# Envision 273 Comprehensive Multimodal Corridor Plan

## *Final Draft Appendix*

April 30, 2025

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# Appendix A.

## Traffic Data Sheets

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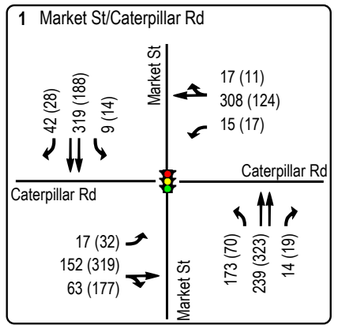
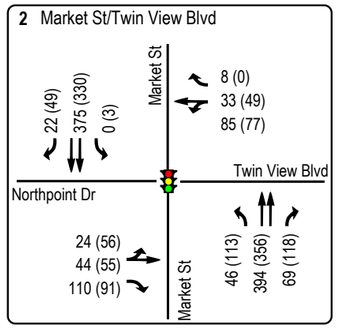
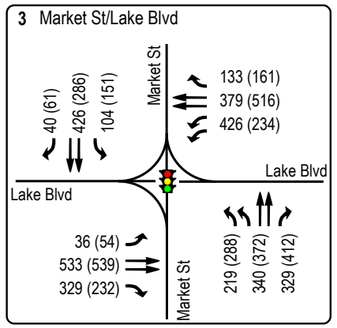
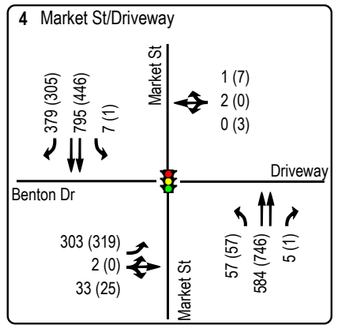
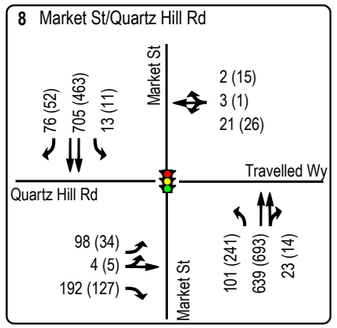
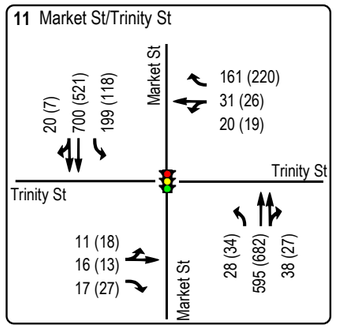


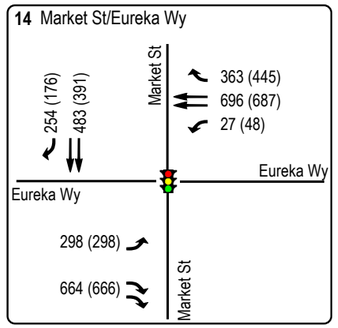



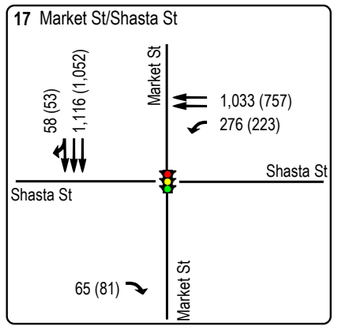



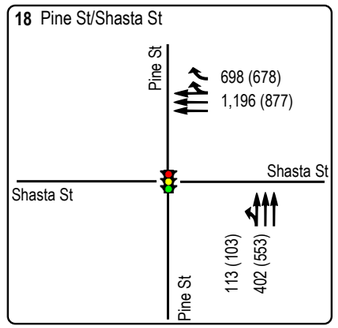



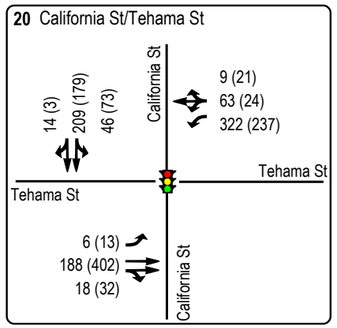



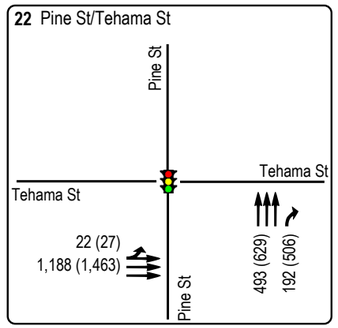



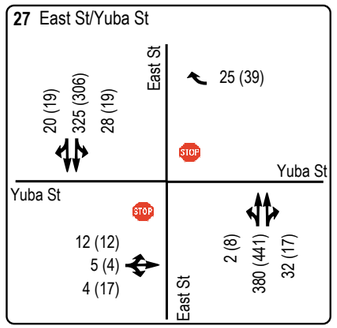



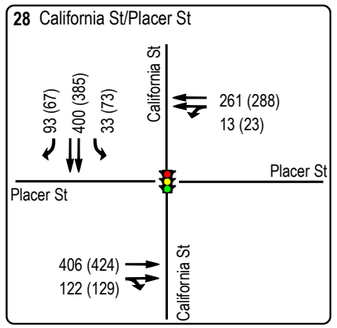



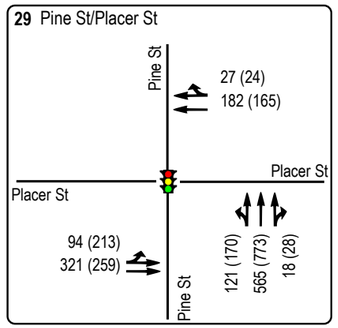



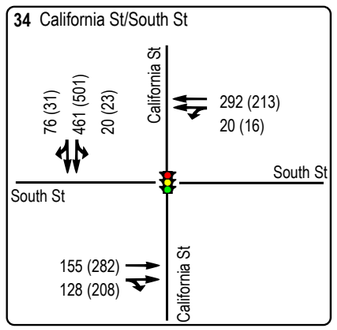



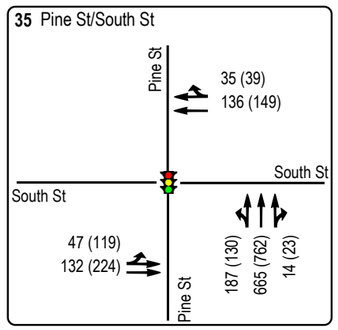



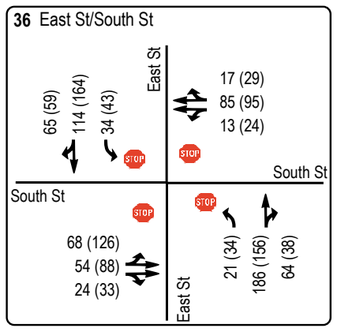



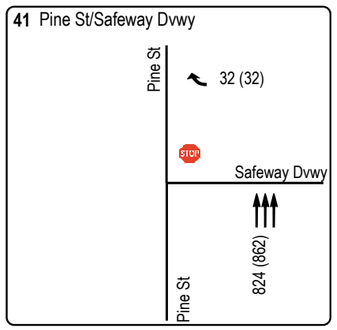



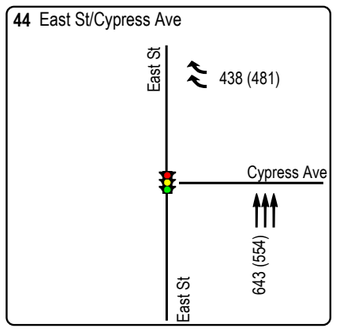



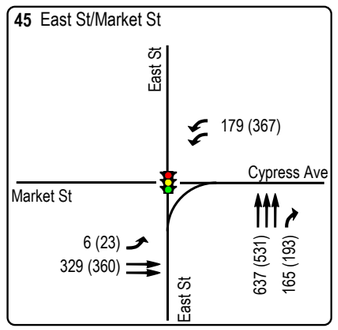



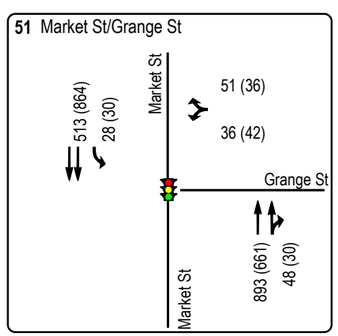



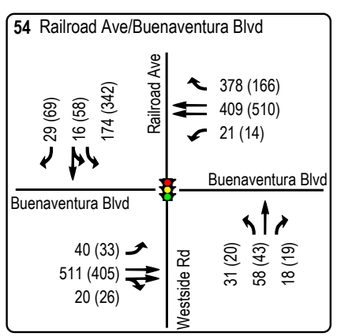



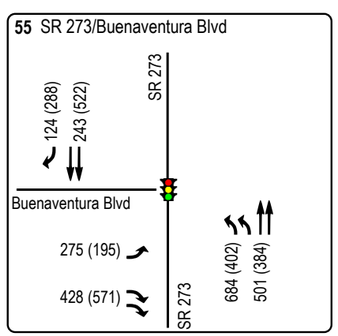


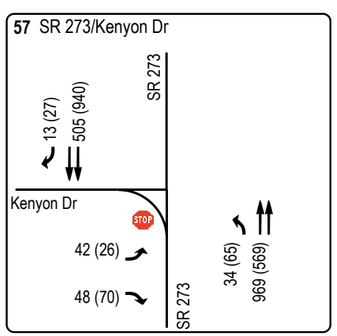



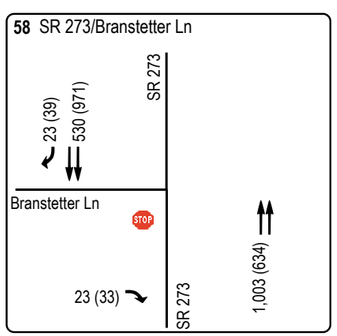



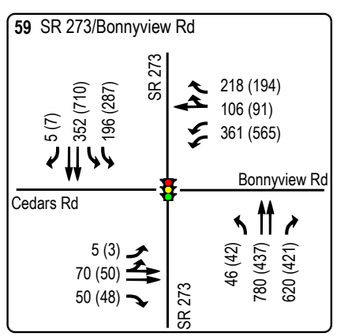



**Legend**

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane — Stop Sign

Traffic Signal — Roundabout

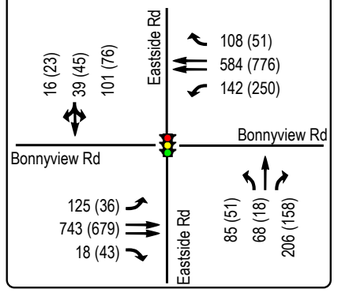
GHD

**Shasta Regional Transportation Agency**
**SR 273 Multimodal Corridor Plan**

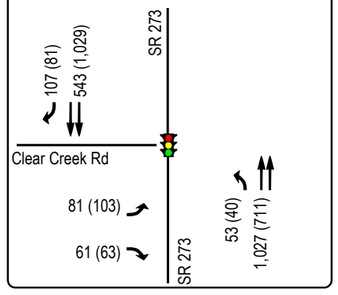
**Existing Conditions**
**Peak Hour Traffic Volumes,**
**Lane Geometries & Traffic Control**

Project No. **12560002**
Report No. **001**
Date

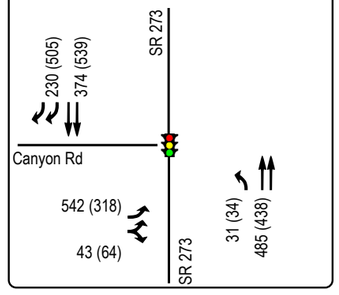
**60** Eastside Rd/Bonnyview Rd



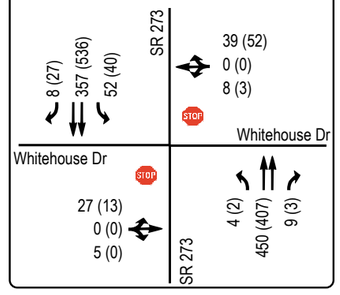

**62** SR 273/Clear Creek Rd



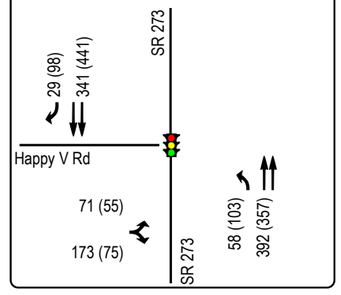

**64** SR 273/Canyon Rd



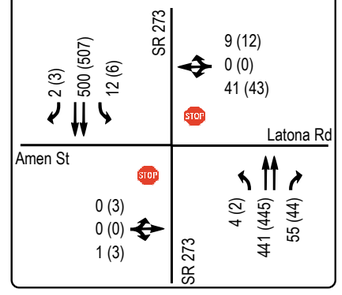

**65** SR 273/Whitehouse Dr



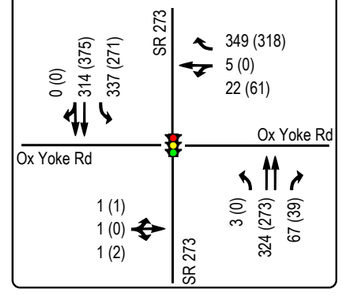

**66** SR 273/Happy V Rd



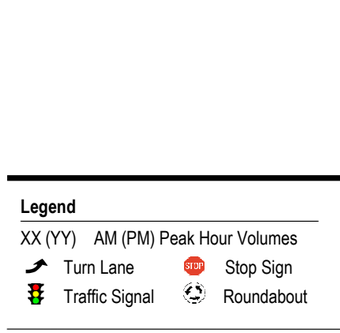

**67** SR 273/Latona Rd




**69** SR 273/Ox Yoke Rd




**72** SR 273/North St



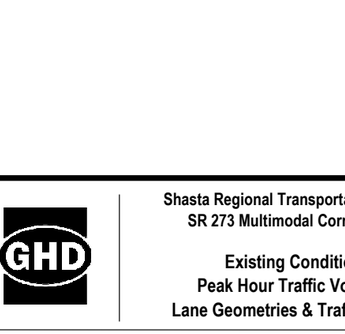

**73** SR 273/South St

**76** SR 273/Factory Outlets Dr

**77** SR 273/Pleasant Hills Dr

**78** Westside Rd/Branstetter Ln

**79** Redding Rancheria/Canyon Rd




**Legend**

XX (YY) AM (PM) Peak Hour Volumes

Turn Lane

Stop Sign

Traffic Signal

Roundabout

GHD

**Shasta Regional Transportation Agency**
**SR 273 Multimodal Corridor Plan**

**Existing Conditions**
**Peak Hour Traffic Volumes,**
**Lane Geometries & Traffic Control**

Project No. **12560002**
Report No. **001**
Date

# Appendix B.

## Intersection Operations Reports

*Table 1 Level of Service Thresholds*

| Level of Service | Type of Flow | Delay | Maneuverability | Stopped Delay/Vehicle | |
|---|---|---|---|---|---|
| | | | | Signalized/Roundabout | Side-Street/All-Way Stop |
| A | Stable Flow | Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all. | Turning movements are easily made, and nearly all drivers find freedom of operation. | <10.0 | <10.0 |
| B | Stable Flow | Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay. | Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles. | >10.0 and <20.0 | >10.0 and <15.0 |
| C | Stable Flow | Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping. | Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted | >20.0 and <35.0 | >15.0 and <25.0 |
| D | Approaching Unstable Flow | The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable. | Maneuverability is severely limited during short periods due to temporary back-ups. | >35.0 and <55.0 | >25.0 and <35.0 |
| E | Unstable Flow | Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences. | There are typically long queues of vehicles waiting upstream of the intersection. | >55.0 and <80.0 | >35.0 and <50.0 |
| F | Forced Flow | Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors. | Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions. | >80.0 | >50.0 |

1. *Based on Highway Capacity Manual 2000, Transportation Research Board, 20000.*

