 0 | 3 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 420 | 929 | 306 | 267 | 991 | 415 | 312 | 1270 | 301 | 350 | 1195 | 336 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 420 | 929 | 306 | 267 | 991 | 415 | 312 | 1270 | 301 | 350 | 1195 | 336 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 420 | 929 | 306 | 267 | 991 | 415 | 312 | 1270 | 301 | 350 | 1195 | 336 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 420 | 929 | 306 | 267 | 991 | 415 | 312 | 1270 | 301 | 350 | 1195 | 336 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 420 | 929 | 306 | 267 | 991 | 415 | 312 | 1270 | 301 | 350 | 1195 | 336 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 420 | 929 | 306 | 267 | 991 | 415 | 312 | 1270 | 301 | 350 | 1195 | 336 |
| OvlAdjVol: | | | | | | 242 | | | | | | 188 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 0.90 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 |
| Lanes: | 2.00 | 2.26 | 0.74 | 2.00 | 3.00 | 1.00 | 2.00 | 3.00 | 1.00 | 2.00 | 3.00 | 1.00 |
| Final Sat.: | 2880 | 3611 | 1189 | 2880 | 4800 | 1600 | 2880 | 4800 | 1600 | 2880 | 4800 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.15 | 0.26 | 0.26 | 0.09 | 0.21 | 0.26 | 0.11 | 0.26 | 0.19 | 0.12 | 0.25 | 0.21 |
| OvlAdjV/S: | | | | | | 0.15 | | | | | | 0.12 |
| Crit Moves: | **** | | | | **** | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #18 Shopkeeper Road at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.918 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 116 | Level Of Service: | E |

| Street Name: | Shopkeeper Road | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 1! 0 | 0 | 0 0 | 1 0 | 0 | 1 0 | 2 1 | 0 | 1 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 155 | 1 | 195 | 0 | 1 | 0 | 28 | 1793 | 54 | 262 | 1673 | 1 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 155 | 1 | 195 | 0 | 1 | 0 | 28 | 1793 | 54 | 262 | 1673 | 1 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 155 | 1 | 195 | 0 | 1 | 0 | 28 | 1793 | 54 | 262 | 1673 | 1 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 155 | 1 | 195 | 0 | 1 | 0 | 28 | 1793 | 54 | 262 | 1673 | 1 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 155 | 1 | 195 | 0 | 1 | 0 | 28 | 1793 | 54 | 262 | 1673 | 1 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 155 | 1 | 195 | 0 | 1 | 0 | 28 | 1793 | 54 | 262 | 1673 | 1 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.44 | 0.01 | 0.55 | 0.00 | 1.00 | 0.00 | 1.00 | 2.91 | 0.09 | 1.00 | 2.99 | 0.01 |
| Final Sat.: | 707 | 5 | 889 | 0 | 1600 | 0 | 1600 | 4660 | 140 | 1600 | 4797 | 3 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.22 | 0.22 | 0.00 | 0.00 | 0.00 | 0.02 | 0.38 | 0.38 | 0.16 | 0.35 | 0.35 |
| Crit Moves: | | **** | | **** | | | | **** | | **** | | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #19 Studebaker Road at 2nd Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 1.006 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 180 | Level Of Service: | F |

| Street Name: | Studebaker Road | | | | | | 2nd Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Split Phase | | | Split Phase | | | Protected | | | Protected | | |
| Rights: | Include | | | Ovl | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 0 0 | 0 | 2 0 | 0 0 | 2 | 2 0 | 2 0 | 0 | 0 0 | 3 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 424 | 0 | 950 | 1307 | 798 | 0 | 0 | 1026 | 644 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 424 | 0 | 950 | 1307 | 798 | 0 | 0 | 1026 | 644 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 424 | 0 | 950 | 1307 | 798 | 0 | 0 | 1026 | 644 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 0 | 0 | 424 | 0 | 950 | 1307 | 798 | 0 | 0 | 1026 | 644 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 424 | 0 | 950 | 1307 | 798 | 0 | 0 | 1026 | 644 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 0 | 0 | 424 | 0 | 950 | 1307 | 798 | 0 | 0 | 1026 | 644 |
| OvlAdjVol: | | | | | | 0 | | | | | | 408 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 | 0.00 | 0.00 | 3.00 | 1.00 |
| Final Sat.: | 0 | 0 | 0 | 2880 | 0 | 3200 | 2880 | 3200 | 0 | 0 | 4800 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.30 | 0.45 | 0.25 | 0.00 | 0.00 | 0.21 | 0.40 |
| OvlAdjV/S: | | | | | | 0.00 | | | | | | 0.26 |
| Crit Moves: | | | | **** | | | **** | | | | | **** |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #20 Seal Beach Boulevard at Westminster Avenue