## HCM Signalized Intersection Capacity Analysis
## 1: Market St & Caterpillar Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 17 | 152 | 63 | 15 | 308 | 17 | 173 | 239 | 14 | 9 | 319 | 42 |
| Future Volume (vph) | 17 | 152 | 63 | 15 | 308 | 17 | 173 | 239 | 14 | 9 | 319 | 42 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 4.9 | | 4.2 | 4.9 | | 4.2 | 6.5 | 6.5 | 4.2 | 6.4 | 6.4 |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.96 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1671 | 1676 | | 1671 | 1744 | | 1671 | 3343 | 1464 | 1671 | 3343 | 1463 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1671 | 1676 | | 1671 | 1744 | | 1671 | 3343 | 1464 | 1671 | 3343 | 1463 |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 19 | 167 | 69 | 16 | 338 | 19 | 190 | 263 | 15 | 10 | 351 | 46 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 0 | 36 |
| Lane Group Flow (vph) | 19 | 228 | 0 | 16 | 356 | 0 | 190 | 263 | 6 | 10 | 351 | 10 |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 1 |
| Confl. Bikes (#/hr) | | | 1 | | | 1 | | | 1 | | | |
| Heavy Vehicles (%) | 8% | 8% | 8% | 8% | 8% | 8% | 8% | 8% | 8% | 8% | 8% | 8% |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | 2 | | | 6 |
| Actuated Green, G (s) | 2.6 | 29.1 | | 3.8 | 30.3 | | 16.5 | 35.2 | 35.2 | 1.1 | 19.9 | 19.9 |
| Effective Green, g (s) | 2.6 | 29.1 | | 3.8 | 30.3 | | 16.5 | 35.2 | 35.2 | 1.1 | 19.9 | 19.9 |
| Actuated g/C Ratio | 0.03 | 0.33 | | 0.04 | 0.34 | | 0.19 | 0.40 | 0.40 | 0.01 | 0.22 | 0.22 |
| Clearance Time (s) | 4.2 | 4.9 | | 4.2 | 4.9 | | 4.2 | 6.5 | 6.5 | 4.2 | 6.4 | 6.4 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 48 | 547 | | 71 | 593 | | 309 | 1322 | 579 | 20 | 747 | 327 |
| v/s Ratio Prot | c0.01 | 0.14 | | 0.01 | c0.20 | | c0.11 | 0.08 | | 0.01 | c0.11 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | 0.01 |
| v/c Ratio | 0.40 | 0.42 | | 0.23 | 0.60 | | 0.61 | 0.20 | 0.01 | 0.50 | 0.47 | 0.03 |
| Uniform Delay, d1 | 42.4 | 23.3 | | 41.2 | 24.3 | | 33.3 | 17.6 | 16.3 | 43.7 | 30.0 | 27.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 5.3 | 0.5 | | 1.6 | 1.6 | | 3.6 | 0.1 | 0.0 | 18.3 | 0.5 | 0.0 |
| Delay (s) | 47.7 | 23.9 | | 42.8 | 26.0 | | 36.9 | 17.7 | 16.3 | 62.0 | 30.4 | 27.1 |
| Level of Service | D | C | | D | C | | D | B | B | E | C | C |
| Approach Delay (s) | | 25.6 | | | 26.7 | | | 25.5 | | | 30.8 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 27.3 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.56 | | | |
| Actuated Cycle Length (s) | 89.0 | Sum of lost time (s) | 19.8 | |
| Intersection Capacity Utilization | 49.0% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
## 2: Market St & Northpoint Dr/Twin View Blvd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 24 | 44 | 110 | 85 | 33 | 8 | 46 | 394 | 69 | 0 | 375 | 22 |
| Future Volume (vph) | 24 | 44 | 110 | 85 | 33 | 8 | 46 | 394 | 69 | 0 | 375 | 22 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.6 | 4.6 | | 4.6 | 4.6 | 4.2 | 6.5 | 6.5 | | 6.5 | 6.5 |
| Lane Util. Factor | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 |
| Frpb, ped/bikes | | 1.00 | 1.00 | | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Flpb, ped/bikes | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Frt | | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 |
| Flt Protected | | 0.98 | 1.00 | | 0.97 | 1.00 | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Satd. Flow (prot) | | 1795 | 1553 | | 1763 | 1534 | 1736 | 3471 | 1553 | | 3471 | 1553 |
| Flt Permitted | | 0.98 | 1.00 | | 0.97 | 1.00 | 0.95 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Satd. Flow (perm) | | 1795 | 1553 | | 1763 | 1534 | 1736 | 3471 | 1553 | | 3471 | 1553 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 26 | 47 | 117 | 90 | 35 | 9 | 49 | 419 | 73 | 0 | 399 | 23 |
| RTOR Reduction (vph) | 0 | 0 | 102 | 0 | 0 | 7 | 0 | 0 | 40 | 0 | 0 | 16 |
| Lane Group Flow (vph) | 0 | 73 | 15 | 0 | 125 | 2 | 49 | 419 | 33 | 0 | 399 | 7 |
| Confl. Peds. (#/hr) | | | | | | 1 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Split | NA | Perm | Split | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 4 | 4 | | 3 | 3 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 3 | | | 2 | | | 6 |
| Actuated Green, G (s) | | 8.7 | 8.7 | | 12.0 | 12.0 | 4.8 | 29.7 | 29.7 | | 20.7 | 20.7 |
| Effective Green, g (s) | | 8.7 | 8.7 | | 12.0 | 12.0 | 4.8 | 29.7 | 29.7 | | 20.7 | 20.7 |
| Actuated g/C Ratio | | 0.13 | 0.13 | | 0.18 | 0.18 | 0.07 | 0.45 | 0.45 | | 0.31 | 0.31 |
| Clearance Time (s) | | 4.6 | 4.6 | | 4.6 | 4.6 | 4.2 | 6.5 | 6.5 | | 6.5 | 6.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 236 | 204 | | 320 | 278 | 126 | 1559 | 697 | | 1086 | 486 |
| v/s Ratio Prot | | c0.04 | | | c0.07 | | c0.03 | 0.12 | | | c0.11 | |
| v/s Ratio Perm | | | 0.01 | | | 0.00 | | | 0.02 | | | 0.00 |
| v/c Ratio | | 0.31 | 0.08 | | 0.39 | 0.01 | 0.39 | 0.27 | 0.05 | | 0.37 | 0.01 |
| Uniform Delay, d1 | | 26.0 | 25.2 | | 23.8 | 22.2 | 29.3 | 11.4 | 10.2 | | 17.6 | 15.7 |
| Progression Factor | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.7 | 0.2 | | 0.8 | 0.0 | 2.0 | 0.1 | 0.0 | | 0.2 | 0.0 |
| Delay (s) | | 26.7 | 25.3 | | 24.6 | 22.2 | 31.2 | 11.5 | 10.3 | | 17.8 | 15.7 |
| Level of Service | | C | C | | C | C | C | B | B | | B | B |
| Approach Delay (s) | | 25.9 | | | 24.5 | | | 13.1 | | | 17.7 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 17.7 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.36 | | | |
| Actuated Cycle Length (s) | 66.1 | Sum of lost time (s) | 19.9 | |
| Intersection Capacity Utilization | 45.8% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
### 3: Market St & Lake Blvd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 36 | 533 | 329 | 426 | 379 | 133 | 219 | 340 | 329 | 104 | 426 | 40 |
| Future Volume (vph) | 36 | 533 | 329 | 426 | 379 | 133 | 219 | 340 | 329 | 104 | 426 | 40 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 5.1 | 4.0 | 4.2 | 5.8 | 4.0 | 4.2 | 6.2 | 4.2 | 4.2 | 6.2 | 6.2 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 |
| Flpb, ped/bikes | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1752 | 3505 | 1549 | 3400 | 3505 | 1548 | 3400 | 3505 | 1568 | 1752 | 3505 | 1547 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1752 | 3505 | 1549 | 3400 | 3505 | 1548 | 3400 | 3505 | 1568 | 1752 | 3505 | 1547 |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 40 | 586 | 362 | 468 | 416 | 146 | 241 | 374 | 362 | 114 | 468 | 44 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 0 | 0 | 35 |
| Lane Group Flow (vph) | 40 | 586 | 362 | 468 | 416 | 146 | 241 | 374 | 272 | 114 | 468 | 9 |
| Confl. Peds. (#/hr) | | | 1 | | | 1 | | | | | | 1 |
| Confl. Bikes (#/hr) | | | | | | 1 | | | | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Prot | NA | Free | Prot | NA | Free | Prot | NA | pm+ov | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | 3 | 1 | 6 | |
| Permitted Phases | | | Free | | | Free | | | 2 | | | 6 |
| Actuated Green, G (s) | 6.4 | 26.8 | 99.8 | 19.6 | 39.3 | 99.8 | 13.8 | 19.7 | 39.3 | 14.0 | 19.9 | 19.9 |
| Effective Green, g (s) | 6.4 | 26.8 | 99.8 | 19.6 | 39.3 | 99.8 | 13.8 | 19.7 | 39.3 | 14.0 | 19.9 | 19.9 |
| Actuated g/C Ratio | 0.06 | 0.27 | 1.00 | 0.20 | 0.39 | 1.00 | 0.14 | 0.20 | 0.39 | 0.14 | 0.20 | 0.20 |
| Clearance Time (s) | 4.2 | 5.1 | | 4.2 | 5.8 | | 4.2 | 6.2 | 4.2 | 4.2 | 6.2 | 6.2 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 112 | 941 | 1549 | 667 | 1380 | 1548 | 470 | 691 | 617 | 245 | 698 | 308 |
| v/s Ratio Prot | 0.02 | c0.17 | | c0.14 | 0.12 | | c0.07 | 0.11 | 0.09 | 0.07 | c0.13 | |
| v/s Ratio Perm | | | c0.23 | | | 0.09 | | | 0.09 | | | 0.01 |
| v/c Ratio | 0.36 | 0.62 | 0.23 | 0.70 | 0.30 | 0.09 | 0.51 | 0.54 | 0.44 | 0.47 | 0.67 | 0.03 |
| Uniform Delay, d1 | 44.7 | 32.1 | 0.0 | 37.4 | 20.8 | 0.0 | 39.9 | 36.0 | 22.2 | 39.5 | 36.9 | 32.2 |
| Progression 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 |
| Incremental Delay, d2 | 2.0 | 1.3 | 0.4 | 3.3 | 0.1 | 0.1 | 0.9 | 0.9 | 0.5 | 1.4 | 2.5 | 0.0 |
| Delay (s) | 46.7 | 33.4 | 0.4 | 40.7 | 20.9 | 0.1 | 40.8 | 36.9 | 22.7 | 40.9 | 39.5 | 32.2 |
| Level of Service | D | C | A | D | C | A | D | D | C | D | D | C |
| Approach Delay (s) | | 21.8 | | | 27.0 | | | 32.6 | | | 39.2 | |
| Approach LOS | | C | | | C | | | C | | | D | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 29.2 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.64 | | | |
| Actuated Cycle Length (s) | 99.8 | Sum of lost time (s) | 20.4 | |
| Intersection Capacity Utilization | 65.0% | ICU Level of Service | C | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
### 4: Market St & Benton Dr

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 303 | 2 | 33 | 0 | 2 | 1 | 57 | 584 | 5 | 7 | 795 | 379 |
| Future Volume (vph) | 303 | 2 | 33 | 0 | 2 | 1 | 57 | 584 | 5 | 7 | 795 | 379 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | | | 4.2 | | 4.2 | 6.2 | 6.2 | 4.2 | 6.2 | 6.2 |
| Lane Util. Factor | 0.95 | 0.95 | | | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.97 | | | 0.95 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 0.96 | | | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1665 | 1636 | | | 1762 | | 1752 | 3505 | 1568 | 1752 | 3505 | 1533 |
| Flt Permitted | 0.95 | 0.96 | | | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1665 | 1636 | | | 1762 | | 1752 | 3505 | 1568 | 1752 | 3505 | 1533 |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 340 | 2 | 37 | 0 | 2 | 1 | 64 | 656 | 6 | 8 | 893 | 426 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 168 |
| Lane Group Flow (vph) | 190 | 181 | 0 | 0 | 2 | 0 | 64 | 656 | 4 | 8 | 893 | 258 |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 1 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Split | NA | | | NA | | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 4 | 4 | | 3 | 3 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | 2 | | | 6 |
| Actuated Green, G (s) | 20.5 | 20.5 | | | 2.0 | | 9.5 | 86.3 | 86.3 | 2.0 | 78.8 | 78.8 |
| Effective Green, g (s) | 20.5 | 20.5 | | | 2.0 | | 9.5 | 86.3 | 86.3 | 2.0 | 78.8 | 78.8 |
| Actuated g/C Ratio | 0.16 | 0.16 | | | 0.02 | | 0.07 | 0.66 | 0.66 | 0.02 | 0.61 | 0.61 |
| Clearance Time (s) | 4.6 | 4.6 | | | 4.2 | | 4.2 | 6.2 | 6.2 | 4.2 | 6.2 | 6.2 |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 262 | 257 | | | 27 | | 128 | 2326 | 1040 | 26 | 2124 | 929 |
| v/s Ratio Prot | c0.11 | 0.11 | | | c0.00 | | c0.04 | 0.19 | | 0.00 | c0.25 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | 0.17 |
| v/c Ratio | 0.73 | 0.71 | | | 0.07 | | 0.50 | 0.28 | 0.00 | 0.31 | 0.42 | 0.28 |
| Uniform Delay, d1 | 52.1 | 51.9 | | | 63.1 | | 58.0 | 9.0 | 7.4 | 63.3 | 13.5 | 12.1 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | 1.15 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 9.6 | 8.5 | | | 1.2 | | 3.0 | 0.3 | 0.0 | 6.6 | 0.6 | 0.7 |
| Delay (s) | 61.6 | 60.4 | | | 64.3 | | 70.0 | 8.3 | 7.4 | 69.9 | 14.1 | 12.9 |
| Level of Service | E | E | | | E | | E | A | A | E | B | B |
| Approach Delay (s) | | 61.0 | | | 64.3 | | | 13.7 | | | 14.1 | |
| Approach LOS | | E | | | E | | | B | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 21.3 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.48 | | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 19.2 | |
| Intersection Capacity Utilization | 59.8% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
## 8: Market St & Quartz Hill Rd/Travelled Wy

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 98 | 4 | 192 | 21 | 3 | 2 | 101 | 639 | 23 | 13 | 705 | 76 |
| Future Volume (vph) | 98 | 4 | 192 | 21 | 3 | 2 | 101 | 639 | 23 | 13 | 705 | 76 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 4.2 | 4.2 | | 4.2 | | 4.2 | 5.8 | | 4.2 | 5.8 | 5.8 |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | | 0.99 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 0.96 | 1.00 | | 0.96 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1665 | 1675 | 1546 | | 1753 | | 1752 | 3483 | | 1752 | 3505 | 1568 |
| Flt Permitted | 0.95 | 0.96 | 1.00 | | 0.96 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1665 | 1675 | 1546 | | 1753 | | 1752 | 3483 | | 1752 | 3505 | 1568 |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 109 | 4 | 213 | 23 | 3 | 2 | 112 | 710 | 26 | 14 | 783 | 84 |
| RTOR Reduction (vph) | 0 | 0 | 188 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 39 |
| Lane Group Flow (vph) | 57 | 56 | 25 | 0 | 26 | 0 | 112 | 735 | 0 | 14 | 783 | 45 |
| Confl. Peds. (#/hr) | | | | | | 1 | | | 1 | | | |
| Confl. Bikes (#/hr) | | | 1 | | | | | | | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Split | NA | Perm | Split | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 4 | 4 | | 3 | 3 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | | | | | | | 6 |
| Actuated Green, G (s) | 15.2 | 15.2 | 15.2 | | 12.8 | | 13.9 | 79.6 | | 4.0 | 69.7 | 69.7 |
| Effective Green, g (s) | 15.2 | 15.2 | 15.2 | | 12.8 | | 13.9 | 79.6 | | 4.0 | 69.7 | 69.7 |
| Actuated g/C Ratio | 0.12 | 0.12 | 0.12 | | 0.10 | | 0.11 | 0.61 | | 0.03 | 0.54 | 0.54 |
| Clearance Time (s) | 4.2 | 4.2 | 4.2 | | 4.2 | | 4.2 | 5.8 | | 4.2 | 5.8 | 5.8 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 194 | 195 | 180 | | 172 | | 187 | 2132 | | 53 | 1879 | 840 |
| v/s Ratio Prot | c0.03 | 0.03 | | | c0.01 | | c0.06 | 0.21 | | 0.01 | c0.22 | |
| v/s Ratio Perm | | | 0.02 | | | | | | | | | 0.03 |
| v/c Ratio | 0.29 | 0.29 | 0.14 | | 0.15 | | 0.60 | 0.34 | | 0.26 | 0.42 | 0.05 |
| Uniform Delay, d1 | 52.5 | 52.4 | 51.5 | | 53.6 | | 55.4 | 12.4 | | 61.6 | 18.0 | 14.4 |
| Progression Factor | 1.00 | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.01 | 1.07 | 3.56 |
| Incremental Delay, d2 | 0.8 | 0.8 | 0.4 | | 0.4 | | 5.1 | 0.4 | | 2.6 | 0.7 | 0.1 |
| Delay (s) | 53.3 | 53.3 | 51.9 | | 54.0 | | 60.5 | 12.8 | | 64.9 | 19.9 | 51.4 |
| Level of Service | D | D | D | | D | | E | B | | E | B | D |
| Approach Delay (s) | | 52.4 | | | 54.0 | | | 19.1 | | | 23.6 | |
| Approach LOS | | D | | | D | | | B | | | C | |

| Intersection Summary | | | | | |
|---|---|---|---|---|---|
| HCM 2000 Control Delay | 26.7 | HCM 2000 Level of Service | | C | |
| HCM 2000 Volume to Capacity ratio | 0.39 | | | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | | 18.4 | |
| Intersection Capacity Utilization | 56.1% | ICU Level of Service | | B | |
| Analysis Period (min) | 15 | | | | |
| c Critical Lane Group | | | | | |



## HCM Signalized Intersection Capacity Analysis
## 11: Market St & Trinity St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 11 | 16 | 17 | 20 | 31 | 161 | 28 | 595 | 38 | 199 | 700 | 20 |
| Future Volume (vph) | 11 | 16 | 17 | 20 | 31 | 161 | 28 | 595 | 38 | 199 | 700 | 20 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | 4.7 | | 4.2 | 4.2 | 4.2 | 4.7 | | 4.1 | 4.7 | |
| Lane Util. Factor | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frpb, ped/bikes | | 1.00 | 0.98 | | 1.00 | 0.98 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | 1.00 | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1807 | 1540 | | 1809 | 1539 | 1752 | 3463 | | 1752 | 3487 | |
| Flt Permitted | | 0.98 | 1.00 | | 0.98 | 1.00 | 0.35 | 1.00 | | 0.32 | 1.00 | |
| Satd. Flow (perm) | | 1807 | 1540 | | 1809 | 1539 | 643 | 3463 | | 588 | 3487 | |
| Peak-hour factor, PHF | 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) | 12 | 17 | 18 | 22 | 34 | 175 | 30 | 647 | 41 | 216 | 761 | 22 |
| RTOR Reduction (vph) | 0 | 0 | 17 | 0 | 0 | 157 | 0 | 3 | 0 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 0 | 29 | 1 | 0 | 56 | 18 | 30 | 685 | 0 | 216 | 782 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 4 | | | 12 | | | 3 |
| Confl. Bikes (#/hr) | | | 1 | | | | | | | | | 1 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Split | NA | Perm | Split | NA | Perm | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 4 | 4 | | 3 | 3 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 3 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 8.4 | 8.4 | | 11.6 | 11.6 | 65.4 | 60.6 | | 76.4 | 67.4 | |
| Effective Green, g (s) | | 8.4 | 8.4 | | 11.6 | 11.6 | 65.4 | 60.6 | | 76.4 | 67.4 | |
| Actuated g/C Ratio | | 0.08 | 0.08 | | 0.11 | 0.11 | 0.59 | 0.55 | | 0.69 | 0.61 | |
| Clearance Time (s) | | 4.7 | 4.7 | | 4.2 | 4.2 | 4.2 | 4.7 | | 4.1 | 4.7 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 137 | 117 | | 190 | 162 | 430 | 1907 | | 532 | 2136 | |
| v/s Ratio Prot | | c0.02 | | | c0.03 | | 0.00 | 0.20 | | c0.04 | 0.22 | |
| v/s Ratio Perm | | | 0.00 | | | 0.01 | 0.04 | | | c0.24 | | |
| v/c Ratio | | 0.21 | 0.01 | | 0.29 | 0.11 | 0.07 | 0.36 | | 0.41 | 0.37 | |
| Uniform Delay, d1 | | 47.7 | 47.0 | | 45.4 | 44.5 | 9.2 | 13.8 | | 6.8 | 10.6 | |
| Progression Factor | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.52 | 1.25 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.8 | 0.0 | | 0.9 | 0.3 | 0.1 | 0.5 | | 0.5 | 0.5 | |
| Delay (s) | | 48.5 | 47.0 | | 46.3 | 44.9 | 14.1 | 17.7 | | 7.3 | 11.1 | |
| Level of Service | | D | D | | D | D | B | B | | A | B | |
| Approach Delay (s) | | 47.9 | | | 45.2 | | | 17.6 | | | 10.3 | |
| Approach LOS | | D | | | D | | | B | | | B | |

| Intersection Summary | | | | | |
|---|---|---|---|---|---|
| HCM 2000 Control Delay | 17.8 | HCM 2000 Level of Service | | B | |
| HCM 2000 Volume to Capacity ratio | 0.39 | | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | | 17.8 | |
| Intersection Capacity Utilization | 50.0% | ICU Level of Service | | A | |
| Analysis Period (min) | 15 | | | | |
| c Critical Lane Group | | | | | |

## HCM Signalized Intersection Capacity Analysis
### 14: Market St & Eureka Wy

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 298 | 0 | 664 | 27 | 696 | 363 | 0 | 0 | 0 | 0 | 483 | 254 |
| Future Volume (vph) | 298 | 0 | 664 | 27 | 696 | 363 | 0 | 0 | 0 | 0 | 483 | 254 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.7 | | 4.7 | 4.7 | 4.7 | 4.7 | | | | | 4.7 | 4.7 |
| Lane Util. Factor | 1.00 | | 0.88 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | 1.00 | 0.99 |
| Flpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | 1.00 | 1.00 |
| Frt | 1.00 | | 0.85 | 1.00 | 1.00 | 0.85 | | | | | 1.00 | 0.85 |
| Flt Protected | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | | | | | 1.00 | 1.00 |
| Satd. Flow (prot) | 1752 | | 2760 | 1752 | 3505 | 1568 | | | | | 3505 | 1559 |
| Flt Permitted | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | | | | | 1.00 | 1.00 |
| Satd. Flow (perm) | 1752 | | 2760 | 1752 | 3505 | 1568 | | | | | 3505 | 1559 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 317 | 0 | 706 | 29 | 740 | 386 | 0 | 0 | 0 | 0 | 514 | 270 |
| RTOR Reduction (vph) | 0 | 0 | 439 | 21 | 0 | 114 | 0 | 0 | 0 | 0 | 0 | 21 |
| Lane Group Flow (vph) | 317 | 0 | 267 | 8 | 740 | 272 | 0 | 0 | 0 | 0 | 514 | 249 |
| Confl. Peds. (#/hr) | | | 9 | | | | | | 12 | | | 1 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | 6 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Prot | | Prot | Split | NA | custom | | | | | NA | pm+ov |
| Protected Phases | 2 | | 2 | 8 | 8 | 1 | | | | | 1 | 2 |
| Permitted Phases | | | | | | 8 | | | | | | 1 |
| Actuated Green, G (s) | 41.6 | | 41.6 | 30.0 | 30.0 | 54.3 | | | | | 24.3 | 65.9 |
| Effective Green, g (s) | 41.6 | | 41.6 | 30.0 | 30.0 | 54.3 | | | | | 24.3 | 65.9 |
| Actuated g/C Ratio | 0.38 | | 0.38 | 0.27 | 0.27 | 0.49 | | | | | 0.22 | 0.60 |
| Clearance Time (s) | 4.7 | | 4.7 | 4.7 | 4.7 | 4.7 | | | | | 4.7 | 4.7 |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 662 | | 1043 | 477 | 955 | 841 | | | | | 774 | 1000 |
| v/s Ratio Prot | c0.18 | | 0.10 | 0.00 | c0.21 | 0.07 | | | | | c0.15 | 0.09 |
| v/s Ratio Perm | | | | | | 0.10 | | | | | | 0.07 |
| v/c Ratio | 0.48 | | 0.26 | 0.02 | 0.77 | 0.32 | | | | | 0.66 | 0.25 |
| Uniform Delay, d1 | 26.0 | | 23.5 | 29.2 | 36.9 | 16.8 | | | | | 39.1 | 10.4 |
| Progression Factor | 1.00 | | 1.00 | 1.30 | 0.77 | 0.32 | | | | | 1.39 | 2.17 |
| Incremental Delay, d2 | 2.5 | | 0.6 | 0.0 | 3.7 | 0.2 | | | | | 2.1 | 0.1 |
| Delay (s) | 28.4 | | 24.1 | 38.1 | 32.1 | 5.6 | | | | | 56.6 | 22.7 |
| Level of Service | C | | C | D | C | A | | | | | E | C |
| Approach Delay (s) | | 25.5 | | | 23.4 | | | 0.0 | | | 44.9 | |
| Approach LOS | | C | | | C | | | A | | | D | |

| Intersection Summary | | | | | |
|---|---|---|---|---|---|
| HCM 2000 Control Delay | 29.8 | HCM 2000 Level of Service | | C | |
| HCM 2000 Volume to Capacity ratio | 0.62 | | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | | 14.1 | |
| Intersection Capacity Utilization | 60.7% | ICU Level of Service | | B | |
| Analysis Period (min) | 15 | | | | |
| c Critical Lane Group | | | | | |