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.929 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 117 | Level Of Service: | E |

| Street Name: | Seal Beach Boulevard | | | | | | Westminster Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 1 | 0 | 2 0 | 3 0 | 1 | 2 0 | 3 0 | 1 | 2 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 58 | 849 | 188 | 236 | 821 | 253 | 441 | 883 | 22 | 265 | 894 | 390 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 58 | 849 | 188 | 236 | 821 | 253 | 441 | 883 | 22 | 265 | 894 | 390 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 58 | 849 | 188 | 236 | 821 | 253 | 441 | 883 | 22 | 265 | 894 | 390 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 58 | 849 | 188 | 236 | 821 | 253 | 441 | 883 | 22 | 265 | 894 | 390 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 58 | 849 | 188 | 236 | 821 | 253 | 441 | 883 | 22 | 265 | 894 | 390 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 58 | 849 | 188 | 236 | 821 | 253 | 441 | 883 | 22 | 265 | 894 | 390 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.05 | 1.00 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 | 1.00 | 1.04 | 1.00 |
| Lanes: | 1.00 | 2.46 | 0.54 | 2.00 | 3.00 | 1.00 | 2.00 | 3.00 | 1.00 | 2.00 | 1.39 | 0.61 |
| Final Sat.: | 1600 | 4130 | 870 | 3200 | 5100 | 1700 | 3200 | 5100 | 1700 | 3200 | 2328 | 972 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.21 | 0.22 | 0.07 | 0.16 | 0.15 | 0.14 | 0.17 | 0.01 | 0.08 | 0.38 | 0.40 |
| Crit Moves: | | | **** | **** | | | **** | | | | | **** |

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| Intersection | |
|---|---|
| Intersection Delay, s/veh | 16.9 |
| Intersection LOS | C |

| Movement | EBU | EBL | EBT | EBR | WBU | WBL | WBT | WBR | NBU | NBL | NBT | NBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 5 | 6 | 3 | 0 | 138 | 12 | 127 | 0 | 4 | 177 | 81 |
| Future Vol, veh/h | 0 | 5 | 6 | 3 | 0 | 138 | 12 | 127 | 0 | 4 | 177 | 81 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 5 | 7 | 3 | 0 | 150 | 13 | 138 | 0 | 4 | 192 | 88 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|---|---|---|---|
| Opposing Approach | WB | EB | SB |
| Opposing Lanes | 3 | 1 | 2 |
| Conflicting Approach Left | SB | NB | EB |
| Conflicting Lanes Left | 2 | 2 | 1 |
| Conflicting Approach Right | NB | SB | WB |
| Conflicting Lanes Right | 2 | 2 | 3 |
| HCM Control Delay | 11.3 | 12.2 | 17.2 |
| HCM LOS | B | B | C |

| Lane | NBLn1 | NBLn2 | EBLn1 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 36% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 69% | 43% | 0% | 100% | 0% | 0% | 98% |
| Vol Right, % | 0% | 31% | 21% | 0% | 0% | 100% | 0% | 2% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 4 | 258 | 14 | 138 | 12 | 127 | 320 | 208 |
| LT Vol | 4 | 0 | 5 | 138 | 0 | 0 | 320 | 0 |
| Through Vol | 0 | 177 | 6 | 0 | 12 | 0 | 0 | 204 |
| RT Vol | 0 | 81 | 3 | 0 | 0 | 127 | 0 | 4 |
| Lane Flow Rate | 4 | 280 | 15 | 150 | 13 | 138 | 348 | 226 |
| Geometry Grp | 8 | 8 | 8 | 7 | 7 | 7 | 8 | 8 |
| Degree of Util (X) | 0.009 | 0.533 | 0.035 | 0.311 | 0.025 | 0.24 | 0.673 | 0.405 |
| Departure Headway (Hd) | 7.574 | 6.842 | 8.34 | 7.467 | 6.959 | 6.246 | 6.967 | 6.448 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 470 | 524 | 432 | 480 | 512 | 572 | 518 | 556 |
| Service Time | 5.36 | 4.628 | 6.04 | 5.24 | 4.731 | 4.018 | 4.74 | 4.22 |
| HCM Lane V/C Ratio | 0.009 | 0.534 | 0.035 | 0.313 | 0.025 | 0.241 | 0.672 | 0.406 |
| HCM Control Delay | 10.4 | 17.3 | 11.3 | 13.6 | 9.9 | 11 | 23 | 13.6 |
| HCM Lane LOS | B | C | B | B | A | B | C | B |
| HCM 95th-tile Q | 0 | 3.1 | 0.1 | 1.3 | 0.1 | 0.9 | 5 | 1.9 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | |
| Intersection LOS | |

| Movement | SBU | SBL | SBT | SBR |
|---|---|---|---|---|
| Lane Configurations | | | | |
| Traffic Vol, veh/h | 0 | 320 | 204 | 4 |
| Future Vol, veh/h | 0 | 320 | 204 | 4 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 348 | 222 | 4 |
| Number of Lanes | 0 | 1 | 1 | 0 |

| Approach | SB |
|---|---|
| Opposing Approach | NB |
| Opposing Lanes | 2 |
| Conflicting Approach Left | WB |
| Conflicting Lanes Left | 3 |
| Conflicting Approach Right | EB |
| Conflicting Lanes Right | 1 |
| HCM Control Delay | 19.3 |
| HCM LOS | C |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 6 | 3 | 138 | 12 | 127 | 4 | 177 | 81 | 320 | 204 | 4 |
| Future Volume (vph) | 5 | 6 | 3 | 138 | 12 | 127 | 4 | 177 | 81 | 320 | 204 | 4 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.973 | | | | 0.850 | | 0.953 | | | 0.997 | |
| Flt Protected | | 0.984 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1783 | 0 | 1770 | 1863 | 1583 | 1770 | 1775 | 0 | 1770 | 1857 | 0 |
| Flt Permitted | | 0.984 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1783 | 0 | 1770 | 1863 | 1583 | 1770 | 1775 | 0 | 1770 | 1857 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 330 | | | 322 | | | 311 | | | 284 | |
| Travel Time (s) | | 7.5 | | | 7.3 | | | 7.1 | | | 6.5 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 5 | 7 | 3 | 150 | 13 | 138 | 4 | 192 | 88 | 348 | 222 | 4 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 15 | 0 | 150 | 13 | 138 | 4 | 280 | 0 | 348 | 226 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |

**Intersection Summary**

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 56.3% ICU Level of Service B
Analysis Period (min) 15

PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #22 Pacific Coast Highway at Studebaker Road

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.842 |
| Loss Time (sec): | 18 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 92 | Level Of Service: | D |