## HCM Signalized Intersection Capacity Analysis
### 17: Market St & Shasta St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 65 | 276 | 1033 | 0 | 0 | 0 | 0 | 0 | 1116 | 58 |
| Future Volume (vph) | 0 | 0 | 65 | 276 | 1033 | 0 | 0 | 0 | 0 | 0 | 1116 | 58 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | | 4.7 | 4.7 | 4.7 | | | | | | 4.7 | |
| Lane Util. Factor | | | 1.00 | 1.00 | 0.95 | | | | | | 0.91 | |
| Frpb, ped/bikes | | | 0.97 | 1.00 | 1.00 | | | | | | 1.00 | |
| Flpb, ped/bikes | | | 1.00 | 1.00 | 1.00 | | | | | | 1.00 | |
| Frt | | | 0.86 | 1.00 | 1.00 | | | | | | 0.99 | |
| Flt Protected | | | 1.00 | 0.95 | 1.00 | | | | | | 1.00 | |
| Satd. Flow (prot) | | | 1559 | 1770 | 3539 | | | | | | 5042 | |
| Flt Permitted | | | 1.00 | 0.95 | 1.00 | | | | | | 1.00 | |
| Satd. Flow (perm) | | | 1559 | 1770 | 3539 | | | | | | 5042 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 0 | 0 | 73 | 310 | 1161 | 0 | 0 | 0 | 0 | 0 | 1254 | 65 |
| RTOR Reduction (vph) | 0 | 0 | 70 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 0 | 0 | 3 | 275 | 1161 | 0 | 0 | 0 | 0 | 0 | 1314 | 0 |
| Confl. Peds. (#/hr) | | | 3 | | | 6 | | | 5 | | | 9 |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 1 |
| Turn Type | | | Perm | Split | NA | | | | | | NA | |
| Protected Phases | | | | 8 | 8 | | | | | | 6 | |
| Permitted Phases | | | 7 | | | | | | | | | |
| Actuated Green, G (s) | | | 4.8 | 48.1 | 48.1 | | | | | | 43.0 | |
| Effective Green, g (s) | | | 4.8 | 48.1 | 48.1 | | | | | | 43.0 | |
| Actuated g/C Ratio | | | 0.04 | 0.44 | 0.44 | | | | | | 0.39 | |
| Clearance Time (s) | | | 4.7 | 4.7 | 4.7 | | | | | | 4.7 | |
| Vehicle Extension (s) | | | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | | | 68 | 773 | 1547 | | | | | | 1970 | |
| v/s Ratio Prot | | | | 0.16 | c0.33 | | | | | | c0.26 | |
| v/s Ratio Perm | | | c0.00 | | | | | | | | | |
| v/c Ratio | | | 0.05 | 0.36 | 0.75 | | | | | | 0.67 | |
| Uniform Delay, d1 | | | 50.4 | 20.6 | 25.9 | | | | | | 27.6 | |
| Progression Factor | | | 1.00 | 0.78 | 0.89 | | | | | | 0.61 | |
| Incremental Delay, d2 | | | 0.3 | 0.3 | 1.9 | | | | | | 1.6 | |
| Delay (s) | | | 50.7 | 16.2 | 24.8 | | | | | | 18.5 | |
| Level of Service | | | D | B | C | | | | | | B | |
| Approach Delay (s) | | 50.7 | | | 23.0 | | | 0.0 | | | 18.5 | |
| Approach LOS | | D | | | C | | | A | | | B | |

| Intersection Summary | | | | | |
|---|---|---|---|---|---|
| HCM 2000 Control Delay | 21.7 | HCM 2000 Level of Service | | C | |
| HCM 2000 Volume to Capacity ratio | 0.68 | | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | | 14.1 | |
| Intersection Capacity Utilization | 59.3% | ICU Level of Service | | B | |
| Analysis Period (min) | 15 | | | | |
| c Critical Lane Group | | | | | |

## HCM Signalized Intersection Capacity Analysis
### 18: Shasta St & Pine St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 1196 | 698 | 113 | 402 | 0 | 0 | 0 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 1196 | 698 | 113 | 402 | 0 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | | | | 4.7 | 4.7 | | 4.7 | | | | |
| Lane Util. Factor | | | | | 0.86 | 0.86 | | 0.91 | | | | |
| Frpb, ped/bikes | | | | | 1.00 | 0.98 | | 1.00 | | | | |
| Flpb, ped/bikes | | | | | 1.00 | 1.00 | | 1.00 | | | | |
| Frt | | | | | 0.97 | 0.85 | | 1.00 | | | | |
| Flt Protected | | | | | 1.00 | 1.00 | | 0.99 | | | | |
| Satd. Flow (prot) | | | | | 4612 | 1325 | | 4981 | | | | |
| Flt Permitted | | | | | 1.00 | 1.00 | | 0.99 | | | | |
| Satd. Flow (perm) | | | | | 4612 | 1325 | | 4981 | | | | |
| Peak-hour factor, PHF | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 1391 | 812 | 131 | 467 | 0 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 17 | 59 | 0 | 25 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 1691 | 436 | 0 | 573 | 0 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 4 | | | 4 | | | 3 | | | 3 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | | | | | NA | Perm | Perm | NA | | | | |
| Protected Phases | | | | | 8 | | | 2 | | | | |
| Permitted Phases | | | | | | 8 | 2 | | | | | |
| Actuated Green, G (s) | | | | | 81.0 | 81.0 | | 19.6 | | | | |
| Effective Green, g (s) | | | | | 81.0 | 81.0 | | 19.6 | | | | |
| Actuated g/C Ratio | | | | | 0.74 | 0.74 | | 0.18 | | | | |
| Clearance Time (s) | | | | | 4.7 | 4.7 | | 4.7 | | | | |
| Vehicle Extension (s) | | | | | 3.0 | 3.0 | | 3.0 | | | | |
| Lane Grp Cap (vph) | | | | | 3396 | 975 | | 887 | | | | |
| v/s Ratio Prot | | | | | c0.37 | | | | | | | |
| v/s Ratio Perm | | | | | | 0.33 | | 0.12 | | | | |
| v/c Ratio | | | | | 0.50 | 0.45 | | 0.65 | | | | |
| Uniform Delay, d1 | | | | | 6.0 | 5.7 | | 42.0 | | | | |
| Progression Factor | | | | | 1.00 | 1.00 | | 0.16 | | | | |
| Incremental Delay, d2 | | | | | 0.5 | 1.5 | | 1.6 | | | | |
| Delay (s) | | | | | 6.6 | 7.2 | | 8.3 | | | | |
| Level of Service | | | | | A | A | | A | | | | |
| Approach Delay (s) | | 0.0 | | | 6.7 | | | 8.3 | | | 0.0 | |
| Approach LOS | | A | | | A | | | A | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 7.0 | HCM 2000 Level of Service | A | |
| HCM 2000 Volume to Capacity ratio | 0.53 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 59.3% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
### 20: California St & Tehama St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 6 | 188 | 18 | 322 | 63 | 9 | 0 | 0 | 0 | 46 | 209 | 14 |
| Future Volume (vph) | 6 | 188 | 18 | 322 | 63 | 9 | 0 | 0 | 0 | 46 | 209 | 14 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 4.2 | | 4.7 | 4.7 | | | | | | 4.2 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.95 | 0.95 | | | | | | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | | | | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | | | | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.99 | | | | | | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 0.97 | | | | | | 0.99 | |
| Satd. Flow (prot) | 1752 | 3450 | | 1665 | 1682 | | | | | | 3437 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 0.97 | | | | | | 0.99 | |
| Satd. Flow (perm) | 1752 | 3450 | | 1665 | 1682 | | | | | | 3437 | |
| Peak-hour factor, PHF | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Adj. Flow (vph) | 7 | 229 | 22 | 393 | 77 | 11 | 0 | 0 | 0 | 56 | 255 | 17 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 7 | 243 | 0 | 240 | 240 | 0 | 0 | 0 | 0 | 0 | 324 | 0 |
| Confl. Peds. (#/hr) | | | 12 | | | 17 | | | 10 | | | 19 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Split | NA | | Split | NA | | | | | Perm | NA | |
| Protected Phases | 5 | 5 | | 6 | 6 | | | | | | 4 | |
| Permitted Phases | | | | | | | | | | 4 | | |
| Actuated Green, G (s) | 14.6 | 14.6 | | 64.5 | 64.5 | | | | | | 17.8 | |
| Effective Green, g (s) | 14.6 | 14.6 | | 64.5 | 64.5 | | | | | | 17.8 | |
| Actuated g/C Ratio | 0.13 | 0.13 | | 0.59 | 0.59 | | | | | | 0.16 | |
| Clearance Time (s) | 4.2 | 4.2 | | 4.7 | 4.7 | | | | | | 4.2 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | 232 | 457 | | 976 | 986 | | | | | | 556 | |
| v/s Ratio Prot | 0.00 | c0.07 | | c0.14 | 0.14 | | | | | | | |
| v/s Ratio Perm | | | | | | | | | | | 0.09 | |
| v/c Ratio | 0.03 | 0.53 | | 0.25 | 0.24 | | | | | | 0.58 | |
| Uniform Delay, d1 | 41.5 | 44.5 | | 11.0 | 11.0 | | | | | | 42.7 | |
| Progression Factor | 1.00 | 1.00 | | 0.66 | 0.65 | | | | | | 1.00 | |
| Incremental Delay, d2 | 0.1 | 1.2 | | 0.5 | 0.5 | | | | | | 1.6 | |
| Delay (s) | 41.6 | 45.7 | | 7.8 | 7.7 | | | | | | 44.2 | |
| Level of Service | D | D | | A | A | | | | | | D | |
| Approach Delay (s) | | 45.6 | | | 7.8 | | | 0.0 | | | 44.2 | |
| Approach LOS | | D | | | A | | | A | | | D | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 28.1 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.35 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 13.1 | |
| Intersection Capacity Utilization | 58.3% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
### 22: Pine St & Tehama St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 1188 | 0 | 0 | 0 | 0 | 0 | 493 | 192 | 0 | 0 | 0 |
| Future Volume (vph) | 22 | 1188 | 0 | 0 | 0 | 0 | 0 | 493 | 192 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | | | | 4.7 | 4.7 | | | |
| Lane Util. Factor | | 0.91 | | | | | | 0.91 | 1.00 | | | |
| Frpb, ped/bikes | | 1.00 | | | | | | 1.00 | 0.98 | | | |
| Flpb, ped/bikes | | 1.00 | | | | | | 1.00 | 1.00 | | | |
| Frt | | 1.00 | | | | | | 1.00 | 0.85 | | | |
| Flt Protected | | 1.00 | | | | | | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | | 5031 | | | | | | 5036 | 1539 | | | |
| Flt Permitted | | 1.00 | | | | | | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | | 5031 | | | | | | 5036 | 1539 | | | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 23 | 1225 | 0 | 0 | 0 | 0 | 0 | 508 | 198 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 1244 | 0 | 0 | 0 | 0 | 0 | 508 | 160 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 3 | | | 9 | | | 4 | | | 8 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Perm | NA | | | | | | NA | Perm | | | |
| Protected Phases | | 4 | | | | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | | | 2 | | | |
| Actuated Green, G (s) | | 81.2 | | | | | | 19.4 | 19.4 | | | |
| Effective Green, g (s) | | 81.2 | | | | | | 19.4 | 19.4 | | | |
| Actuated g/C Ratio | | 0.74 | | | | | | 0.18 | 0.18 | | | |
| Clearance Time (s) | | 4.7 | | | | | | 4.7 | 4.7 | | | |
| Vehicle Extension (s) | | 3.0 | | | | | | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | | 3713 | | | | | | 888 | 271 | | | |
| v/s Ratio Prot | | | | | | | | 0.10 | | | | |
| v/s Ratio Perm | | 0.25 | | | | | | | c0.10 | | | |
| v/c Ratio | | 0.33 | | | | | | 0.57 | 0.59 | | | |
| Uniform Delay, d1 | | 5.0 | | | | | | 41.5 | 41.7 | | | |
| Progression Factor | | 0.20 | | | | | | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | | 0.2 | | | | | | 0.9 | 3.4 | | | |
| Delay (s) | | 1.2 | | | | | | 42.4 | 45.1 | | | |
| Level of Service | | A | | | | | | D | D | | | |
| Approach Delay (s) | | 1.2 | | | 0.0 | | | 43.1 | | | 0.0 | |
| Approach LOS | | A | | | A | | | D | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 16.4 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.38 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 44.7% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Unsignalized Intersection Capacity Analysis
### 27: Yuba St & East St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 5 | 4 | 0 | 0 | 25 | 2 | 380 | 32 | 28 | 325 | 20 |
| Future Volume (Veh/h) | 12 | 5 | 4 | 0 | 0 | 25 | 2 | 380 | 32 | 28 | 325 | 20 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Hourly flow rate (vph) | 14 | 6 | 5 | 0 | 0 | 29 | 2 | 437 | 37 | 32 | 374 | 23 |
| Pedestrians | | 4 | | | 6 | | | 9 | | | 1 | |
| Lane Width (ft) | | 12.0 | | | 12.0 | | | 12.0 | | | 12.0 | |
| Walking Speed (ft/s) | | 3.5 | | | 3.5 | | | 3.5 | | | 3.5 | |
| Percent Blockage | | 0 | | | 1 | | | 1 | | | 0 | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 391 | | | 764 | |
| pX, platoon unblocked | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | | 0.95 | | | | | |
| vC, conflicting volume | 706 | 938 | 212 | 734 | 930 | 244 | 401 | | | 480 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 593 | 836 | 75 | 622 | 829 | 244 | 273 | | | 480 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 96 | 98 | 99 | 100 | 100 | 96 | 100 | | | 97 | | |
| cM capacity (veh/h) | 346 | 278 | 918 | 332 | 280 | 755 | 1229 | | | 1080 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 25 | 29 | 220 | 256 | 219 | 210 |
| Volume Left | 14 | 0 | 2 | 0 | 32 | 0 |
| Volume Right | 5 | 29 | 0 | 37 | 0 | 23 |
| cSH | 370 | 755 | 1229 | 1700 | 1080 | 1700 |
| Volume to Capacity | 0.07 | 0.04 | 0.00 | 0.15 | 0.03 | 0.12 |
| Queue Length 95th (ft) | 5 | 3 | 0 | 0 | 2 | 0 |
| Control Delay (s) | 15.4 | 10.0 | 0.1 | 0.0 | 1.5 | 0.0 |
| Lane LOS | C | A | A | | A | |
| Approach Delay (s) | 15.4 | 10.0 | 0.0 | | 0.8 | |
| Approach LOS | C | A | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.1 | | | |
| Intersection Capacity Utilization | 42.1% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

## HCM Signalized Intersection Capacity Analysis
### 28: California St & Placer St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 406 | 122 | 13 | 261 | 0 | 0 | 0 | 0 | 33 | 400 | 93 |
| Future Volume (vph) | 0 | 406 | 122 | 13 | 261 | 0 | 0 | 0 | 0 | 33 | 400 | 93 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | 4.7 | | | | | 4.7 | 4.7 | 4.7 |
| Lane Util. Factor | | 0.95 | | | 0.95 | | | | | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | 1.00 |
| Frt | | 0.97 | | | 1.00 | | | | | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 1.00 | | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3402 | | | 3531 | | | | | 1770 | 3539 | 1549 |
| Flt Permitted | | 1.00 | | | 0.87 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3402 | | | 3063 | | | | | 1770 | 3539 | 1549 |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 0 | 467 | 140 | 15 | 300 | 0 | 0 | 0 | 0 | 38 | 460 | 107 |
| RTOR Reduction (vph) | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| Lane Group Flow (vph) | 0 | 569 | 0 | 0 | 315 | 0 | 0 | 0 | 0 | 38 | 460 | 83 |
| Confl. Peds. (#/hr) | | | 4 | | | 5 | | | 1 | | | 7 |
| Confl. Bikes (#/hr) | | | 1 | | | 2 | | | | | | |
| Turn Type | | NA | | Perm | NA | | | | | Perm | NA | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 25.6 | | | 25.6 | | | | | 75.0 | 75.0 | 75.0 |
| Effective Green, g (s) | | 25.6 | | | 25.6 | | | | | 75.0 | 75.0 | 75.0 |
| Actuated g/C Ratio | | 0.23 | | | 0.23 | | | | | 0.68 | 0.68 | 0.68 |
| Clearance Time (s) | | 4.7 | | | 4.7 | | | | | 4.7 | 4.7 | 4.7 |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 791 | | | 712 | | | | | 1206 | 2412 | 1056 |
| v/s Ratio Prot | | c0.17 | | | | | | | | | c0.13 | |
| v/s Ratio Perm | | | | | 0.10 | | | | | 0.02 | | 0.05 |
| v/c Ratio | | 0.72 | | | 0.44 | | | | | 0.03 | 0.19 | 0.08 |
| Uniform Delay, d1 | | 38.9 | | | 36.1 | | | | | 5.7 | 6.4 | 5.9 |
| Progression Factor | | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 3.1 | | | 0.4 | | | | | 0.0 | 0.2 | 0.1 |
| Delay (s) | | 42.0 | | | 36.5 | | | | | 5.7 | 6.6 | 6.0 |
| Level of Service | | D | | | D | | | | | A | A | A |
| Approach Delay (s) | | 42.0 | | | 36.5 | | | 0.0 | | | 6.4 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 26.8 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.32 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 44.5% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
### 29: Pine St & Placer St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 94 | 321 | 0 | 0 | 182 | 27 | 121 | 565 | 18 | 0 | 0 | 0 |
| Future Volume (vph) | 94 | 321 | 0 | 0 | 182 | 27 | 121 | 565 | 18 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | 4.7 | | | 4.7 | | | | |
| Lane Util. Factor | | 0.95 | | | 0.95 | | | 0.91 | | | | |
| Frpb, ped/bikes | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Frt | | 1.00 | | | 0.98 | | | 1.00 | | | | |
| Flt Protected | | 0.99 | | | 1.00 | | | 0.99 | | | | |
| Satd. Flow (prot) | | 3466 | | | 3427 | | | 4971 | | | | |
| Flt Permitted | | 0.79 | | | 1.00 | | | 0.99 | | | | |
| Satd. Flow (perm) | | 2764 | | | 3427 | | | 4971 | | | | |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 100 | 341 | 0 | 0 | 194 | 29 | 129 | 601 | 19 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 441 | 0 | 0 | 206 | 0 | 0 | 748 | 0 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 13 | | | 6 | | | 6 | | | 12 |
| Confl. Bikes (#/hr) | | | 2 | | | 1 | | | | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Perm | NA | | | NA | | Perm | NA | | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | | | | |
| Actuated Green, G (s) | | 23.4 | | | 23.4 | | | 77.2 | | | | |
| Effective Green, g (s) | | 23.4 | | | 23.4 | | | 77.2 | | | | |
| Actuated g/C Ratio | | 0.21 | | | 0.21 | | | 0.70 | | | | |
| Clearance Time (s) | | 4.7 | | | 4.7 | | | 4.7 | | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | | |
| Lane Grp Cap (vph) | | 587 | | | 729 | | | 3488 | | | | |
| v/s Ratio Prot | | | | | 0.06 | | | | | | | |
| v/s Ratio Perm | | c0.16 | | | | | | 0.15 | | | | |
| v/c Ratio | | 0.75 | | | 0.28 | | | 0.21 | | | | |
| Uniform Delay, d1 | | 40.6 | | | 36.3 | | | 5.8 | | | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Incremental Delay, d2 | | 5.4 | | | 0.2 | | | 0.1 | | | | |
| Delay (s) | | 46.0 | | | 36.5 | | | 5.9 | | | | |
| Level of Service | | D | | | D | | | A | | | | |
| Approach Delay (s) | | 46.0 | | | 36.5 | | | 5.9 | | | 0.0 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 23.2 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.34 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 54.2% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
### 34: California St & South St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 155 | 128 | 20 | 292 | 0 | 0 | 0 | 0 | 20 | 461 | 76 |
| Future Volume (vph) | 0 | 155 | 128 | 20 | 292 | 0 | 0 | 0 | 0 | 20 | 461 | 76 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | 4.7 | | | | | | 4.7 | |
| Lane Util. Factor | | 0.95 | | | 0.95 | | | | | | 0.95 | |
| Frpb, ped/bikes | | 0.99 | | | 1.00 | | | | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | | | | | 1.00 | |
| Frt | | 0.93 | | | 1.00 | | | | | | 0.98 | |
| Flt Protected | | 1.00 | | | 1.00 | | | | | | 1.00 | |
| Satd. Flow (prot) | | 3279 | | | 3528 | | | | | | 3453 | |
| Flt Permitted | | 1.00 | | | 0.88 | | | | | | 1.00 | |
| Satd. Flow (perm) | | 3279 | | | 3104 | | | | | | 3453 | |
| Peak-hour factor, PHF | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Adj. Flow (vph) | 0 | 194 | 160 | 25 | 365 | 0 | 0 | 0 | 0 | 25 | 576 | 95 |
| RTOR Reduction (vph) | 0 | 132 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 0 | 222 | 0 | 0 | 390 | 0 | 0 | 0 | 0 | 0 | 691 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | 4 | | | | | | 3 |
| Confl. Bikes (#/hr) | | | | | | 3 | | | | | | 1 |
| Turn Type | | NA | | Perm | NA | | | | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | | 8 | | | | | | 6 | | |
| Actuated Green, G (s) | | 19.1 | | | 19.1 | | | | | | 81.5 | |
| Effective Green, g (s) | | 19.1 | | | 19.1 | | | | | | 81.5 | |
| Actuated g/C Ratio | | 0.17 | | | 0.17 | | | | | | 0.74 | |
| Clearance Time (s) | | 4.7 | | | 4.7 | | | | | | 4.7 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | | 569 | | | 538 | | | | | | 2558 | |
| v/s Ratio Prot | | 0.07 | | | | | | | | | | |
| v/s Ratio Perm | | | | | c0.13 | | | | | | 0.20 | |
| v/c Ratio | | 0.39 | | | 0.72 | | | | | | 0.27 | |
| Uniform Delay, d1 | | 40.3 | | | 43.0 | | | | | | 4.6 | |
| Progression Factor | | 1.00 | | | 1.00 | | | | | | 1.00 | |
| Incremental Delay, d2 | | 0.4 | | | 4.8 | | | | | | 0.3 | |
| Delay (s) | | 40.7 | | | 47.8 | | | | | | 4.9 | |
| Level of Service | | D | | | D | | | | | | A | |
| Approach Delay (s) | | 40.7 | | | 47.8 | | | 0.0 | | | 4.9 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 25.3 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.36 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 48.7% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
### 35: Pine St & South St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 47 | 132 | 0 | 0 | 136 | 35 | 187 | 665 | 14 | 0 | 0 | 0 |
| Future Volume (vph) | 47 | 132 | 0 | 0 | 136 | 35 | 187 | 665 | 14 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | 4.7 | | | 4.7 | | | | |
| Lane Util. Factor | | 0.95 | | | 0.95 | | | 0.91 | | | | |
| Frpb, ped/bikes | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Frt | | 1.00 | | | 0.97 | | | 1.00 | | | | |
| Flt Protected | | 0.99 | | | 1.00 | | | 0.99 | | | | |
| Satd. Flow (prot) | | 3460 | | | 3386 | | | 4968 | | | | |
| Flt Permitted | | 0.78 | | | 1.00 | | | 0.99 | | | | |
| Satd. Flow (perm) | | 2743 | | | 3386 | | | 4968 | | | | |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 54 | 152 | 0 | 0 | 156 | 40 | 215 | 764 | 16 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 206 | 0 | 0 | 161 | 0 | 0 | 995 | 0 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 3 | | | 6 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Perm | NA | | | NA | | Perm | NA | | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | | | | |
| Actuated Green, G (s) | | 14.4 | | | 14.4 | | | 86.2 | | | | |
| Effective Green, g (s) | | 14.4 | | | 14.4 | | | 86.2 | | | | |
| Actuated g/C Ratio | | 0.13 | | | 0.13 | | | 0.78 | | | | |
| Clearance Time (s) | | 4.7 | | | 4.7 | | | 4.7 | | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | | |
| Lane Grp Cap (vph) | | 359 | | | 443 | | | 3893 | | | | |
| v/s Ratio Prot | | | | | 0.05 | | | | | | | |
| v/s Ratio Perm | | c0.08 | | | | | | 0.20 | | | | |
| v/c Ratio | | 0.57 | | | 0.36 | | | 0.26 | | | | |
| Uniform Delay, d1 | | 44.9 | | | 43.6 | | | 3.2 | | | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Incremental Delay, d2 | | 2.2 | | | 0.5 | | | 0.2 | | | | |
| Delay (s) | | 47.1 | | | 44.1 | | | 3.4 | | | | |
| Level of Service | | D | | | D | | | A | | | | |
| Approach Delay (s) | | 47.1 | | | 44.1 | | | 3.4 | | | 0.0 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 15.5 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.30 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 46.2% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Unsignalized Intersection Capacity Analysis
### 36: East St & South St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Traffic Volume (vph) | 68 | 54 | 24 | 13 | 85 | 17 | 21 | 186 | 64 | 34 | 114 | 65 |
| Future Volume (vph) | 68 | 54 | 24 | 13 | 85 | 17 | 21 | 186 | 64 | 34 | 114 | 65 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Hourly flow rate (vph) | 76 | 61 | 27 | 15 | 96 | 19 | 24 | 209 | 72 | 38 | 128 | 73 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|---|
| Volume Total (vph) | 107 | 58 | 63 | 67 | 24 | 281 | 38 | 201 |
| Volume Left (vph) | 76 | 0 | 15 | 0 | 24 | 0 | 38 | 0 |
| Volume Right (vph) | 0 | 27 | 0 | 19 | 0 | 72 | 0 | 73 |
| Hadj (s) | 0.39 | -0.29 | 0.15 | -0.16 | 0.53 | -0.15 | 0.53 | -0.22 |
| Departure Headway (s) | 6.5 | 5.8 | 6.3 | 6.0 | 6.2 | 5.5 | 6.2 | 5.5 |
| Degree Utilization, x | 0.19 | 0.09 | 0.11 | 0.11 | 0.04 | 0.43 | 0.07 | 0.31 |
| Capacity (veh/h) | 517 | 574 | 527 | 554 | 558 | 632 | 548 | 627 |
| Control Delay (s) | 9.8 | 8.2 | 8.9 | 8.5 | 8.2 | 11.4 | 8.5 | 9.7 |
| Approach Delay (s) | 9.2 | | 8.7 | | 11.1 | | 9.5 | |
| Approach LOS | A | | A | | B | | A | |