| Street Name: | Pacific Coast Highway | | | | | | Studebaker Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Ovl | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 3 0 | 1 | 1 0 | 2 0 | 1 | 1 1 | 0 0 | 1 | 0 0 | 1! 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 152 | 1417 | 29 | 28 | 1269 | 119 | 156 | 15 | 277 | 78 | 42 | 27 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 152 | 1417 | 29 | 28 | 1269 | 119 | 156 | 15 | 277 | 78 | 42 | 27 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 152 | 1417 | 29 | 28 | 1269 | 119 | 156 | 15 | 277 | 78 | 42 | 27 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 152 | 1417 | 29 | 28 | 1269 | 119 | 156 | 15 | 277 | 78 | 42 | 27 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 152 | 1417 | 29 | 28 | 1269 | 119 | 156 | 15 | 277 | 78 | 42 | 27 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 152 | 1417 | 29 | 28 | 1269 | 119 | 156 | 15 | 277 | 78 | 42 | 27 |
| OvlAdjVol: | | | | | | | | | 125 | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 1.00 | 3.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.82 | 0.18 | 1.00 | 0.53 | 0.29 | 0.18 |
| Final Sat.: | 1600 | 4800 | 1600 | 1600 | 3200 | 1600 | 2919 | 281 | 1600 | 849 | 457 | 294 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.30 | 0.02 | 0.02 | 0.40 | 0.07 | 0.05 | 0.05 | 0.17 | 0.09 | 0.09 | 0.09 |
| OvlAdjV/S: | | | | | | | | | 0.08 | | | |
| Crit Moves: | **** | | | | **** | | | | **** | | | **** |

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**Intersection Level Of Service Report**
**Intersection 23: Pacific Coast Highway at Marina Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 28.2 |
| Analysis Method: | HCM 2010 | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.613 |

**Intersection Setup**

| Name | Pacific Coast Highway | | Pacific Coast Highway | | Marina Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | Yes | |

**Volumes**

| Name | Pacific Coast Highway | | Pacific Coast Highway | | Marina Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 214 | 1505 | 1512 | 26 | 0 | 122 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Rate | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 214 | 1505 | 1512 | 26 | 0 | 122 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 1.0000 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 59 | 413 | 415 | 0 | 0 | 34 |
| Total Analysis Volume [veh/h] | 235 | 1654 | 1662 | 0 | 0 | 134 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.61 | 0.02 | 0.02 | 0.00 | 0.00 | 0.43 |
| d_M, Delay for Movement [s/veh] | 28.18 | 0.00 | 0.00 | 0.00 | 0.00 | 24.86 |
| Movement LOS | D | A | A | A | | C |
| 95th-Percentile Queue Length [veh] | 3.92 | 0.00 | 0.00 | 0.00 | 0.00 | 2.06 |
| 95th-Percentile Queue Length [ft] | 98.06 | 0.00 | 0.00 | 0.00 | 0.00 | 51.47 |
| d_A, Approach Delay [s/veh] | 3.51 | | 0.00 | | 24.86 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 2.70 | | | | | |
| Intersection LOS | D | | | | | |

PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #24 Pacific Coast Highway at Main Street/Bolsa Avenue

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.702 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 50 | Level Of Service: | C |

| Street Name: | Pacific Coast Highway | | | | | | Main Street/Bolsa Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 2 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 78 | 1421 | 14 | 112 | 1418 | 83 | 74 | 53 | 68 | 19 | 63 | 170 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 78 | 1421 | 14 | 112 | 1418 | 83 | 74 | 53 | 68 | 19 | 63 | 170 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 78 | 1421 | 14 | 112 | 1418 | 83 | 74 | 53 | 68 | 19 | 63 | 170 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 78 | 1421 | 14 | 112 | 1418 | 83 | 74 | 53 | 68 | 19 | 63 | 170 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 78 | 1421 | 14 | 112 | 1418 | 83 | 74 | 53 | 68 | 19 | 63 | 170 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 78 | 1421 | 14 | 112 | 1418 | 83 | 74 | 53 | 68 | 19 | 63 | 170 |
| OvlAdjVol: | | | | | | | | | | | | 51 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.03 | 1.00 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 |
| Lanes: | 1.00 | 1.98 | 0.02 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1600 | 3269 | 31 | 1600 | 3400 | 1700 | 1600 | 1700 | 1700 | 1600 | 1700 | 1700 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.43 | 0.45 | 0.07 | 0.42 | 0.05 | 0.05 | 0.03 | 0.04 | 0.01 | 0.04 | 0.10 |
| OvlAdjV/S: | | | | | | | | | | | | 0.03 |
| Crit Moves: | | | **** | **** | | | **** | | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #25 Seal Beach Boulevard at Pacific Coast Highway

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.811 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 69 | Level Of Service: | D |

| Street Name: | Seal Beach Boulevard | | | | | | Pacific Coast Highway | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Split Phase | | | Split Phase | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 | 1 0 | 2 0 | 1 | 0 1 | 1 0 | 2 | 0 1 | 1 0 | 2 | 0 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 19 | 146 | 69 | 469 | 194 | 261 | 202 | 1185 | 45 | 73 | 1237 | 462 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 19 | 146 | 69 | 469 | 194 | 261 | 202 | 1185 | 45 | 73 | 1237 | 462 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 19 | 146 | 69 | 469 | 194 | 261 | 202 | 1185 | 45 | 73 | 1237 | 462 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 19 | 146 | 69 | 469 | 194 | 261 | 202 | 1185 | 45 | 73 | 1237 | 462 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 19 | 146 | 69 | 469 | 194 | 261 | 202 | 1185 | 45 | 73 | 1237 | 462 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 19 | 146 | 69 | 469 | 194 | 261 | 202 | 1185 | 45 | 73 | 1237 | 462 |
| OvlAdjVol: | | | | | | | | | | | | 201 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.05 | 1.00 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.06 |
| Lanes: | 1.00 | 1.36 | 0.64 | 2.00 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 |
| Final Sat.: | 1600 | 2273 | 1027 | 3200 | 1700 | 1700 | 1600 | 3400 | 1700 | 1600 | 3400 | 1700 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.06 | 0.07 | 0.15 | 0.11 | 0.15 | 0.13 | 0.35 | 0.03 | 0.05 | 0.36 | 0.27 |
| OvlAdjV/S: | | | | | | | | | | | | 0.12 |
| Crit Moves: | | | **** | | | **** | **** | | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #26 Seal Beach Boulevard at Bolsa Avenue

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.492 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 33 | Level Of Service: | A |

| Street Name: | Seal Beach Boulevard | | | | | | Bolsa Avenue | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 2 1 | 0 | 1 0 | 2 1 | 0 | 0 0 | 1! 0 | 0 | 1 0 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 7 | 740 | 16 | 40 | 901 | 290 | 163 | 10 | 29 | 6 | 8 | 22 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 7 | 740 | 16 | 40 | 901 | 290 | 163 | 10 | 29 | 6 | 8 | 22 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 7 | 740 | 16 | 40 | 901 | 290 | 163 | 10 | 29 | 6 | 8 | 22 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 7 | 740 | 16 | 40 | 901 | 290 | 163 | 10 | 29 | 6 | 8 | 22 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 7 | 740 | 16 | 40 | 901 | 290 | 163 | 10 | 29 | 6 | 8 | 22 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 7 | 740 | 16 | 40 | 901 | 290 | 163 | 10 | 29 | 6 | 8 | 22 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.04 | 1.00 | 1.00 | 1.06 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.06 | 1.06 |
| Lanes: | 1.00 | 2.94 | 0.06 | 1.00 | 2.27 | 0.73 | 0.81 | 0.05 | 0.14 | 1.00 | 1.00 | 1.00 |
| Final Sat.: | 1600 | 4898 | 102 | 1600 | 3831 | 1169 | 1291 | 79 | 230 | 1600 | 1700 | 1700 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.15 | 0.16 | 0.03 | 0.24 | 0.25 | 0.13 | 0.13 | 0.13 | 0.00 | 0.00 | 0.01 |
| Crit Moves: | **** | | | | | **** | | **** | | | | **** |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #27 Santiago Avenue at 7th Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.730 |
| Loss Time (sec): | 12 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 58 | Level Of Service: | C |