| Intersection Summary | | | | | |
|---|---|---|---|---|---|
| Delay | 9.9 | | | | |
| Level of Service | A | | | | |
| Intersection Capacity Utilization | 37.9% | ICU Level of Service | | A | |
| Analysis Period (min) | 15 | | | | |



## HCM Signalized Intersection Capacity Analysis
### 38: Gold St & Market St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 22 | 522 | 5 | 0 | 8 | 0 | 0 | 0 | 1 | 35 | 0 |
| Future Volume (vph) | 12 | 22 | 522 | 5 | 0 | 8 | 0 | 0 | 0 | 1 | 35 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | 4.7 | 4.7 | | 4.7 | | | | | 4.7 | |
| Lane Util. Factor | | 0.95 | 0.95 | 1.00 | | 1.00 | | | | | 0.95 | |
| Frpb, ped/bikes | | 0.99 | 0.99 | 1.00 | | 0.93 | | | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | | 1.00 | | | | | 1.00 | |
| Frt | | 0.87 | 0.85 | 1.00 | | 0.85 | | | | | 1.00 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | | 1.00 | | | | | 1.00 | |
| Satd. Flow (prot) | | 1515 | 1484 | 1770 | | 1472 | | | | | 3535 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | | 1.00 | | | | | 1.00 | |
| Satd. Flow (perm) | | 1515 | 1484 | 1770 | | 1472 | | | | | 3535 | |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 13 | 23 | 555 | 5 | 0 | 9 | 0 | 0 | 0 | 1 | 37 | 0 |
| RTOR Reduction (vph) | 0 | 60 | 67 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 237 | 227 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | 3 | | | 3 | | | 5 |
| Turn Type | Split | NA | Perm | Prot | | Perm | | | | Perm | NA | |
| Protected Phases | 6 | 6 | | 5 | | | | | | | 4 | |
| Permitted Phases | | | 6 | | | 5 | | | | 4 | | |
| Actuated Green, G (s) | | 84.9 | 84.9 | 3.2 | | 3.2 | | | | | 7.8 | |
| Effective Green, g (s) | | 84.9 | 84.9 | 3.2 | | 3.2 | | | | | 7.8 | |
| Actuated g/C Ratio | | 0.77 | 0.77 | 0.03 | | 0.03 | | | | | 0.07 | |
| Clearance Time (s) | | 4.7 | 4.7 | 4.7 | | 4.7 | | | | | 4.7 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | | 3.0 | | | | | 3.0 | |
| Lane Grp Cap (vph) | | 1169 | 1145 | 51 | | 42 | | | | | 250 | |
| v/s Ratio Prot | | c0.16 | | c0.00 | | | | | | | | |
| v/s Ratio Perm | | | 0.15 | | | 0.00 | | | | | 0.01 | |
| v/c Ratio | | 0.20 | 0.20 | 0.10 | | 0.01 | | | | | 0.15 | |
| Uniform Delay, d1 | | 3.4 | 3.4 | 52.0 | | 51.9 | | | | | 48.0 | |
| Progression Factor | | 3.52 | 4.49 | 1.00 | | 1.00 | | | | | 1.00 | |
| Incremental Delay, d2 | | 0.4 | 0.4 | 0.8 | | 0.1 | | | | | 0.3 | |
| Delay (s) | | 12.3 | 15.6 | 52.8 | | 51.9 | | | | | 48.3 | |
| Level of Service | | B | B | D | | D | | | | | D | |
| Approach Delay (s) | | 13.9 | | | 52.2 | | | 0.0 | | | 48.3 | |
| Approach LOS | | B | | | D | | | A | | | D | |

| Intersection Summary | | | | | |
|---|---|---|---|---|---|
| HCM 2000 Control Delay | 16.8 | HCM 2000 Level of Service | | B | |
| HCM 2000 Volume to Capacity ratio | 0.20 | | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | | 14.1 | |
| Intersection Capacity Utilization | 45.7% | ICU Level of Service | | A | |
| Analysis Period (min) | 15 | | | | |
| c Critical Lane Group | | | | | |

## HCM Signalized Intersection Capacity Analysis
### 45: Market St/Cypress Ave & East St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | WBL | NBT | NBR |
|---|---|---|---|---|---|
| Lane Configurations | | | | | |
| Traffic Volume (vph) | 6 | 329 | 179 | 637 | 165 |
| Future Volume (vph) | 6 | 329 | 179 | 637 | 165 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 4.2 | 4.2 | 4.6 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | 0.97 | 0.91 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1752 | 3505 | 3400 | 5036 | 1545 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1752 | 3505 | 3400 | 5036 | 1545 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 6 | 350 | 190 | 678 | 176 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 6 | 350 | 190 | 678 | 176 |
| Confl. Peds. (#/hr) | | | | | 8 |
| Confl. Bikes (#/hr) | | | | | 1 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Split | NA | Prot | NA | Free |
| Protected Phases | 3 | 3 | 4 | 6 | |
| Permitted Phases | | | | | Free |
| Actuated Green, G (s) | 11.9 | 11.9 | 11.4 | 17.1 | 60.0 |
| Effective Green, g (s) | 11.9 | 11.9 | 11.4 | 17.1 | 60.0 |
| Actuated g/C Ratio | 0.20 | 0.20 | 0.19 | 0.29 | 1.00 |
| Clearance Time (s) | 4.2 | 4.2 | 4.2 | 4.6 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 347 | 695 | 646 | 1435 | 1545 |
| v/s Ratio Prot | 0.00 | c0.10 | c0.06 | c0.13 | |
| v/s Ratio Perm | | | | | c0.11 |
| v/c Ratio | 0.02 | 0.50 | 0.29 | 0.47 | 0.11 |
| Uniform Delay, d1 | 19.3 | 21.4 | 20.8 | 17.7 | 0.0 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.0 | 0.6 | 0.3 | 0.2 | 0.1 |
| Delay (s) | 19.4 | 22.0 | 21.1 | 18.0 | 0.1 |
| Level of Service | B | C | C | B | A |
| Approach Delay (s) | | 22.0 | | 14.3 | |
| Approach LOS | | C | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 17.2 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.43 | | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 17.6 | |
| Intersection Capacity Utilization | 40.9% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Signalized Intersection Capacity Analysis
### 51: Market St & Grange St

Timing Plan: EXISTING AM_17

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 36 | 51 | 893 | 48 | 28 | 513 |
| Future Volume (vph) | 36 | 51 | 893 | 48 | 28 | 513 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | | 5.4 | | 4.2 | 5.4 |
| Lane Util. Factor | 1.00 | | 0.95 | | 1.00 | 0.95 |
| Frpb, ped/bikes | 0.99 | | 1.00 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | | 1.00 | | 1.00 | 1.00 |
| Frt | 0.92 | | 0.99 | | 1.00 | 1.00 |
| Flt Protected | 0.98 | | 1.00 | | 0.95 | 1.00 |
| Satd. Flow (prot) | 1647 | | 3474 | | 1752 | 3505 |
| Flt Permitted | 0.98 | | 1.00 | | 0.95 | 1.00 |
| Satd. Flow (perm) | 1647 | | 3474 | | 1752 | 3505 |
| Peak-hour factor, PHF | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Adj. Flow (vph) | 43 | 61 | 1063 | 57 | 33 | 611 |
| RTOR Reduction (vph) | 51 | 0 | 5 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 53 | 0 | 1115 | 0 | 33 | 611 |
| Confl. Peds. (#/hr) | | 9 | | 4 | | |
| Confl. Bikes (#/hr) | | | | 1 | | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Perm | | NA | | Prot | NA |
| Protected Phases | | | 2 | | 1 | 6 |
| Permitted Phases | 8 | | | | | |
| Actuated Green, G (s) | 10.1 | | 32.0 | | 3.0 | 39.2 |
| Effective Green, g (s) | 10.1 | | 32.0 | | 3.0 | 39.2 |
| Actuated g/C Ratio | 0.17 | | 0.54 | | 0.05 | 0.67 |
| Clearance Time (s) | 4.2 | | 5.4 | | 4.2 | 5.4 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 282 | | 1887 | | 89 | 2332 |
| v/s Ratio Prot | | | c0.32 | | 0.02 | c0.17 |
| v/s Ratio Perm | c0.03 | | | | | |
| v/c Ratio | 0.19 | | 0.59 | | 0.37 | 0.26 |
| Uniform Delay, d1 | 20.9 | | 9.0 | | 27.0 | 4.0 |
| Progression Factor | 1.00 | | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.3 | | 0.5 | | 2.6 | 0.1 |
| Delay (s) | 21.2 | | 9.5 | | 29.6 | 4.1 |
| Level of Service | C | | A | | C | A |
| Approach Delay (s) | 21.2 | | 9.5 | | | 5.4 |
| Approach LOS | C | | A | | | A |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 8.8 | HCM 2000 Level of Service | A | |
| HCM 2000 Volume to Capacity ratio | 0.49 | | | |
| Actuated Cycle Length (s) | 58.9 | Sum of lost time (s) | 13.8 | |
| Intersection Capacity Utilization | 46.7% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
## 54: Westside Rd/Railroad Ave & Buenaventura Blvd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 40 | 511 | 20 | 21 | 409 | 378 | 31 | 58 | 18 | 174 | 16 | 29 |
| Future Volume (vph) | 40 | 511 | 20 | 21 | 409 | 378 | 31 | 58 | 18 | 174 | 16 | 29 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 5.3 | | 4.0 | 5.3 | 5.3 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.96 | 1.00 |
| Satd. Flow (prot) | 1752 | 3485 | | 1752 | 3505 | 1568 | 1752 | 1845 | 1548 | 1665 | 1682 | 1547 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.96 | 1.00 |
| Satd. Flow (perm) | 1752 | 3485 | | 1752 | 3505 | 1568 | 1752 | 1845 | 1548 | 1665 | 1682 | 1547 |
| Peak-hour factor, PHF | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Adj. Flow (vph) | 47 | 601 | 24 | 25 | 481 | 445 | 36 | 68 | 21 | 205 | 19 | 34 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 0 | 300 | 0 | 0 | 18 | 0 | 0 | 28 |
| Lane Group Flow (vph) | 47 | 623 | 0 | 25 | 481 | 145 | 36 | 68 | 3 | 111 | 113 | 6 |
| Confl. Peds. (#/hr) | | | | | | | | | 1 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 1 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Prot | NA | | Prot | NA | Perm | Split | NA | Perm | Split | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 3 | | 4 | 4 | |
| Permitted Phases | | | | | | 6 | | | 3 | | | 4 |
| Actuated Green, G (s) | 4.2 | 21.6 | | 2.3 | 19.7 | 19.7 | 8.1 | 8.1 | 8.1 | 11.3 | 11.3 | 11.3 |
| Effective Green, g (s) | 4.2 | 21.6 | | 2.3 | 19.7 | 19.7 | 8.1 | 8.1 | 8.1 | 11.3 | 11.3 | 11.3 |
| Actuated g/C Ratio | 0.07 | 0.36 | | 0.04 | 0.33 | 0.33 | 0.13 | 0.13 | 0.13 | 0.19 | 0.19 | 0.19 |
| Clearance Time (s) | 4.0 | 5.3 | | 4.0 | 5.3 | 5.3 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 121 | 1242 | | 66 | 1139 | 509 | 234 | 246 | 206 | 310 | 313 | 288 |
| v/s Ratio Prot | c0.03 | c0.18 | | 0.01 | 0.14 | | 0.02 | c0.04 | | 0.07 | c0.07 | |
| v/s Ratio Perm | | | | | | 0.09 | | | 0.00 | | | 0.00 |
| v/c Ratio | 0.39 | 0.50 | | 0.38 | 0.42 | 0.28 | 0.15 | 0.28 | 0.01 | 0.36 | 0.36 | 0.02 |
| Uniform Delay, d1 | 27.0 | 15.3 | | 28.5 | 16.0 | 15.2 | 23.2 | 23.6 | 22.8 | 21.5 | 21.5 | 20.1 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.1 | 0.3 | | 3.6 | 0.3 | 0.3 | 0.3 | 0.6 | 0.0 | 0.7 | 0.7 | 0.0 |
| Delay (s) | 29.0 | 15.6 | | 32.1 | 16.3 | 15.5 | 23.5 | 24.2 | 22.8 | 22.2 | 22.2 | 20.2 |
| Level of Service | C | B | | C | B | B | C | C | C | C | C | C |
| Approach Delay (s) | | 16.5 | | | 16.3 | | | 23.8 | | | 21.9 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 17.6 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.43 | | | |
| Actuated Cycle Length (s) | 60.6 | Sum of lost time (s) | 17.3 | |
| Intersection Capacity Utilization | 41.7% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
## 55: SR 273 & Buenaventura Blvd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 275 | 428 | 684 | 501 | 243 | 124 |
| Future Volume (vph) | 275 | 428 | 684 | 501 | 243 | 124 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.2 | 4.2 | 5.8 | 5.8 | 4.6 |
| Lane Util. Factor | 1.00 | 0.88 | 0.97 | 0.95 | 0.95 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3433 | 3539 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3433 | 3539 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Adj. Flow (vph) | 331 | 516 | 824 | 604 | 293 | 149 |
| RTOR Reduction (vph) | 0 | 196 | 0 | 0 | 0 | 4 |
| Lane Group Flow (vph) | 331 | 320 | 824 | 604 | 293 | 145 |
| Turn Type | Prot | pm+ov | Prot | NA | NA | pm+ov |
| Protected Phases | 4 | 5 | 5 | 2 | 6 | 4 |
| Permitted Phases | | 4 | | | | 6 |
| Actuated Green, G (s) | 19.3 | 42.3 | 23.0 | 38.5 | 11.3 | 30.6 |
| Effective Green, g (s) | 19.3 | 42.3 | 23.0 | 38.5 | 11.3 | 30.6 |
| Actuated g/C Ratio | 0.28 | 0.62 | 0.34 | 0.56 | 0.17 | 0.45 |
| Clearance Time (s) | 4.6 | 4.2 | 4.2 | 5.8 | 5.8 | 4.6 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 500 | 1728 | 1157 | 1997 | 586 | 710 |
| v/s Ratio Prot | c0.19 | 0.06 | c0.24 | 0.17 | c0.08 | 0.06 |
| v/s Ratio Perm | | 0.05 | | | | 0.03 |
| v/c Ratio | 0.66 | 0.19 | 0.71 | 0.30 | 0.50 | 0.20 |
| Uniform Delay, d1 | 21.6 | 5.6 | 19.7 | 7.8 | 25.9 | 11.4 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 3.3 | 0.1 | 2.1 | 0.1 | 0.7 | 0.1 |
| Delay (s) | 24.9 | 5.6 | 21.8 | 7.9 | 26.6 | 11.6 |
| Level of Service | C | A | C | A | C | B |
| Approach Delay (s) | 13.1 | | | 15.9 | 21.5 | |
| Approach LOS | B | | | B | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 16.0 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.65 | | | |
| Actuated Cycle Length (s) | 68.2 | Sum of lost time (s) | 14.6 | |
| Intersection Capacity Utilization | 55.2% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
57: SR 273 & Kenyon Dr

Timing Plan: EXISTING AM_17

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 42 | 48 | 34 | 969 | 505 | 13 |
| Future Volume (Veh/h) | 42 | 48 | 34 | 969 | 505 | 13 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Hourly flow rate (vph) | 50 | 57 | 40 | 1154 | 601 | 15 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | 2 | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1258 | 300 | 616 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1258 | 300 | 616 | | | |
| tC, single (s) | 6.9 | 7.0 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 67 | 92 | 96 | | | |
| cM capacity (veh/h) | 153 | 690 | 946 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|
| Volume Total | 107 | 40 | 577 | 577 | 300 | 300 | 15 |
| Volume Left | 50 | 40 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 57 | 0 | 0 | 0 | 0 | 0 | 15 |
| cSH | 328 | 946 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.33 | 0.04 | 0.34 | 0.34 | 0.18 | 0.18 | 0.01 |
| Queue Length 95th (ft) | 35 | 3 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 24.1 | 9.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | A | | | | | |
| Approach Delay (s) | 24.1 | 0.3 | | | 0.0 | | |
| Approach LOS | C | | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.5 | | | |
| Intersection Capacity Utilization | 36.8% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |



HCM Unsignalized Intersection Capacity Analysis
58: SR 273 & Branstetter Ln

Timing Plan: EXISTING AM_17

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 23 | 0 | 1003 | 530 | 23 |
| Future Volume (Veh/h) | 0 | 23 | 0 | 1003 | 530 | 23 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Hourly flow rate (vph) | 0 | 27 | 0 | 1194 | 631 | 27 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1228 | 316 | 658 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1228 | 316 | 658 | | | |
| tC, single (s) | 6.9 | 7.0 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 100 | 96 | 100 | | | |
| cM capacity (veh/h) | 168 | 674 | 912 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|
| Volume Total | 27 | 597 | 597 | 316 | 316 | 27 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 27 | 0 | 0 | 0 | 0 | 27 |
| cSH | 674 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.04 | 0.35 | 0.35 | 0.19 | 0.19 | 0.02 |
| Queue Length 95th (ft) | 3 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 10.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | | | | | |
| Approach Delay (s) | 10.6 | 0.0 | | 0.0 | | |
| Approach LOS | B | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 0.2 | | | |
| Intersection Capacity Utilization | 31.1% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

## HCM Signalized Intersection Capacity Analysis
### 59: SR 273 & Cedars Rd/Bonnyview Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 70 | 50 | 361 | 106 | 218 | 46 | 780 | 620 | 196 | 352 | 5 |
| Future Volume (vph) | 5 | 70 | 50 | 361 | 106 | 218 | 46 | 780 | 620 | 196 | 352 | 5 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | 4.6 | 4.9 | 4.9 | 4.9 | 4.2 | 6.5 | 4.9 | 4.2 | 6.5 | 6.5 |
| Lane Util. Factor | 0.91 | 0.91 | 1.00 | 0.97 | 0.95 | 0.95 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1564 | 3291 | 1518 | 3335 | 1615 | 1442 | 1719 | 3438 | 1538 | 3335 | 3438 | 1505 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1564 | 3291 | 1518 | 3335 | 1615 | 1442 | 1719 | 3438 | 1538 | 3335 | 3438 | 1505 |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 6 | 80 | 57 | 415 | 122 | 251 | 53 | 897 | 713 | 225 | 405 | 6 |
| RTOR Reduction (vph) | 0 | 0 | 48 | 0 | 0 | 0 | 0 | 0 | 158 | 0 | 0 | 4 |
| Lane Group Flow (vph) | 5 | 81 | 9 | 415 | 195 | 178 | 53 | 897 | 555 | 225 | 405 | 2 |
| Confl. Peds. (#/hr) | | | 1 | | | | | | | | | 1 |
| Confl. Bikes (#/hr) | | | | | | 1 | | | | | | |
| Heavy Vehicles (%) | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| Turn Type | Split | NA | Perm | Split | NA | Perm | Prot | NA | pm+ov | Prot | NA | Perm |
| Protected Phases | 8 | 8 | | 7 | 7 | | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | 8 | | | 7 | | | 6 | | | 2 |
| Actuated Green, G (s) | 18.4 | 18.4 | 18.4 | 29.4 | 29.4 | 29.4 | 9.0 | 39.0 | 68.4 | 15.0 | 45.0 | 45.0 |
| Effective Green, g (s) | 18.4 | 18.4 | 18.4 | 29.4 | 29.4 | 29.4 | 9.0 | 39.0 | 68.4 | 15.0 | 45.0 | 45.0 |
| Actuated g/C Ratio | 0.15 | 0.15 | 0.15 | 0.24 | 0.24 | 0.24 | 0.07 | 0.32 | 0.56 | 0.12 | 0.37 | 0.37 |
| Clearance Time (s) | 4.6 | 4.6 | 4.6 | 4.9 | 4.9 | 4.9 | 4.2 | 6.5 | 4.9 | 4.2 | 6.5 | 6.5 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 235 | 496 | 228 | 803 | 389 | 347 | 126 | 1099 | 862 | 410 | 1268 | 555 |
| v/s Ratio Prot | 0.00 | c0.02 | | 0.12 | 0.12 | | 0.03 | c0.26 | c0.16 | c0.07 | 0.12 | |
| v/s Ratio Perm | | | 0.01 | | | 0.12 | | | 0.21 | | | 0.00 |
| v/c Ratio | 0.02 | 0.16 | 0.04 | 0.52 | 0.50 | 0.51 | 0.42 | 0.82 | 0.64 | 0.55 | 0.32 | 0.00 |
| Uniform Delay, d1 | 44.1 | 45.1 | 44.2 | 40.1 | 40.0 | 40.1 | 54.0 | 38.2 | 18.4 | 50.3 | 27.5 | 24.3 |
| Progression 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 |
| Incremental Delay, d2 | 0.0 | 0.2 | 0.1 | 0.6 | 1.0 | 1.3 | 2.3 | 4.8 | 1.7 | 1.5 | 0.1 | 0.0 |
| Delay (s) | 44.2 | 45.3 | 44.3 | 40.7 | 41.0 | 41.4 | 56.3 | 43.0 | 20.1 | 51.8 | 27.7 | 24.3 |
| Level of Service | D | D | D | D | D | D | E | D | C | D | C | C |
| Approach Delay (s) | | 44.8 | | | 40.9 | | | 33.6 | | | 36.2 | |
| Approach LOS | | D | | | D | | | C | | | D | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 36.4 | HCM 2000 Level of Service | D | |
| HCM 2000 Volume to Capacity ratio | 0.61 | | | |
| Actuated Cycle Length (s) | 122.0 | Sum of lost time (s) | 20.2 | |
| Intersection Capacity Utilization | 72.2% | ICU Level of Service | C | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
### 60: Eastside Rd & Bonnyview Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 125 | 743 | 18 | 142 | 584 | 108 | 85 | 68 | 206 | 101 | 39 | 16 |
| Future Volume (vph) | 125 | 743 | 18 | 142 | 584 | 108 | 85 | 68 | 206 | 101 | 39 | 16 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 3.5 | 4.9 | 4.9 | 3.5 | 4.9 | 4.9 | 4.2 | 4.2 | 4.2 | | 4.2 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.97 | |
| Satd. Flow (prot) | 1719 | 3438 | 1538 | 1719 | 3438 | 1494 | 1719 | 1810 | 1538 | | 1726 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.97 | |
| Satd. Flow (perm) | 1719 | 3438 | 1538 | 1719 | 3438 | 1494 | 1719 | 1810 | 1538 | | 1726 | |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 144 | 854 | 21 | 163 | 671 | 124 | 98 | 78 | 237 | 116 | 45 | 18 |
| RTOR Reduction (vph) | 0 | 0 | 15 | 0 | 0 | 87 | 0 | 0 | 199 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 144 | 854 | 6 | 163 | 671 | 37 | 98 | 78 | 38 | 0 | 176 | 0 |
| Confl. Peds. (#/hr) | | | | | | 5 | | | | | | 5 |
| Heavy Vehicles (%) | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Split | NA | Perm | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 3 | | 4 | 4 | |
| Permitted Phases | | | 2 | | | 6 | | | 3 | | | |
| Actuated Green, G (s) | 14.0 | 25.6 | 25.6 | 14.3 | 25.9 | 25.9 | 13.9 | 13.9 | 13.9 | | 15.5 | |
| Effective Green, g (s) | 14.0 | 25.6 | 25.6 | 14.3 | 25.9 | 25.9 | 13.9 | 13.9 | 13.9 | | 15.5 | |
| Actuated g/C Ratio | 0.16 | 0.30 | 0.30 | 0.17 | 0.30 | 0.30 | 0.16 | 0.16 | 0.16 | | 0.18 | |
| Clearance Time (s) | 3.5 | 4.9 | 4.9 | 3.5 | 4.9 | 4.9 | 4.2 | 4.2 | 4.2 | | 4.2 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 279 | 1022 | 457 | 285 | 1034 | 449 | 277 | 292 | 248 | | 310 | |
| v/s Ratio Prot | 0.08 | c0.25 | | c0.09 | 0.20 | | c0.06 | 0.04 | | | c0.10 | |
| v/s Ratio Perm | | | 0.00 | | | 0.02 | | | 0.02 | | | |
| v/c Ratio | 0.52 | 0.84 | 0.01 | 0.57 | 0.65 | 0.08 | 0.35 | 0.27 | 0.15 | | 0.57 | |
| Uniform Delay, d1 | 33.0 | 28.3 | 21.3 | 33.1 | 26.2 | 21.6 | 32.1 | 31.6 | 31.0 | | 32.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 1.6 | 6.0 | 0.0 | 2.8 | 1.4 | 0.1 | 0.8 | 0.5 | 0.3 | | 2.4 | |
| Delay (s) | 34.6 | 34.3 | 21.4 | 35.8 | 27.6 | 21.7 | 32.9 | 32.1 | 31.3 | | 34.6 | |
| Level of Service | C | C | C | D | C | C | C | C | C | | C | |
| Approach Delay (s) | | 34.1 | | | 28.2 | | | 31.9 | | | 34.6 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 31.6 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.62 | | | |
| Actuated Cycle Length (s) | 86.1 | Sum of lost time (s) | 16.8 | |
| Intersection Capacity Utilization | 58.2% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
## 62: SR 273 & Clear Creek Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 81 | 61 | 53 | 1027 | 543 | 107 |
| Future Volume (vph) | 81 | 61 | 53 | 1027 | 543 | 107 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 5.1 | 5.1 | 4.2 | 6.5 | 6.5 | 5.1 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1687 | 1509 | 1687 | 3374 | 3374 | 1488 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1687 | 1509 | 1687 | 3374 | 3374 | 1488 |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 90 | 68 | 59 | 1141 | 603 | 119 |
| RTOR Reduction (vph) | 0 | 53 | 0 | 0 | 0 | 42 |
| Lane Group Flow (vph) | 90 | 15 | 59 | 1141 | 603 | 77 |
| Confl. Peds. (#/hr) | | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 1 |
| Heavy Vehicles (%) | 7% | 7% | 7% | 7% | 7% | 7% |
| Turn Type | Prot | Perm | Prot | NA | NA | pm+ov |
| Protected Phases | 7 | | 5 | 2 | 6 | 7 |
| Permitted Phases | | 7 | | | | 6 |
| Actuated Green, G (s) | 13.3 | 13.3 | 5.9 | 35.9 | 25.8 | 39.1 |
| Effective Green, g (s) | 13.3 | 13.3 | 5.9 | 35.9 | 25.8 | 39.1 |
| Actuated g/C Ratio | 0.22 | 0.22 | 0.10 | 0.59 | 0.42 | 0.64 |
| Clearance Time (s) | 5.1 | 5.1 | 4.2 | 6.5 | 6.5 | 5.1 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 369 | 330 | 163 | 1992 | 1431 | 956 |
| v/s Ratio Prot | c0.05 | | 0.03 | c0.34 | 0.18 | 0.02 |
| v/s Ratio Perm | | 0.01 | | | | 0.03 |
| v/c Ratio | 0.24 | 0.05 | 0.36 | 0.57 | 0.42 | 0.08 |
| Uniform Delay, d1 | 19.6 | 18.7 | 25.7 | 7.7 | 12.3 | 4.1 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.3 | 0.1 | 1.4 | 0.4 | 0.2 | 0.0 |
| Delay (s) | 19.9 | 18.8 | 27.1 | 8.1 | 12.5 | 4.1 |
| Level of Service | B | B | C | A | B | A |
| Approach Delay (s) | 19.5 | | | 9.0 | 11.1 | |
| Approach LOS | B | | | A | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 10.5 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.53 | | | |
| Actuated Cycle Length (s) | 60.8 | Sum of lost time (s) | 15.8 | |
| Intersection Capacity Utilization | 48.6% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
## 64: SR 273 & Canyon Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 542 | 43 | 31 | 485 | 374 | 230 |
| Future Volume (vph) | 542 | 43 | 31 | 485 | 374 | 230 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | | 4.6 | 6.5 | 6.5 | 6.5 |
| Lane Util. Factor | 0.97 | | 1.00 | 0.95 | 0.95 | 0.88 |
| Frpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.99 | | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.96 | | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3312 | | 1719 | 3438 | 3438 | 2707 |
| Flt Permitted | 0.96 | | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3312 | | 1719 | 3438 | 3438 | 2707 |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 602 | 48 | 34 | 539 | 416 | 256 |
| RTOR Reduction (vph) | 4 | 0 | 0 | 0 | 0 | 199 |
| Lane Group Flow (vph) | 646 | 0 | 34 | 539 | 416 | 57 |
| Confl. Peds. (#/hr) | | 2 | | | | |
| Heavy Vehicles (%) | 5% | 5% | 5% | 5% | 5% | 5% |
| Turn Type | Prot | | Prot | NA | NA | Perm |
| Protected Phases | 8 | | 5 | 2 | 6 | |
| Permitted Phases | | | | | | 6 |
| Actuated Green, G (s) | 27.6 | | 10.6 | 30.8 | 15.6 | 15.6 |
| Effective Green, g (s) | 27.6 | | 10.6 | 30.8 | 15.6 | 15.6 |
| Actuated g/C Ratio | 0.40 | | 0.15 | 0.44 | 0.22 | 0.22 |
| Clearance Time (s) | 4.6 | | 4.6 | 6.5 | 6.5 | 6.5 |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 1315 | | 262 | 1523 | 771 | 607 |
| v/s Ratio Prot | c0.19 | | 0.02 | c0.16 | c0.12 | |
| v/s Ratio Perm | | | | | | 0.02 |
| v/c Ratio | 0.49 | | 0.13 | 0.35 | 0.54 | 0.09 |
| Uniform Delay, d1 | 15.7 | | 25.5 | 12.8 | 23.8 | 21.4 |
| Progression Factor | 0.77 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.3 | | 0.2 | 0.1 | 0.7 | 0.1 |
| Delay (s) | 12.4 | | 25.7 | 12.9 | 24.5 | 21.4 |
| Level of Service | B | | C | B | C | C |
| Approach Delay (s) | 12.4 | | | 13.7 | 23.3 | |
| Approach LOS | B | | | B | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 16.7 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.54 | | | |
| Actuated Cycle Length (s) | 69.5 | Sum of lost time (s) | 20.3 | |
| Intersection Capacity Utilization | 49.1% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Unsignalized Intersection Capacity Analysis
## 65: SR 273 & Whitehouse Dr

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 27 | 0 | 5 | 8 | 0 | 39 | 4 | 450 | 9 | 52 | 357 | 8 |
| Future Volume (Veh/h) | 27 | 0 | 5 | 8 | 0 | 39 | 4 | 450 | 9 | 52 | 357 | 8 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Hourly flow rate (vph) | 29 | 0 | 5 | 9 | 0 | 41 | 4 | 479 | 10 | 55 | 380 | 9 |
| Pedestrians | | 1 | | | | | | | | | | |
| Lane Width (ft) | | 12.0 | | | | | | | | | | |
| Walking Speed (ft/s) | | 3.5 | | | | | | | | | | |
| Percent Blockage | | 0 | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 780 | 988 | 191 | 792 | 987 | 240 | 390 | | | 489 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 780 | 988 | 191 | 792 | 987 | 240 | 390 | | | 489 | | |
| tC, single (s) | 7.7 | 6.7 | 7.1 | 7.7 | 6.7 | 7.1 | 4.3 | | | 4.3 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.6 | 4.1 | 3.4 | 3.6 | 4.1 | 3.4 | 2.3 | | | 2.3 | | |
| p0 queue free % | 88 | 100 | 99 | 96 | 100 | 94 | 100 | | | 95 | | |
| cM capacity (veh/h) | 247 | 221 | 796 | 254 | 221 | 741 | 1115 | | | 1023 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | NB 4 | SB 1 | SB 2 | SB 3 | SB 4 |
|---|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 34 | 50 | 4 | 240 | 240 | 10 | 55 | 190 | 190 | 9 |
| Volume Left | 29 | 9 | 4 | 0 | 0 | 0 | 55 | 0 | 0 | 0 |
| Volume Right | 5 | 41 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 9 |
| cSH | 275 | 551 | 1115 | 1700 | 1700 | 1700 | 1023 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.12 | 0.09 | 0.00 | 0.14 | 0.14 | 0.01 | 0.05 | 0.11 | 0.11 | 0.01 |
| Queue Length 95th (ft) | 10 | 7 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Control Delay (s) | 20.0 | 12.2 | 8.2 | 0.0 | 0.0 | 0.0 | 8.7 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | B | A | | | | A | | | |
| Approach Delay (s) | 20.0 | 12.2 | 0.1 | | | | 1.1 | | | |
| Approach LOS | C | B | | | | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.8 | | | |
| Intersection Capacity Utilization | 32.4% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |



## HCM Signalized Intersection Capacity Analysis
## 66: SR 273 & Happy V Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 71 | 173 | 58 | 392 | 341 | 29 |
| Future Volume (vph) | 71 | 173 | 58 | 392 | 341 | 29 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | | 4.2 | 7.0 | 7.0 | 7.0 |
| Lane Util. Factor | 1.00 | | 1.00 | 0.95 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.90 | | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.99 | | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1568 | | 1671 | 3343 | 3343 | 1462 |
| Flt Permitted | 0.99 | | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1568 | | 1671 | 3343 | 3343 | 1462 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 77 | 188 | 63 | 426 | 371 | 32 |
| RTOR Reduction (vph) | 92 | 0 | 0 | 0 | 0 | 22 |
| Lane Group Flow (vph) | 173 | 0 | 63 | 426 | 371 | 10 |
| Confl. Peds. (#/hr) | | | | | | 1 |
| Confl. Bikes (#/hr) | | | | | | 1 |
| Heavy Vehicles (%) | 8% | 8% | 8% | 8% | 8% | 8% |
| Turn Type | Perm | | Prot | NA | NA | Perm |
| Protected Phases | | | 5 | 2 | 6 | |
| Permitted Phases | 4 | | | | | 6 |
| Actuated Green, G (s) | 12.7 | | 5.7 | 25.1 | 15.2 | 15.2 |
| Effective Green, g (s) | 12.7 | | 5.7 | 25.1 | 15.2 | 15.2 |
| Actuated g/C Ratio | 0.26 | | 0.12 | 0.51 | 0.31 | 0.31 |
| Clearance Time (s) | 4.6 | | 4.2 | 7.0 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 403 | | 192 | 1698 | 1028 | 449 |
| v/s Ratio Prot | | | c0.04 | 0.13 | c0.11 | |
| v/s Ratio Perm | c0.11 | | | | | 0.01 |
| v/c Ratio | 0.43 | | 0.33 | 0.25 | 0.36 | 0.02 |
| Uniform Delay, d1 | 15.3 | | 20.1 | 6.8 | 13.3 | 11.9 |
| Progression Factor | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.7 | | 1.0 | 0.1 | 0.2 | 0.0 |
| Delay (s) | 16.1 | | 21.1 | 6.9 | 13.5 | 11.9 |
| Level of Service | B | | C | A | B | B |
| Approach Delay (s) | 16.1 | | | 8.8 | 13.4 | |
| Approach LOS | B | | | A | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 12.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.38 | | |
| Actuated Cycle Length (s) | 49.4 | Sum of lost time (s) | 15.8 |
| Intersection Capacity Utilization | 46.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

## HCM Unsignalized Intersection Capacity Analysis
## 67: SR 273 & Amen St/Latona Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 1 | 41 | 0 | 9 | 4 | 441 | 55 | 12 | 500 | 2 |
| Future Volume (Veh/h) | 0 | 0 | 1 | 41 | 0 | 9 | 4 | 441 | 55 | 12 | 500 | 2 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| 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 |
| Hourly flow rate (vph) | 0 | 0 | 1 | 45 | 0 | 10 | 4 | 479 | 60 | 13 | 543 | 2 |
| Pedestrians | | 1 | | | | | | | | | | |
| Lane Width (ft) | | 12.0 | | | | | | | | | | |
| Walking Speed (ft/s) | | 3.5 | | | | | | | | | | |
| Percent Blockage | | 0 | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 828 | 1117 | 272 | 786 | 1059 | 240 | 546 | | | 539 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 828 | 1117 | 272 | 786 | 1059 | 240 | 546 | | | 539 | | |
| tC, single (s) | 7.7 | 6.7 | 7.1 | 7.7 | 6.7 | 7.1 | 4.3 | | | 4.3 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.6 | 4.1 | 3.4 | 3.6 | 4.1 | 3.4 | 2.3 | | | 2.3 | | |
| p0 queue free % | 100 | 100 | 100 | 83 | 100 | 99 | 100 | | | 99 | | |
| cM capacity (veh/h) | 242 | 189 | 698 | 263 | 205 | 735 | 958 | | | 965 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | NB 4 | SB 1 | SB 2 | SB 3 | SB 4 |
|---|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 1 | 55 | 4 | 240 | 240 | 60 | 13 | 272 | 272 | 2 |
| Volume Left | 0 | 45 | 4 | 0 | 0 | 0 | 13 | 0 | 0 | 0 |
| Volume Right | 1 | 10 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 2 |
| cSH | 698 | 298 | 958 | 1700 | 1700 | 1700 | 965 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.18 | 0.00 | 0.14 | 0.14 | 0.04 | 0.01 | 0.16 | 0.16 | 0.00 |
| Queue Length 95th (ft) | 0 | 17 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Control Delay (s) | 10.2 | 19.8 | 8.8 | 0.0 | 0.0 | 0.0 | 8.8 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | C | A | | | | A | | | |
| Approach Delay (s) | 10.2 | 19.8 | 0.1 | | | | 0.2 | | | |
| Approach LOS | B | C | | | | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.1 | | | |
| Intersection Capacity Utilization | 30.0% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |



## HCM Signalized Intersection Capacity Analysis
## 69: SR 273 & Ox Yoke Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 1 | 1 | 22 | 5 | 349 | 3 | 324 | 67 | 337 | 314 | 0 |
| Future Volume (vph) | 1 | 1 | 1 | 22 | 5 | 349 | 3 | 324 | 67 | 337 | 314 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.2 | | | 4.4 | 4.4 | 4.2 | 7.0 | 7.0 | 4.2 | 7.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | | 0.95 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1637 | | | 1676 | 1482 | 1656 | 3312 | 1482 | 1656 | 3312 | |
| Flt Permitted | | 0.98 | | | 0.96 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1637 | | | 1676 | 1482 | 1656 | 3312 | 1482 | 1656 | 3312 | |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 1 | 1 | 1 | 25 | 6 | 401 | 3 | 372 | 77 | 387 | 361 | 0 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 0 | 344 | 0 | 0 | 60 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 2 | 0 | 0 | 31 | 57 | 3 | 372 | 17 | 387 | 361 | 0 |
| Heavy Vehicles (%) | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% |
| Turn Type | Split | NA | | Split | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 8 | 8 | | 7 | 7 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | | | | 7 | | | 6 | | | |
| Actuated Green, G (s) | | 1.7 | | | 11.6 | 11.6 | 1.2 | 18.4 | 18.4 | 30.1 | 47.3 | |
| Effective Green, g (s) | | 1.7 | | | 11.6 | 11.6 | 1.2 | 18.4 | 18.4 | 30.1 | 47.3 | |
| Actuated g/C Ratio | | 0.02 | | | 0.14 | 0.14 | 0.01 | 0.23 | 0.23 | 0.37 | 0.58 | |
| Clearance Time (s) | | 4.2 | | | 4.4 | 4.4 | 4.2 | 7.0 | 7.0 | 4.2 | 7.0 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 34 | | | 238 | 210 | 24 | 746 | 334 | 610 | 1919 | |
| v/s Ratio Prot | | c0.00 | | | 0.02 | | 0.00 | c0.11 | | c0.23 | 0.11 | |
| v/s Ratio Perm | | | | | | c0.04 | | | 0.01 | | | |
| v/c Ratio | | 0.06 | | | 0.13 | 0.27 | 0.12 | 0.50 | 0.05 | 0.63 | 0.19 | |
| Uniform Delay, d1 | | 39.2 | | | 30.6 | 31.2 | 39.7 | 27.6 | 24.8 | 21.2 | 8.1 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.7 | | | 0.2 | 0.7 | 2.3 | 0.5 | 0.1 | 2.2 | 0.0 | |
| Delay (s) | | 39.9 | | | 30.8 | 31.9 | 42.0 | 28.1 | 24.8 | 23.4 | 8.1 | |
| Level of Service | | D | | | C | C | D | C | C | C | A | |
| Approach Delay (s) | | 39.9 | | | 31.9 | | | 27.6 | | | 16.0 | |
| Approach LOS | | D | | | C | | | C | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 23.5 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.51 | | | |
| Actuated Cycle Length (s) | 81.6 | Sum of lost time (s) | 19.8 | |
| Intersection Capacity Utilization | 53.6% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
### 72: SR 273 & North St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 176 | 33 | 118 | 181 | 52 | 29 | 224 | 163 | 97 | 237 | 10 |
| Future Volume (vph) | 12 | 176 | 33 | 118 | 181 | 52 | 29 | 224 | 163 | 97 | 237 | 10 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | | 4.6 | 4.6 | 4.6 | 4.2 | 5.8 | 5.8 | 4.2 | 5.8 | 5.8 |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1736 | 1778 | | 1736 | 1827 | 1528 | 1736 | 3471 | 1518 | 1736 | 3471 | 1553 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1736 | 1778 | | 1736 | 1827 | 1528 | 1736 | 3471 | 1518 | 1736 | 3471 | 1553 |
| Peak-hour factor, PHF | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Adj. Flow (vph) | 14 | 207 | 39 | 139 | 213 | 61 | 34 | 264 | 192 | 114 | 279 | 12 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 49 | 0 | 0 | 155 | 0 | 0 | 9 |
| Lane Group Flow (vph) | 14 | 241 | 0 | 139 | 213 | 12 | 34 | 264 | 37 | 114 | 279 | 3 |
| Confl. Peds. (#/hr) | | | 11 | | | 2 | | | 1 | | | |
| Confl. Bikes (#/hr) | | | | | | 1 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Split | NA | | Split | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 8 | 8 | | 7 | 7 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | | | | 7 | | | 6 | | | 2 |
| Actuated Green, G (s) | 18.6 | 18.6 | | 16.5 | 16.5 | 16.5 | 4.7 | 15.7 | 15.7 | 12.0 | 23.0 | 23.0 |
| Effective Green, g (s) | 18.6 | 18.6 | | 16.5 | 16.5 | 16.5 | 4.7 | 15.7 | 15.7 | 12.0 | 23.0 | 23.0 |
| Actuated g/C Ratio | 0.23 | 0.23 | | 0.20 | 0.20 | 0.20 | 0.06 | 0.19 | 0.19 | 0.15 | 0.28 | 0.28 |
| Clearance Time (s) | 4.6 | 4.6 | | 4.6 | 4.6 | 4.6 | 4.2 | 5.8 | 5.8 | 4.2 | 5.8 | 5.8 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 393 | 403 | | 349 | 367 | 307 | 99 | 664 | 290 | 254 | 973 | 435 |
| v/s Ratio Prot | 0.01 | c0.14 | | 0.08 | c0.12 | | 0.02 | c0.08 | | c0.07 | 0.08 | |
| v/s Ratio Perm | | | | | | 0.01 | | | 0.02 | | | 0.00 |
| v/c Ratio | 0.04 | 0.60 | | 0.40 | 0.58 | 0.04 | 0.34 | 0.40 | 0.13 | 0.45 | 0.29 | 0.01 |
| Uniform Delay, d1 | 24.7 | 28.4 | | 28.4 | 29.6 | 26.4 | 37.2 | 29.0 | 27.5 | 32.0 | 23.1 | 21.3 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.0 | 2.4 | | 0.7 | 2.3 | 0.1 | 2.1 | 0.4 | 0.2 | 1.3 | 0.2 | 0.0 |
| Delay (s) | 24.7 | 30.8 | | 29.2 | 32.0 | 26.4 | 39.2 | 29.4 | 27.7 | 33.2 | 23.2 | 21.3 |
| Level of Service | C | C | | C | C | C | D | C | C | C | C | C |
| Approach Delay (s) | | 30.4 | | | 30.2 | | | 29.4 | | | 26.0 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 28.9 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.51 | | | |
| Actuated Cycle Length (s) | 82.0 | Sum of lost time (s) | 19.2 | |
| Intersection Capacity Utilization | 55.9% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
### 73: SR 273 & South St

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 127 | 117 | 114 | 40 | 109 | 37 | 137 | 252 | 83 | 50 | 235 | 103 |
| Future Volume (vph) | 127 | 117 | 114 | 40 | 109 | 37 | 137 | 252 | 83 | 50 | 235 | 103 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.6 | | 4.6 | 4.6 | | 4.2 | 5.8 | 5.8 | 4.2 | 5.8 | 5.8 |
| Lane Util. Factor | | 0.95 | | 0.95 | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.95 | | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 0.98 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3234 | | 1649 | 1663 | | 1736 | 3471 | 1553 | 1736 | 3471 | 1553 |
| Flt Permitted | | 0.98 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3234 | | 1649 | 1663 | | 1736 | 3471 | 1553 | 1736 | 3471 | 1553 |
| Peak-hour factor, PHF | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Adj. Flow (vph) | 153 | 141 | 137 | 48 | 131 | 45 | 165 | 304 | 100 | 60 | 283 | 124 |
| RTOR Reduction (vph) | 0 | 36 | 0 | 0 | 8 | 0 | 0 | 0 | 73 | 0 | 0 | 101 |
| Lane Group Flow (vph) | 0 | 395 | 0 | 43 | 173 | 0 | 165 | 304 | 27 | 60 | 283 | 23 |
| Confl. Peds. (#/hr) | | | 2 | | | 1 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Split | NA | | Split | NA | | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 8 | 8 | | 7 | 7 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | | | | | | | 6 | | | 2 |
| Actuated Green, G (s) | | 18.8 | | 17.5 | 17.5 | | 15.1 | 23.0 | 23.0 | 7.8 | 15.7 | 15.7 |
| Effective Green, g (s) | | 18.8 | | 17.5 | 17.5 | | 15.1 | 23.0 | 23.0 | 7.8 | 15.7 | 15.7 |
| Actuated g/C Ratio | | 0.22 | | 0.20 | 0.20 | | 0.17 | 0.27 | 0.27 | 0.09 | 0.18 | 0.18 |
| Clearance Time (s) | | 4.6 | | 4.6 | 4.6 | | 4.2 | 5.8 | 5.8 | 4.2 | 5.8 | 5.8 |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 704 | | 334 | 337 | | 303 | 925 | 413 | 156 | 631 | 282 |
| v/s Ratio Prot | | c0.12 | | 0.03 | c0.10 | | c0.10 | 0.09 | | 0.03 | c0.08 | |
| v/s Ratio Perm | | | | | | | | | 0.02 | | | 0.01 |
| v/c Ratio | | 0.56 | | 0.13 | 0.51 | | 0.54 | 0.33 | 0.06 | 0.38 | 0.45 | 0.08 |
| Uniform Delay, d1 | | 30.1 | | 28.2 | 30.6 | | 32.5 | 25.4 | 23.6 | 37.0 | 31.4 | 29.3 |
| Progression Factor | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 1.0 | | 0.2 | 1.3 | | 2.0 | 0.2 | 0.1 | 1.6 | 0.5 | 0.1 |
| Delay (s) | | 31.1 | | 28.3 | 31.9 | | 34.5 | 25.7 | 23.7 | 38.6 | 32.0 | 29.4 |
| Level of Service | | C | | C | C | | C | C | C | D | C | C |
| Approach Delay (s) | | 31.1 | | | 31.2 | | | 27.9 | | | 32.1 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 30.3 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.52 | | | |
| Actuated Cycle Length (s) | 86.3 | Sum of lost time (s) | 19.2 | |
| Intersection Capacity Utilization | 52.4% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
76: SR 273 & Factory Outlets Dr

Timing Plan: EXISTING AM_17

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 202 | 155 | 240 | 166 | 176 | 282 |
| Future Volume (vph) | 202 | 155 | 240 | 166 | 176 | 282 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | 6.0 | 4.6 | 4.2 | 6.0 |
| Lane Util. Factor | 0.97 | 0.91 | 0.95 | 1.00 | 1.00 | 0.95 |
| Frt | 0.97 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.96 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3346 | 1427 | 3505 | 1568 | 1752 | 3505 |
| Flt Permitted | 0.96 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3346 | 1427 | 3505 | 1568 | 1752 | 3505 |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 227 | 174 | 270 | 187 | 198 | 317 |
| RTOR Reduction (vph) | 13 | 92 | 0 | 101 | 0 | 0 |
| Lane Group Flow (vph) | 263 | 33 | 270 | 86 | 198 | 317 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Prot | Perm | NA | pm+ov | Prot | NA |
| Protected Phases | 3 | | 2 | 3 | 1 | 6 |
| Permitted Phases | | 3 | | 2 | | |
| Actuated Green, G (s) | 14.0 | 14.0 | 10.4 | 24.4 | 14.0 | 28.6 |
| Effective Green, g (s) | 14.0 | 14.0 | 10.4 | 24.4 | 14.0 | 28.6 |
| Actuated g/C Ratio | 0.26 | 0.26 | 0.20 | 0.46 | 0.26 | 0.54 |
| Clearance Time (s) | 4.6 | 4.6 | 6.0 | 4.6 | 4.2 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 880 | 375 | 685 | 719 | 461 | 1884 |
| v/s Ratio Prot | c0.08 | | c0.08 | 0.03 | c0.11 | 0.09 |
| v/s Ratio Perm | | 0.02 | | 0.02 | | |
| v/c Ratio | 0.30 | 0.09 | 0.39 | 0.12 | 0.43 | 0.17 |
| Uniform Delay, d1 | 15.7 | 14.8 | 18.7 | 8.2 | 16.3 | 6.3 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.2 | 0.1 | 0.4 | 0.1 | 0.6 | 0.0 |
| Delay (s) | 15.9 | 14.9 | 19.0 | 8.3 | 16.9 | 6.3 |
| Level of Service | B | B | B | A | B | A |
| Approach Delay (s) | 15.6 | | 14.6 | | | 10.4 |
| Approach LOS | B | | B | | | B |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 13.3 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.41 | | | |
| Actuated Cycle Length (s) | 53.2 | Sum of lost time (s) | 18.3 | |
| Intersection Capacity Utilization | 42.3% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



HCM Signalized Intersection Capacity Analysis
77: SR 273 & Pleasant Hills Dr

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 274 | 3 | 60 | 1 | 9 | 4 | 83 | 128 | 8 | 5 | 222 | 257 |
| Future Volume (vph) | 274 | 3 | 60 | 1 | 9 | 4 | 83 | 128 | 8 | 5 | 222 | 257 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 7.0 | 7.0 | 4.6 | 7.0 | 7.0 |
| Lane Util. Factor | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3400 | 1845 | 1568 | 1752 | 1845 | 1568 | 3400 | 3505 | 1568 | 1752 | 3505 | 1568 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3400 | 1845 | 1568 | 1752 | 1845 | 1568 | 3400 | 3505 | 1568 | 1752 | 3505 | 1568 |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 282 | 3 | 62 | 1 | 9 | 4 | 86 | 132 | 8 | 5 | 229 | 265 |
| RTOR Reduction (vph) | 0 | 0 | 49 | 0 | 0 | 4 | 0 | 0 | 5 | 0 | 0 | 193 |
| Lane Group Flow (vph) | 282 | 3 | 13 | 1 | 9 | 0 | 86 | 132 | 3 | 5 | 229 | 72 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 12.7 | 12.9 | 12.9 | 1.5 | 1.7 | 1.7 | 9.0 | 23.9 | 23.9 | 1.5 | 16.4 | 16.4 |
| Effective Green, g (s) | 12.7 | 12.9 | 12.9 | 1.5 | 1.7 | 1.7 | 9.0 | 23.9 | 23.9 | 1.5 | 16.4 | 16.4 |
| Actuated g/C Ratio | 0.21 | 0.21 | 0.21 | 0.02 | 0.03 | 0.03 | 0.15 | 0.39 | 0.39 | 0.02 | 0.27 | 0.27 |
| Clearance Time (s) | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 7.0 | 7.0 | 4.6 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 712 | 392 | 333 | 43 | 51 | 43 | 504 | 1382 | 618 | 43 | 948 | 424 |
| v/s Ratio Prot | c0.08 | 0.00 | | 0.00 | c0.00 | | c0.03 | 0.04 | | 0.00 | c0.07 | |
| v/s Ratio Perm | | | 0.01 | | | 0.00 | | | 0.00 | | | 0.05 |
| v/c Ratio | 0.40 | 0.01 | 0.04 | 0.02 | 0.18 | 0.00 | 0.17 | 0.10 | 0.01 | 0.12 | 0.24 | 0.17 |
| Uniform Delay, d1 | 20.6 | 18.8 | 18.9 | 28.8 | 28.8 | 28.6 | 22.5 | 11.5 | 11.1 | 28.9 | 17.2 | 16.9 |
| Progression 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 |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.0 | 0.2 | 1.7 | 0.0 | 0.2 | 0.0 | 0.0 | 1.2 | 0.1 | 0.2 |
| Delay (s) | 21.0 | 18.8 | 19.0 | 29.1 | 30.4 | 28.7 | 22.7 | 11.6 | 11.1 | 30.1 | 17.4 | 17.1 |
| Level of Service | C | B | B | C | C | C | C | B | B | C | B | B |
| Approach Delay (s) | | 20.6 | | | 29.8 | | | 15.8 | | | 17.3 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 18.2 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.27 | | | |
| Actuated Cycle Length (s) | 60.6 | Sum of lost time (s) | 20.8 | |
| Intersection Capacity Utilization | 48.8% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Unsignalized Intersection Capacity Analysis
## 78: Branstetter Ln & Westside Rd

Timing Plan: EXISTING AM_17

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 37 | 17 | 5 | 4 | 18 | 1 | 14 | 29 | 0 | 6 | 11 | 2 |
| Future Volume (Veh/h) | 37 | 17 | 5 | 4 | 18 | 1 | 14 | 29 | 0 | 6 | 11 | 2 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Hourly flow rate (vph) | 45 | 21 | 6 | 5 | 22 | 1 | 17 | 35 | 0 | 7 | 13 | 2 |
| Pedestrians | | 3 | | | | | | | | | | |
| Lane Width (ft) | | 12.0 | | | | | | | | | | |
| Walking Speed (ft/s) | | 3.5 | | | | | | | | | | |
| Percent Blockage | | 0 | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 23 | | | 27 | | | 158 | 147 | 24 | 164 | 150 | 26 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 23 | | | 27 | | | 158 | 147 | 24 | 164 | 150 | 26 |
| tC, single (s) | 4.2 | | | 4.2 | | | 7.2 | 6.6 | 6.3 | 7.2 | 6.6 | 6.3 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.3 | | | 2.3 | | | 3.6 | 4.1 | 3.4 | 3.6 | 4.1 | 3.4 |
| p0 queue free % | 97 | | | 100 | | | 98 | 95 | 100 | 99 | 98 | 100 |
| cM capacity (veh/h) | 1536 | | | 1530 | | | 754 | 705 | 1027 | 733 | 702 | 1022 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 72 | 28 | 52 | 22 |
| Volume Left | 45 | 5 | 17 | 7 |
| Volume Right | 6 | 1 | 0 | 2 |
| cSH | 1536 | 1530 | 720 | 733 |
| Volume to Capacity | 0.03 | 0.00 | 0.07 | 0.03 |
| Queue Length 95th (ft) | 2 | 0 | 6 | 2 |
| Control Delay (s) | 4.7 | 1.3 | 10.4 | 10.1 |
| Lane LOS | A | A | B | B |
| Approach Delay (s) | 4.7 | 1.3 | 10.4 | 10.1 |
| Approach LOS | | | B | B |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 6.5 | | | |
| Intersection Capacity Utilization | 20.0% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |



## HCM Signalized Intersection Capacity Analysis
## 1: Market St & Caterpillar Rd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 32 | 319 | 177 | 17 | 124 | 11 | 70 | 323 | 19 | 14 | 188 | 28 |
| Future Volume (vph) | 32 | 319 | 177 | 17 | 124 | 11 | 70 | 323 | 19 | 14 | 188 | 28 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 4.9 | | 4.2 | 4.9 | | 4.2 | 6.5 | 6.5 | 4.2 | 6.4 | 6.4 |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.95 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1736 | 1721 | | 1736 | 1803 | | 1736 | 3471 | 1553 | 1736 | 3471 | 1553 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1736 | 1721 | | 1736 | 1803 | | 1736 | 3471 | 1553 | 1736 | 3471 | 1553 |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 36 | 358 | 199 | 19 | 139 | 12 | 79 | 363 | 21 | 16 | 211 | 31 |
| RTOR Reduction (vph) | 0 | 9 | 0 | 0 | 1 | 0 | 0 | 0 | 16 | 0 | 0 | 26 |
| Lane Group Flow (vph) | 36 | 548 | 0 | 19 | 150 | 0 | 79 | 363 | 5 | 16 | 211 | 5 |
| Confl. Bikes (#/hr) | | | 1 | | | 1 | | | | | | |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | 2 | | | 6 |
| Actuated Green, G (s) | 4.5 | 36.1 | | 4.0 | 35.6 | | 8.7 | 21.2 | 21.2 | 1.3 | 13.9 | 13.9 |
| Effective Green, g (s) | 4.5 | 36.1 | | 4.0 | 35.6 | | 8.7 | 21.2 | 21.2 | 1.3 | 13.9 | 13.9 |
| Actuated g/C Ratio | 0.05 | 0.44 | | 0.05 | 0.43 | | 0.11 | 0.26 | 0.26 | 0.02 | 0.17 | 0.17 |
| Clearance Time (s) | 4.2 | 4.9 | | 4.2 | 4.9 | | 4.2 | 6.5 | 6.5 | 4.2 | 6.4 | 6.4 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 94 | 753 | | 84 | 778 | | 183 | 893 | 399 | 27 | 585 | 261 |
| v/s Ratio Prot | c0.02 | c0.32 | | 0.01 | 0.08 | | c0.05 | c0.10 | | 0.01 | 0.06 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | 0.00 |
| v/c Ratio | 0.38 | 0.73 | | 0.23 | 0.19 | | 0.43 | 0.41 | 0.01 | 0.59 | 0.36 | 0.02 |
| Uniform Delay, d1 | 37.6 | 19.1 | | 37.7 | 14.5 | | 34.5 | 25.4 | 22.8 | 40.3 | 30.3 | 28.6 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.6 | 3.5 | | 1.4 | 0.1 | | 1.6 | 0.3 | 0.0 | 30.3 | 0.4 | 0.0 |
| Delay (s) | 40.2 | 22.6 | | 39.1 | 14.6 | | 36.2 | 25.7 | 22.8 | 70.6 | 30.7 | 28.6 |
| Level of Service | D | C | | D | B | | D | C | C | E | C | C |
| Approach Delay (s) | | 23.7 | | | 17.4 | | | 27.3 | | | 32.9 | |
| Approach LOS | | C | | | B | | | C | | | C | |

| Intersection Summary | | | | | |
|---|---|---|---|---|---|
| HCM 2000 Control Delay | 25.7 | HCM 2000 Level of Service | | C | |
| HCM 2000 Volume to Capacity ratio | 0.61 | | | | |
| Actuated Cycle Length (s) | 82.4 | Sum of lost time (s) | | 19.8 | |
| Intersection Capacity Utilization | 58.0% | ICU Level of Service | | B | |
| Analysis Period (min) | 15 | | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
## 2: Market St & Northpoint Dr/Twin View Blvd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 56 | 55 | 91 | 77 | 49 | 0 | 113 | 356 | 118 | 3 | 330 | 49 |
| Future Volume (vph) | 56 | 55 | 91 | 77 | 49 | 0 | 113 | 356 | 118 | 3 | 330 | 49 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.6 | 4.6 | | 4.6 | | 4.2 | 6.5 | 6.5 | 4.2 | 6.5 | 6.5 |
| Lane Util. Factor | | 1.00 | 1.00 | | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 1.00 | 0.85 | | 1.00 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 0.98 | 1.00 | | 0.97 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 1835 | 1599 | | 1825 | | 1787 | 3574 | 1563 | 1787 | 3574 | 1564 |
| Flt Permitted | | 0.98 | 1.00 | | 0.97 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 1835 | 1599 | | 1825 | | 1787 | 3574 | 1563 | 1787 | 3574 | 1564 |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Adj. Flow (vph) | 60 | 59 | 98 | 83 | 53 | 0 | 122 | 383 | 127 | 3 | 355 | 53 |
| RTOR Reduction (vph) | 0 | 0 | 81 | 0 | 0 | 0 | 0 | 0 | 85 | 0 | 0 | 41 |
| Lane Group Flow (vph) | 0 | 119 | 17 | 0 | 136 | 0 | 122 | 383 | 42 | 3 | 355 | 12 |
| Confl. Peds. (#/hr) | | | | | | 4 | | | 1 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | 1 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Split | NA | Perm | Split | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 4 | 4 | | 3 | 3 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 3 | | | 2 | | | 6 |
| Actuated Green, G (s) | | 12.9 | 12.9 | | 16.0 | | 9.1 | 24.4 | 24.4 | 1.2 | 16.5 | 16.5 |
| Effective Green, g (s) | | 12.9 | 12.9 | | 16.0 | | 9.1 | 24.4 | 24.4 | 1.2 | 16.5 | 16.5 |
| Actuated g/C Ratio | | 0.17 | 0.17 | | 0.22 | | 0.12 | 0.33 | 0.33 | 0.02 | 0.22 | 0.22 |
| Clearance Time (s) | | 4.6 | 4.6 | | 4.6 | | 4.2 | 6.5 | 6.5 | 4.2 | 6.5 | 6.5 |
| Vehicle Extension (s) | | 3.0 | 3.0 | | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 318 | 277 | | 392 | | 218 | 1172 | 512 | 28 | 792 | 346 |
| v/s Ratio Prot | | c0.06 | | | c0.07 | | c0.07 | 0.11 | | 0.00 | c0.10 | |
| v/s Ratio Perm | | | 0.01 | | | | | | 0.03 | | | 0.01 |
| v/c Ratio | | 0.37 | 0.06 | | 0.35 | | 0.56 | 0.33 | 0.08 | 0.11 | 0.45 | 0.03 |
| Uniform Delay, d1 | | 27.2 | 25.7 | | 24.8 | | 30.8 | 18.8 | 17.3 | 36.1 | 25.0 | 22.7 |
| Progression Factor | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.7 | 0.1 | | 0.5 | | 3.1 | 0.2 | 0.1 | 1.7 | 0.4 | 0.0 |
| Delay (s) | | 27.9 | 25.8 | | 25.3 | | 33.9 | 19.0 | 17.3 | 37.8 | 25.4 | 22.7 |
| Level of Service | | C | C | | C | | C | B | B | D | C | C |
| Approach Delay (s) | | 27.0 | | | 25.3 | | | 21.5 | | | 25.2 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 23.8 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.42 | | | |
| Actuated Cycle Length (s) | 74.4 | Sum of lost time (s) | 19.9 | |
| Intersection Capacity Utilization | 47.0% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Signalized Intersection Capacity Analysis
## 3: Market St & Lake Blvd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 54 | 539 | 232 | 234 | 516 | 161 | 288 | 372 | 412 | 151 | 286 | 61 |
| Future Volume (vph) | 54 | 539 | 232 | 234 | 516 | 161 | 288 | 372 | 412 | 151 | 286 | 61 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 5.1 | 5.1 | 4.2 | 5.8 | 5.8 | 4.2 | 6.2 | 4.2 | 4.2 | 6.2 | 6.2 |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 0.99 |
| Flpb, ped/bikes | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1787 | 3574 | 1577 | 3467 | 3574 | 1599 | 3467 | 3574 | 1588 | 1787 | 3574 | 1578 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1787 | 3574 | 1577 | 3467 | 3574 | 1599 | 3467 | 3574 | 1588 | 1787 | 3574 | 1578 |
| Peak-hour factor, PHF | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Adj. Flow (vph) | 56 | 561 | 242 | 244 | 538 | 168 | 300 | 388 | 429 | 157 | 298 | 64 |
| RTOR Reduction (vph) | 0 | 0 | 176 | 0 | 0 | 83 | 0 | 0 | 68 | 0 | 0 | 52 |
| Lane Group Flow (vph) | 56 | 561 | 66 | 244 | 538 | 85 | 300 | 388 | 361 | 157 | 298 | 12 |
| Confl. Peds. (#/hr) | | | 3 | | | | | | 1 | | | |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | 1 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | pm+ov | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | 3 | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 9.5 | 24.3 | 24.3 | 14.7 | 28.8 | 28.8 | 14.2 | 15.9 | 30.6 | 14.5 | 16.2 | 16.2 |
| Effective Green, g (s) | 9.5 | 24.3 | 24.3 | 14.7 | 28.8 | 28.8 | 14.2 | 15.9 | 30.6 | 14.5 | 16.2 | 16.2 |
| Actuated g/C Ratio | 0.11 | 0.27 | 0.27 | 0.16 | 0.32 | 0.32 | 0.16 | 0.18 | 0.34 | 0.16 | 0.18 | 0.18 |
| Clearance Time (s) | 4.2 | 5.1 | 5.1 | 4.2 | 5.8 | 5.8 | 4.2 | 6.2 | 4.2 | 4.2 | 6.2 | 6.2 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 190 | 974 | 430 | 571 | 1155 | 516 | 552 | 637 | 545 | 290 | 649 | 286 |
| v/s Ratio Prot | 0.03 | c0.16 | | 0.07 | 0.15 | | 0.09 | 0.11 | c0.11 | c0.09 | 0.08 | |
| v/s Ratio Perm | | | 0.04 | | | 0.05 | | | 0.12 | | | 0.01 |
| v/c Ratio | 0.29 | 0.58 | 0.15 | 0.43 | 0.47 | 0.16 | 0.54 | 0.61 | 0.66 | 0.54 | 0.46 | 0.04 |
| Uniform Delay, d1 | 36.7 | 28.0 | 24.6 | 33.4 | 24.0 | 21.5 | 34.5 | 33.7 | 24.9 | 34.2 | 32.5 | 30.0 |
| Progression 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 |
| Incremental Delay, d2 | 0.9 | 0.8 | 0.2 | 0.5 | 0.3 | 0.2 | 1.1 | 1.7 | 3.0 | 2.1 | 0.5 | 0.1 |
| Delay (s) | 37.6 | 28.8 | 24.8 | 33.9 | 24.3 | 21.7 | 35.6 | 35.4 | 27.9 | 36.3 | 33.1 | 30.1 |
| Level of Service | D | C | C | C | C | C | D | D | C | D | C | C |
| Approach Delay (s) | | 28.2 | | | 26.3 | | | 32.6 | | | 33.7 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 29.9 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.61 | | | |
| Actuated Cycle Length (s) | 89.1 | Sum of lost time (s) | 20.4 | |
| Intersection Capacity Utilization | 64.5% | ICU Level of Service | C | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
## 4: Market St & Benton Dr

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 319 | 0 | 25 | 3 | 0 | 7 | 57 | 746 | 1 | 1 | 446 | 305 |
| Future Volume (vph) | 319 | 0 | 25 | 3 | 0 | 7 | 57 | 746 | 1 | 1 | 446 | 305 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | | | 4.2 | | 4.2 | 6.2 | 6.2 | 4.2 | 6.2 | 6.2 |
| Lane Util. Factor | 0.95 | 0.95 | | | 1.00 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.96 |
| Flpb, ped/bikes | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.98 | | | 0.91 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 0.96 | | | 0.99 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1698 | 1676 | | | 1678 | | 1787 | 3574 | 1565 | 1787 | 3574 | 1543 |
| Flt Permitted | 0.95 | 0.96 | | | 0.99 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1698 | 1676 | | | 1678 | | 1787 | 3574 | 1565 | 1787 | 3574 | 1543 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 339 | 0 | 27 | 3 | 0 | 7 | 61 | 794 | 1 | 1 | 474 | 324 |
| RTOR Reduction (vph) | 0 | 113 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 125 |
| Lane Group Flow (vph) | 183 | 70 | 0 | 0 | 0 | 0 | 61 | 794 | 1 | 1 | 474 | 199 |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 5 |
| Confl. Bikes (#/hr) | | | | | | | | | 2 | | | 4 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Split | NA | | Split | NA | | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 4 | 4 | | 3 | 3 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | 2 | | | 6 |
| Actuated Green, G (s) | 19.7 | 19.7 | | | 2.0 | | 9.4 | 87.1 | 87.1 | 2.0 | 79.7 | 79.7 |
| Effective Green, g (s) | 19.7 | 19.7 | | | 2.0 | | 9.4 | 87.1 | 87.1 | 2.0 | 79.7 | 79.7 |
| Actuated g/C Ratio | 0.15 | 0.15 | | | 0.02 | | 0.07 | 0.67 | 0.67 | 0.02 | 0.61 | 0.61 |
| Clearance Time (s) | 4.6 | 4.6 | | | 4.2 | | 4.2 | 6.2 | 6.2 | 4.2 | 6.2 | 6.2 |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 257 | 253 | | | 25 | | 129 | 2394 | 1048 | 27 | 2191 | 945 |
| v/s Ratio Prot | c0.11 | 0.04 | | | c0.00 | | c0.03 | c0.22 | | 0.00 | 0.13 | |
| v/s Ratio Perm | | | | | | | | | 0.00 | | | 0.13 |
| v/c Ratio | 0.71 | 0.28 | | | 0.01 | | 0.47 | 0.33 | 0.00 | 0.04 | 0.22 | 0.21 |
| Uniform Delay, d1 | 52.5 | 48.8 | | | 63.0 | | 57.9 | 9.1 | 7.1 | 63.1 | 11.2 | 11.2 |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | 1.11 | 0.60 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 9.0 | 0.6 | | | 0.1 | | 2.7 | 0.4 | 0.0 | 0.6 | 0.2 | 0.5 |
| Delay (s) | 61.4 | 49.4 | | | 63.1 | | 66.8 | 5.8 | 7.1 | 63.6 | 11.4 | 11.7 |
| Level of Service | E | D | | | E | | E | A | A | E | B | B |
| Approach Delay (s) | | 55.4 | | | 63.1 | | | 10.2 | | | 11.6 | |
| Approach LOS | | E | | | E | | | B | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 19.1 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.41 | | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 19.2 | |
| Intersection Capacity Utilization | 58.8% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Signalized Intersection Capacity Analysis
## 8: Market St & Quartz Hill Rd/Travelled Wy

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 34 | 5 | 127 | 26 | 1 | 15 | 241 | 693 | 14 | 11 | 463 | 52 |
| Future Volume (vph) | 34 | 5 | 127 | 26 | 1 | 15 | 241 | 693 | 14 | 11 | 463 | 52 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 4.2 | 4.2 | | 4.2 | | 4.2 | 5.8 | | 4.2 | 5.8 | 5.8 |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.98 | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.97 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | | 0.95 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 0.96 | 1.00 | | 0.97 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1698 | 1723 | 1574 | | 1737 | | 1787 | 3562 | | 1787 | 3574 | 1555 |
| Flt Permitted | 0.95 | 0.96 | 1.00 | | 0.97 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1698 | 1723 | 1574 | | 1737 | | 1787 | 3562 | | 1787 | 3574 | 1555 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 39 | 6 | 144 | 30 | 1 | 17 | 274 | 788 | 16 | 12 | 526 | 59 |
| RTOR Reduction (vph) | 0 | 0 | 127 | 0 | 16 | 0 | 0 | 1 | 0 | 0 | 0 | 33 |
| Lane Group Flow (vph) | 22 | 23 | 17 | 0 | 32 | 0 | 274 | 803 | 0 | 13 | 526 | 26 |
| Confl. Peds. (#/hr) | | | | | | | | | 2 | | | 1 |
| Confl. Bikes (#/hr) | | | 2 | | | | | | 2 | | | 5 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Split | NA | Perm | Split | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | 4 | 4 | | 3 | 3 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | | | | | | | 6 |
| Actuated Green, G (s) | 15.0 | 15.0 | 15.0 | | 11.2 | | 28.5 | 81.4 | | 4.0 | 56.9 | 56.9 |
| Effective Green, g (s) | 15.0 | 15.0 | 15.0 | | 11.2 | | 28.5 | 81.4 | | 4.0 | 56.9 | 56.9 |
| Actuated g/C Ratio | 0.12 | 0.12 | 0.12 | | 0.09 | | 0.22 | 0.63 | | 0.03 | 0.44 | 0.44 |
| Clearance Time (s) | 4.2 | 4.2 | 4.2 | | 4.2 | | 4.2 | 5.8 | | 4.2 | 5.8 | 5.8 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 195 | 198 | 181 | | 149 | | 391 | 2230 | | 54 | 1564 | 680 |
| v/s Ratio Prot | 0.01 | c0.01 | | | c0.02 | | c0.15 | c0.23 | | 0.01 | 0.15 | |
| v/s Ratio Perm | | | 0.01 | | | | | | | | | 0.02 |
| v/c Ratio | 0.11 | 0.12 | 0.09 | | 0.22 | | 0.70 | 0.36 | | 0.24 | 0.34 | 0.04 |
| Uniform Delay, d1 | 51.5 | 51.6 | 51.4 | | 55.3 | | 46.8 | 11.7 | | 61.5 | 24.1 | 20.9 |
| Progression Factor | 1.00 | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 0.89 | 0.76 | 1.00 |
| Incremental Delay, d2 | 0.3 | 0.3 | 0.2 | | 0.7 | | 5.6 | 0.5 | | 2.3 | 0.6 | 0.1 |
| Delay (s) | 51.8 | 51.8 | 51.6 | | 56.1 | | 52.4 | 12.2 | | 57.3 | 18.9 | 21.0 |
| Level of Service | D | D | D | | E | | D | B | | E | B | C |
| Approach Delay (s) | | 51.7 | | | 56.1 | | | 22.4 | | | 19.9 | |
| Approach LOS | | D | | | E | | | C | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 25.4 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.41 | | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 18.4 | |
| Intersection Capacity Utilization | 53.5% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
### 11: Market St & Trinity St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 18 | 13 | 27 | 19 | 26 | 220 | 34 | 682 | 27 | 118 | 521 | 7 |
| Future Volume (vph) | 18 | 13 | 27 | 19 | 26 | 220 | 34 | 682 | 27 | 118 | 521 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | 4.7 | | 4.2 | 4.2 | 4.2 | 4.7 | | 4.1 | 4.7 | |
| Lane Util. Factor | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frpb, ped/bikes | | 1.00 | 0.99 | | 1.00 | 0.96 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 0.99 | | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | 1.00 | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1829 | 1578 | | 1842 | 1535 | 1787 | 3547 | | 1787 | 3566 | |
| Flt Permitted | | 0.97 | 1.00 | | 0.98 | 1.00 | 0.44 | 1.00 | | 0.29 | 1.00 | |
| Satd. Flow (perm) | | 1829 | 1578 | | 1842 | 1535 | 836 | 3547 | | 540 | 3566 | |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 19 | 14 | 28 | 20 | 27 | 232 | 36 | 718 | 28 | 124 | 548 | 7 |
| RTOR Reduction (vph) | 0 | 0 | 25 | 0 | 0 | 203 | 0 | 2 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 33 | 3 | 0 | 47 | 29 | 36 | 744 | 0 | 124 | 555 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | 18 | | | 11 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 4 | | | 7 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Split | NA | Perm | Split | NA | Perm | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 4 | 4 | | 3 | 3 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 3 | 2 | | | 6 | | |
| Actuated Green, G (s) | | 10.2 | 10.2 | | 13.8 | 13.8 | 63.2 | 58.4 | | 72.4 | 63.4 | |
| Effective Green, g (s) | | 10.2 | 10.2 | | 13.8 | 13.8 | 63.2 | 58.4 | | 72.4 | 63.4 | |
| Actuated g/C Ratio | | 0.09 | 0.09 | | 0.13 | 0.13 | 0.57 | 0.53 | | 0.66 | 0.58 | |
| Clearance Time (s) | | 4.7 | 4.7 | | 4.2 | 4.2 | 4.2 | 4.7 | | 4.1 | 4.7 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 169 | 146 | | 231 | 192 | 521 | 1883 | | 467 | 2055 | |
| v/s Ratio Prot | | c0.02 | | | c0.03 | | 0.00 | c0.21 | | c0.02 | 0.16 | |
| v/s Ratio Perm | | | 0.00 | | | 0.02 | 0.04 | | | 0.15 | | |
| v/c Ratio | | 0.20 | 0.02 | | 0.20 | 0.15 | 0.07 | 0.40 | | 0.27 | 0.27 | |
| Uniform Delay, d1 | | 46.1 | 45.3 | | 43.2 | 42.9 | 10.2 | 15.3 | | 8.0 | 11.7 | |
| Progression Factor | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.73 | 0.67 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.6 | 0.0 | | 0.4 | 0.4 | 0.1 | 0.6 | | 0.3 | 0.3 | |
| Delay (s) | | 46.7 | 45.4 | | 43.6 | 43.2 | 7.4 | 10.9 | | 8.3 | 12.0 | |
| Level of Service | | D | D | | D | D | A | B | | A | B | |
| Approach Delay (s) | | 46.1 | | | 43.3 | | | 10.7 | | | 11.3 | |
| Approach LOS | | D | | | D | | | B | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 17.2 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.33 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 17.8 | |
| Intersection Capacity Utilization | 55.3% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Signalized Intersection Capacity Analysis
### 14: Market St & Eureka Wy

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 298 | 0 | 666 | 48 | 687 | 445 | 0 | 0 | 0 | 0 | 391 | 176 |
| Future Volume (vph) | 298 | 0 | 666 | 48 | 687 | 445 | 0 | 0 | 0 | 0 | 391 | 176 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.7 | | 4.7 | 4.7 | 4.7 | 4.7 | | | | | 4.7 | 4.7 |
| Lane Util. Factor | 1.00 | | 0.88 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | 1.00 | 0.99 |
| Flpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | 1.00 | 1.00 |
| Frt | 1.00 | | 0.85 | 1.00 | 1.00 | 0.85 | | | | | 1.00 | 0.85 |
| Flt Protected | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | | | | | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | | 2787 | 1770 | 3539 | 1583 | | | | | 3539 | 1575 |
| Flt Permitted | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | | | | | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | | 2787 | 1770 | 3539 | 1583 | | | | | 3539 | 1575 |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 327 | 0 | 732 | 53 | 755 | 489 | 0 | 0 | 0 | 0 | 430 | 193 |
| RTOR Reduction (vph) | 0 | 0 | 423 | 40 | 0 | 169 | 0 | 0 | 0 | 0 | 0 | 7 |
| Lane Group Flow (vph) | 327 | 0 | 309 | 13 | 755 | 320 | 0 | 0 | 0 | 0 | 430 | 186 |
| Confl. Peds. (#/hr) | | | 7 | | | | | | 3 | | | 4 |
| Turn Type | Prot | | Prot | Split | NA | custom | | | | | NA | pm+ov |
| Protected Phases | 2 | | 2 | 8 | 8 | 1 | | | | | 1 | 2 |
| Permitted Phases | | | | | | 8 | | | | | | 1 |
| Actuated Green, G (s) | 46.4 | | 46.4 | 27.1 | 27.1 | 49.5 | | | | | 22.4 | 68.8 |
| Effective Green, g (s) | 46.4 | | 46.4 | 27.1 | 27.1 | 49.5 | | | | | 22.4 | 68.8 |
| Actuated g/C Ratio | 0.42 | | 0.42 | 0.25 | 0.25 | 0.45 | | | | | 0.20 | 0.63 |
| Clearance Time (s) | 4.7 | | 4.7 | 4.7 | 4.7 | 4.7 | | | | | 4.7 | 4.7 |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 746 | | 1175 | 436 | 871 | 779 | | | | | 720 | 1052 |
| v/s Ratio Prot | c0.18 | | 0.11 | 0.01 | c0.21 | 0.08 | | | | | c0.12 | 0.07 |
| v/s Ratio Perm | | | | | | 0.12 | | | | | | 0.04 |
| v/c Ratio | 0.44 | | 0.26 | 0.03 | 0.87 | 0.41 | | | | | 0.60 | 0.18 |
| Uniform Delay, d1 | 22.6 | | 20.7 | 31.5 | 39.7 | 20.4 | | | | | 39.7 | 8.7 |
| Progression Factor | 1.00 | | 1.00 | 2.51 | 1.27 | 1.03 | | | | | 1.33 | 0.49 |
| Incremental Delay, d2 | 1.9 | | 0.5 | 0.0 | 8.8 | 0.3 | | | | | 1.3 | 0.1 |
| Delay (s) | 24.4 | | 21.2 | 79.0 | 59.3 | 21.3 | | | | | 54.0 | 4.3 |
| Level of Service | C | | C | E | E | C | | | | | D | A |
| Approach Delay (s) | | 22.2 | | | 45.8 | | | 0.0 | | | 38.6 | |
| Approach LOS | | C | | | D | | | A | | | D | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 35.9 | HCM 2000 Level of Service | D | |
| HCM 2000 Volume to Capacity ratio | 0.60 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 14.1 | |
| Intersection Capacity Utilization | 59.4% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
## 17: Market St & Shasta St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 81 | 223 | 757 | 0 | 0 | 0 | 0 | 0 | 1052 | 53 |
| Future Volume (vph) | 0 | 0 | 81 | 223 | 757 | 0 | 0 | 0 | 0 | 0 | 1052 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | | 4.7 | 4.7 | 4.7 | | | | | | 4.7 | |
| Lane Util. Factor | | | 1.00 | 1.00 | 0.95 | | | | | | 0.91 | |
| Frpb, ped/bikes | | | 0.92 | 1.00 | 1.00 | | | | | | 1.00 | |
| Flpb, ped/bikes | | | 1.00 | 1.00 | 1.00 | | | | | | 1.00 | |
| Frt | | | 0.86 | 1.00 | 1.00 | | | | | | 0.99 | |
| Flt Protected | | | 1.00 | 0.95 | 1.00 | | | | | | 1.00 | |
| Satd. Flow (prot) | | | 1502 | 1787 | 3574 | | | | | | 5093 | |
| Flt Permitted | | | 1.00 | 0.95 | 1.00 | | | | | | 1.00 | |
| Satd. Flow (perm) | | | 1502 | 1787 | 3574 | | | | | | 5093 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 0 | 0 | 84 | 230 | 780 | 0 | 0 | 0 | 0 | 0 | 1085 | 55 |
| RTOR Reduction (vph) | 0 | 0 | 80 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 0 | 0 | 4 | 180 | 780 | 0 | 0 | 0 | 0 | 0 | 1136 | 0 |
| Confl. Peds. (#/hr) | | | 9 | | | 4 | | | 9 | | | 8 |
| Confl. Bikes (#/hr) | | | 1 | | | 2 | | | 2 | | | 2 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | | | Perm | Split | NA | | | | | | NA | |
| Protected Phases | | | | 8 | 8 | | | | | | 6 | |
| Permitted Phases | | | 7 | | | | | | | | | |
| Actuated Green, G (s) | | | 4.8 | 32.7 | 32.7 | | | | | | 58.4 | |
| Effective Green, g (s) | | | 4.8 | 32.7 | 32.7 | | | | | | 58.4 | |
| Actuated g/C Ratio | | | 0.04 | 0.30 | 0.30 | | | | | | 0.53 | |
| Clearance Time (s) | | | 4.7 | 4.7 | 4.7 | | | | | | 4.7 | |
| Vehicle Extension (s) | | | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | | | 65 | 531 | 1062 | | | | | | 2703 | |
| v/s Ratio Prot | | | | 0.10 | c0.22 | | | | | | c0.22 | |
| v/s Ratio Perm | | | c0.00 | | | | | | | | | |
| v/c Ratio | | | 0.06 | 0.34 | 0.73 | | | | | | 0.42 | |
| Uniform Delay, d1 | | | 50.4 | 30.2 | 34.7 | | | | | | 15.6 | |
| Progression Factor | | | 1.00 | 0.83 | 0.91 | | | | | | 0.71 | |
| Incremental Delay, d2 | | | 0.4 | 0.4 | 2.5 | | | | | | 0.4 | |
| Delay (s) | | | 50.8 | 25.3 | 34.1 | | | | | | 11.5 | |
| Level of Service | | | D | C | C | | | | | | B | |
| Approach Delay (s) | | 50.8 | | | 32.1 | | | 0.0 | | | 11.5 | |
| Approach LOS | | D | | | C | | | A | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 22.3 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.51 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 14.1 | |
| Intersection Capacity Utilization | 51.6% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Signalized Intersection Capacity Analysis
## 18: Shasta St & Pine St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 0 | 877 | 678 | 103 | 553 | 0 | 0 | 0 | 0 |
| Future Volume (vph) | 0 | 0 | 0 | 0 | 877 | 678 | 103 | 553 | 0 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | | | | 4.7 | 4.7 | | 4.7 | | | | |
| Lane Util. Factor | | | | | 0.86 | 0.86 | | 0.91 | | | | |
| Frpb, ped/bikes | | | | | 1.00 | 0.98 | | 1.00 | | | | |
| Flpb, ped/bikes | | | | | 1.00 | 1.00 | | 1.00 | | | | |
| Frt | | | | | 0.96 | 0.85 | | 1.00 | | | | |
| Flt Protected | | | | | 1.00 | 1.00 | | 0.99 | | | | |
| Satd. Flow (prot) | | | | | 4634 | 1351 | | 5096 | | | | |
| Flt Permitted | | | | | 1.00 | 1.00 | | 0.99 | | | | |
| Satd. Flow (perm) | | | | | 4634 | 1351 | | 5096 | | | | |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 0 | 0 | 0 | 0 | 923 | 714 | 108 | 582 | 0 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 35 | 42 | 0 | 32 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 1231 | 329 | 0 | 658 | 0 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 2 | | | 4 | | | 2 | | | 4 |
| Confl. Bikes (#/hr) | | | | | | 1 | | | 2 | | | 1 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | | | | | NA | Perm | Perm | NA | | | | |
| Protected Phases | | | | | 8 | | | 2 | | | | |
| Permitted Phases | | | | | | 8 | 2 | | | | | |
| Actuated Green, G (s) | | | | | 79.5 | 79.5 | | 21.1 | | | | |
| Effective Green, g (s) | | | | | 79.5 | 79.5 | | 21.1 | | | | |
| Actuated g/C Ratio | | | | | 0.72 | 0.72 | | 0.19 | | | | |
| Clearance Time (s) | | | | | 4.7 | 4.7 | | 4.7 | | | | |
| Vehicle Extension (s) | | | | | 3.0 | 3.0 | | 3.0 | | | | |
| Lane Grp Cap (vph) | | | | | 3349 | 976 | | 977 | | | | |
| v/s Ratio Prot | | | | | c0.27 | | | | | | | |
| v/s Ratio Perm | | | | | | 0.24 | | 0.13 | | | | |
| v/c Ratio | | | | | 0.37 | 0.34 | | 0.67 | | | | |
| Uniform Delay, d1 | | | | | 5.8 | 5.6 | | 41.3 | | | | |
| Progression Factor | | | | | 1.00 | 1.00 | | 0.41 | | | | |
| Incremental Delay, d2 | | | | | 0.3 | 0.9 | | 1.7 | | | | |
| Delay (s) | | | | | 6.1 | 6.5 | | 18.5 | | | | |
| Level of Service | | | | | A | A | | B | | | | |
| Approach Delay (s) | | 0.0 | | | 6.2 | | | 18.5 | | | 0.0 | |
| Approach LOS | | A | | | A | | | B | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 9.8 | HCM 2000 Level of Service | A | |
| HCM 2000 Volume to Capacity ratio | 0.43 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 51.6% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
## 20: California St & Tehama St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 13 | 402 | 32 | 237 | 24 | 21 | 0 | 0 | 0 | 73 | 179 | 3 |
| Future Volume (vph) | 13 | 402 | 32 | 237 | 24 | 21 | 0 | 0 | 0 | 73 | 179 | 3 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 4.2 | | 4.7 | 4.7 | | | | | | 4.2 | |
| Lane Util. Factor | 1.00 | 0.95 | | 0.95 | 0.95 | | | | | | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 0.99 | | | | | | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | | | | | | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | | | | | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 0.97 | | | | | | 0.99 | |
| Satd. Flow (prot) | 1770 | 3494 | | 1681 | 1660 | | | | | | 3482 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 0.97 | | | | | | 0.99 | |
| Satd. Flow (perm) | 1770 | 3494 | | 1681 | 1660 | | | | | | 3482 | |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Adj. Flow (vph) | 14 | 432 | 34 | 255 | 26 | 23 | 0 | 0 | 0 | 78 | 192 | 3 |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 14 | 460 | 0 | 153 | 147 | 0 | 0 | 0 | 0 | 0 | 272 | 0 |
| Confl. Peds. (#/hr) | | | 10 | | | 13 | | | 7 | | | 12 |
| Confl. Bikes (#/hr) | | | | | | 1 | | | | | | 1 |
| Turn Type | Split | NA | | Split | NA | | | | | Perm | NA | |
| Protected Phases | 5 | 5 | | 6 | 6 | | | | | | 4 | |
| Permitted Phases | | | | | | | | | | 4 | | |
| Actuated Green, G (s) | 20.4 | 20.4 | | 61.4 | 61.4 | | | | | | 15.1 | |
| Effective Green, g (s) | 20.4 | 20.4 | | 61.4 | 61.4 | | | | | | 15.1 | |
| Actuated g/C Ratio | 0.19 | 0.19 | | 0.56 | 0.56 | | | | | | 0.14 | |
| Clearance Time (s) | 4.2 | 4.2 | | 4.7 | 4.7 | | | | | | 4.2 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | 328 | 647 | | 938 | 926 | | | | | | 477 | |
| v/s Ratio Prot | 0.01 | c0.13 | | c0.09 | 0.09 | | | | | | | |
| v/s Ratio Perm | | | | | | | | | | | 0.08 | |
| v/c Ratio | 0.04 | 0.71 | | 0.16 | 0.16 | | | | | | 0.57 | |
| Uniform Delay, d1 | 36.8 | 42.0 | | 11.8 | 11.8 | | | | | | 44.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.09 | 1.10 | | | | | | 1.00 | |
| Incremental Delay, d2 | 0.1 | 3.7 | | 0.3 | 0.3 | | | | | | 1.7 | |
| Delay (s) | 36.8 | 45.7 | | 13.3 | 13.3 | | | | | | 46.1 | |
| Level of Service | D | D | | B | B | | | | | | D | |
| Approach Delay (s) | | 45.5 | | | 13.3 | | | 0.0 | | | 46.1 | |
| Approach LOS | | D | | | B | | | A | | | D | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 36.4 | HCM 2000 Level of Service | D | |
| HCM 2000 Volume to Capacity ratio | 0.34 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 13.1 | |
| Intersection Capacity Utilization | 59.1% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
## 22: Pine St & Tehama St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 27 | 1463 | 0 | 0 | 0 | 0 | 0 | 629 | 506 | 0 | 0 | 0 |
| Future Volume (vph) | 27 | 1463 | 0 | 0 | 0 | 0 | 0 | 629 | 506 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | | | | 4.7 | 4.7 | | | |
| Lane Util. Factor | | 0.91 | | | | | | 0.91 | 1.00 | | | |
| Frpb, ped/bikes | | 1.00 | | | | | | 1.00 | 0.98 | | | |
| Flpb, ped/bikes | | 1.00 | | | | | | 1.00 | 1.00 | | | |
| Frt | | 1.00 | | | | | | 1.00 | 0.85 | | | |
| Flt Protected | | 1.00 | | | | | | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | | 5081 | | | | | | 5085 | 1553 | | | |
| Flt Permitted | | 1.00 | | | | | | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | | 5081 | | | | | | 5085 | 1553 | | | |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 31 | 1662 | 0 | 0 | 0 | 0 | 0 | 715 | 575 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 1686 | 0 | 0 | 0 | 0 | 0 | 715 | 565 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 6 | | | 5 | | | 5 | | | 14 |
| Confl. Bikes (#/hr) | | | 1 | | | | | | 2 | | | 1 |
| Turn Type | Perm | NA | | | | | | NA | Perm | | | |
| Protected Phases | | 4 | | | | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | | | 2 | | | |
| Actuated Green, G (s) | | 58.2 | | | | | | 42.4 | 42.4 | | | |
| Effective Green, g (s) | | 58.2 | | | | | | 42.4 | 42.4 | | | |
| Actuated g/C Ratio | | 0.53 | | | | | | 0.39 | 0.39 | | | |
| Clearance Time (s) | | 4.7 | | | | | | 4.7 | 4.7 | | | |
| Vehicle Extension (s) | | 3.0 | | | | | | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | | 2688 | | | | | | 1960 | 598 | | | |
| v/s Ratio Prot | | | | | | | | 0.14 | | | | |
| v/s Ratio Perm | | 0.33 | | | | | | | c0.36 | | | |
| v/c Ratio | | 0.63 | | | | | | 0.36 | 0.94 | | | |
| Uniform Delay, d1 | | 18.3 | | | | | | 24.2 | 32.7 | | | |
| Progression Factor | | 0.72 | | | | | | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | | 1.0 | | | | | | 0.1 | 23.7 | | | |
| Delay (s) | | 14.1 | | | | | | 24.3 | 56.3 | | | |
| Level of Service | | B | | | | | | C | E | | | |
| Approach Delay (s) | | 14.1 | | | 0.0 | | | 38.6 | | | 0.0 | |
| Approach LOS | | B | | | A | | | D | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 24.7 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.76 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 68.5% | ICU Level of Service | C | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Unsignalized Intersection Capacity Analysis
## 27: Yuba St & East St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 4 | 17 | 0 | 0 | 39 | 8 | 441 | 17 | 19 | 306 | 19 |
| Future Volume (Veh/h) | 12 | 4 | 17 | 0 | 0 | 39 | 8 | 441 | 17 | 19 | 306 | 19 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Hourly flow rate (vph) | 13 | 4 | 19 | 0 | 0 | 43 | 9 | 485 | 19 | 21 | 336 | 21 |
| Pedestrians | | 1 | | | 6 | | | 5 | | | 1 | |
| Lane Width (ft) | | 12.0 | | | 12.0 | | | 12.0 | | | 12.0 | |
| Walking Speed (ft/s) | | 3.5 | | | 3.5 | | | 3.5 | | | 3.5 | |
| Percent Blockage | | 0 | | | 1 | | | 0 | | | 0 | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | 391 | | | 764 | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 694 | 918 | 184 | 754 | 918 | 259 | 358 | | | 510 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 694 | 918 | 184 | 754 | 918 | 259 | 358 | | | 510 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 96 | 98 | 98 | 100 | 100 | 94 | 99 | | | 98 | | |
| cM capacity (veh/h) | 303 | 263 | 825 | 279 | 263 | 738 | 1203 | | | 1052 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 36 | 43 | 252 | 262 | 189 | 189 |
| Volume Left | 13 | 0 | 9 | 0 | 21 | 0 |
| Volume Right | 19 | 43 | 0 | 19 | 0 | 21 |
| cSH | 444 | 738 | 1203 | 1700 | 1052 | 1700 |
| Volume to Capacity | 0.08 | 0.06 | 0.01 | 0.15 | 0.02 | 0.11 |
| Queue Length 95th (ft) | 7 | 5 | 1 | 0 | 2 | 0 |
| Control Delay (s) | 13.8 | 10.2 | 0.4 | 0.0 | 1.1 | 0.0 |
| Lane LOS | B | B | A | | A | |
| Approach Delay (s) | 13.8 | 10.2 | 0.2 | | 0.6 | |
| Approach LOS | B | B | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.3 | | | |
| Intersection Capacity Utilization | 39.6% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |



## HCM Signalized Intersection Capacity Analysis
## 28: California St & Placer St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 424 | 129 | 23 | 288 | 0 | 0 | 0 | 0 | 73 | 385 | 67 |
| Future Volume (vph) | 0 | 424 | 129 | 23 | 288 | 0 | 0 | 0 | 0 | 73 | 385 | 67 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | 4.7 | | | | | 4.7 | 4.7 | 4.7 |
| Lane Util. Factor | | 0.95 | | | 0.95 | | | | | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | | 0.99 | | | 1.00 | | | | | 1.00 | 1.00 | 0.97 |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | 1.00 |
| Frt | | 0.96 | | | 1.00 | | | | | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 1.00 | | | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3420 | | | 3561 | | | | | 1787 | 3574 | 1546 |
| Flt Permitted | | 1.00 | | | 0.78 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3420 | | | 2789 | | | | | 1787 | 3574 | 1546 |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Adj. Flow (vph) | 0 | 456 | 139 | 25 | 310 | 0 | 0 | 0 | 0 | 78 | 414 | 72 |
| RTOR Reduction (vph) | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| Lane Group Flow (vph) | 0 | 555 | 0 | 0 | 335 | 0 | 0 | 0 | 0 | 78 | 414 | 55 |
| Confl. Peds. (#/hr) | | | 16 | | | 35 | | | 16 | | | 15 |
| Confl. Bikes (#/hr) | | | | | | 2 | | | 1 | | | |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | | NA | | Perm | NA | | | | | Perm | NA | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 24.8 | | | 24.8 | | | | | 75.8 | 75.8 | 75.8 |
| Effective Green, g (s) | | 24.8 | | | 24.8 | | | | | 75.8 | 75.8 | 75.8 |
| Actuated g/C Ratio | | 0.23 | | | 0.23 | | | | | 0.69 | 0.69 | 0.69 |
| Clearance Time (s) | | 4.7 | | | 4.7 | | | | | 4.7 | 4.7 | 4.7 |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 771 | | | 628 | | | | | 1231 | 2462 | 1065 |
| v/s Ratio Prot | | c0.16 | | | | | | | | | c0.12 | |
| v/s Ratio Perm | | | | | 0.12 | | | | | 0.04 | | 0.04 |
| v/c Ratio | | 0.72 | | | 0.53 | | | | | 0.06 | 0.17 | 0.05 |
| Uniform Delay, d1 | | 39.4 | | | 37.5 | | | | | 5.6 | 6.0 | 5.5 |
| Progression Factor | | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 3.3 | | | 0.9 | | | | | 0.1 | 0.1 | 0.1 |
| Delay (s) | | 42.7 | | | 38.4 | | | | | 5.7 | 6.2 | 5.6 |
| Level of Service | | D | | | D | | | | | A | A | A |
| Approach Delay (s) | | 42.7 | | | 38.4 | | | 0.0 | | | 6.0 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | | | | | |
|---|---|---|---|---|---|---|
| HCM 2000 Control Delay | 27.9 | HCM 2000 Level of Service | C | | | |
| HCM 2000 Volume to Capacity ratio | 0.30 | | | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | | | |
| Intersection Capacity Utilization | 52.5% | ICU Level of Service | A | | | |
| Analysis Period (min) | 15 | | | | | |
| c Critical Lane Group | | | | | | |

## HCM Signalized Intersection Capacity Analysis
### 29: Pine St & Placer St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 213 | 259 | 0 | 0 | 165 | 24 | 170 | 773 | 28 | 0 | 0 | 0 |
| Future Volume (vph) | 213 | 259 | 0 | 0 | 165 | 24 | 170 | 773 | 28 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | 4.7 | | | 4.7 | | | | |
| Lane Util. Factor | | 0.95 | | | 0.95 | | | 0.91 | | | | |
| Frpb, ped/bikes | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Frt | | 1.00 | | | 0.98 | | | 1.00 | | | | |
| Flt Protected | | 0.98 | | | 1.00 | | | 0.99 | | | | |
| Satd. Flow (prot) | | 3495 | | | 3494 | | | 5066 | | | | |
| Flt Permitted | | 0.72 | | | 1.00 | | | 0.99 | | | | |
| Satd. Flow (perm) | | 2568 | | | 3494 | | | 5066 | | | | |
| Peak-hour factor, PHF | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Adj. Flow (vph) | 254 | 308 | 0 | 0 | 196 | 29 | 202 | 920 | 33 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 562 | 0 | 0 | 209 | 0 | 0 | 1153 | 0 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 24 | | | 7 | | | 6 | | | 22 |
| Confl. Bikes (#/hr) | | | | | | 3 | | | | | | |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Perm | NA | | | NA | | Perm | NA | | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | | | | |
| Actuated Green, G (s) | | 31.8 | | | 31.8 | | | 68.8 | | | | |
| Effective Green, g (s) | | 31.8 | | | 31.8 | | | 68.8 | | | | |
| Actuated g/C Ratio | | 0.29 | | | 0.29 | | | 0.63 | | | | |
| Clearance Time (s) | | 4.7 | | | 4.7 | | | 4.7 | | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | | |
| Lane Grp Cap (vph) | | 742 | | | 1010 | | | 3168 | | | | |
| v/s Ratio Prot | | | | | 0.06 | | | | | | | |
| v/s Ratio Perm | | c0.22 | | | | | | 0.23 | | | | |
| v/c Ratio | | 0.76 | | | 0.21 | | | 0.36 | | | | |
| Uniform Delay, d1 | | 35.6 | | | 29.6 | | | 10.0 | | | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Incremental Delay, d2 | | 4.4 | | | 0.1 | | | 0.3 | | | | |
| Delay (s) | | 40.0 | | | 29.7 | | | 10.3 | | | | |
| Level of Service | | D | | | C | | | B | | | | |
| Approach Delay (s) | | 40.0 | | | 29.7 | | | 10.3 | | | 0.0 | |
| Approach LOS | | D | | | C | | | B | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 21.2 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.49 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 57.8% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Signalized Intersection Capacity Analysis
### 34: California St & South St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 282 | 208