| Street Name: | Santiago Avenue | | | | | | 7th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Permitted | | | Permitted | | | Prot+Permit | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 1! 0 | 0 | 0 0 | 1! 0 | 0 | 1 0 | 2 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 31 | 50 | 29 | 9 | 70 | 9 | 18 | 1611 | 31 | 40 | 1677 | 1 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 31 | 50 | 29 | 9 | 70 | 9 | 18 | 1611 | 31 | 40 | 1677 | 1 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 31 | 50 | 29 | 9 | 70 | 9 | 18 | 1611 | 31 | 40 | 1677 | 1 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 31 | 50 | 29 | 9 | 70 | 9 | 18 | 1611 | 31 | 40 | 1677 | 1 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 31 | 50 | 29 | 9 | 70 | 9 | 18 | 1611 | 31 | 40 | 1677 | 1 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 31 | 50 | 29 | 9 | 70 | 9 | 18 | 1611 | 31 | 40 | 1677 | 1 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.28 | 0.46 | 0.26 | 0.10 | 0.80 | 0.10 | 1.00 | 2.94 | 0.06 | 1.00 | 1.99 | 0.01 |
| Final Sat.: | 451 | 727 | 422 | 164 | 1273 | 164 | 1600 | 4709 | 91 | 1600 | 3198 | 2 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.07 | 0.07 | 0.01 | 0.06 | 0.06 | 0.01 | 0.34 | 0.34 | 0.03 | 0.52 | 0.52 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Long Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #28 Pacific Coast Highway at Channel Drive

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.526 |
| Loss Time (sec): | 15 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 43 | Level Of Service: | A |

| Street Name: | Pacific Coast Highway | | | | | | Channel Drive | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Permitted | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 0 0 | 3 0 | 1 | 1 0 | 3 0 | 0 | 0 0 | 0 0 | 0 | 2 0 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 1372 | 43 | 55 | 1510 | 0 | 0 | 0 | 0 | 125 | 0 | 90 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 1372 | 43 | 55 | 1510 | 0 | 0 | 0 | 0 | 125 | 0 | 90 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 1372 | 43 | 55 | 1510 | 0 | 0 | 0 | 0 | 125 | 0 | 90 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 0 | 1372 | 43 | 55 | 1510 | 0 | 0 | 0 | 0 | 125 | 0 | 90 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 1372 | 43 | 55 | 1510 | 0 | 0 | 0 | 0 | 125 | 0 | 90 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 0 | 1372 | 43 | 55 | 1510 | 0 | 0 | 0 | 0 | 125 | 0 | 90 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 |
| Lanes: | 0.00 | 3.00 | 1.00 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 4800 | 1600 | 1600 | 4800 | 0 | 0 | 0 | 0 | 2880 | 0 | 1600 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.29 | 0.03 | 0.03 | 0.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.06 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |

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PM Existing Plus Construction Traffic Conditions
2-16-3779 2nd & PCH Project, Long Beach
(City of Seal Beach)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #29 Pacific Coast Highway at 1st Street

| | | | |
|---|---|---|---|
| Cycle (sec): | 100 | Critical Vol./Cap.(X): | 0.759 |
| Loss Time (sec): | 10 | Average Delay (sec/veh): | xxxxxx |
| Optimal Cycle: | 59 | Level Of Service: | C |

| Street Name: | Pacific Coast Highway | | | | | | 1st Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Protected | | | Protected | | | Split Phase | | | Split Phase | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 2 0 | 0 1 | 0 | 1 0 | 0 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 61 | 1531 | 0 | 3 | 1728 | 101 | 155 | 0 | 43 | 1 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 61 | 1531 | 0 | 3 | 1728 | 101 | 155 | 0 | 43 | 1 | 0 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 61 | 1531 | 0 | 3 | 1728 | 101 | 155 | 0 | 43 | 1 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 61 | 1531 | 0 | 3 | 1728 | 101 | 155 | 0 | 43 | 1 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 61 | 1531 | 0 | 3 | 1728 | 101 | 155 | 0 | 43 | 1 | 0 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FinalVolume: | 61 | 1531 | 0 | 3 | 1728 | 101 | 155 | 0 | 43 | 1 | 0 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Adjustment: | 1.00 | 1.03 | 1.06 | 1.00 | 1.03 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.06 | 1.06 |
| Lanes: | 1.00 | 2.00 | 0.00 | 1.00 | 1.89 | 0.11 | 2.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Final Sat.: | 1600 | 3300 | 0 | 1600 | 3123 | 177 | 3200 | 0 | 1600 | 1600 | 0 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.46 | 0.00 | 0.00 | 0.55 | 0.57 | 0.05 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 |
| Crit Moves: | **** | | | | | **** | **** | | | **** | | |

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**Intersection Level Of Service Report**
**Intersection 36: Studebaker Road/SR-22 WB Ramps at College Park Drive**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 37.3 |
| Analysis Method: | HCM 2010 | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | SR-22 WB Ramps | | Studebaker Road | | College Park Drive | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Speed [mph] | 30.00 | | 30.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | SR-22 WB Ramps | | Studebaker Road | | College Park Drive | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 1432 | 81 | 58 | 33 | 4 | 100 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Rate | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 1432 | 81 | 58 | 33 | 4 | 100 |
| Peak Hour Factor | 0.8580 | 0.8580 | 0.8580 | 0.8580 | 0.8580 | 0.8580 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 |
| Total 15-Minute Volume [veh/h] | 417 | 24 | 17 | 10 | 1 | 0 |
| Total Analysis Volume [veh/h] | 1669 | 94 | 68 | 38 | 5 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | Yes |
| Number of Storage Spaces in Median | 0 | 0 | 2 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.19 | 0.00 | 0.04 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 17.58 | 0.00 | 35.88 | 37.32 |
| Movement LOS | A | A | C | A | E | E |
| 95th-Percentile Queue Length [veh] | 0.00 | 0.00 | 0.70 | 0.00 | 0.13 | 0.00 |
| 95th-Percentile Queue Length [ft] | 0.00 | 0.00 | 17.50 | 0.00 | 3.19 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | | 11.28 | | 35.88 | |
| Approach LOS | A | | B | | E | |
| d_I, Intersection Delay [s/veh] | 0.73 | | | | | |
| Intersection LOS | E | | | | | |

**Intersection Level Of Service Report**
**Intersection 37: 1st Street at Marina Drive**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 11.3 |
| Analysis Method: | HCM 2010 | Level Of Service: | B |
| Analysis Period: | 15 minutes | | |

**Intersection Setup**

| Name | 1st Street | | | 1st Street | | | Marina Drive | | | Marina Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Speed [mph] | 30.00 | | | 30.00 | | | 30.00 | | | 30.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 1st Street | | | 1st Street | | | Marina Drive | | | Marina Drive | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 78 | 48 | 23 | 30 | 37 | 23 | 28 | 161 | 93 | 23 | 169 | 73 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Rate | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 78 | 48 | 23 | 30 | 37 | 23 | 28 | 161 | 93 | 23 | 169 | 73 |
| Peak Hour Factor | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 | 0.9500 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 21 | 13 | 6 | 8 | 10 | 6 | 7 | 42 | 24 | 6 | 44 | 19 |
| Total Analysis Volume [veh/h] | 82 | 51 | 24 | 32 | 39 | 24 | 29 | 169 | 98 | 24 | 178 | 77 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

**Lanes**

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 0.58 | 0.15 | 0.15 | 0.12 | 0.21 | 0.11 | 0.11 | 0.13 | 0.16 | 2.03 | 0.13 | 1.92 |
| 95th-Percentile Queue Length [ft] | 14.46 | 3.70 | 3.70 | 3.08 | 5.19 | 2.86 | 2.86 | 3.16 | 4.01 | 50.67 | 3.30 | 48.02 |
| Approach Delay [s/veh] | 10.38 | | | | 9.83 | | | | 11.87 | | 11.82 | |
| Approach LOS | B | | | | A | | | | B | | B | |
| Intersection Delay [s/veh] | 11.33 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |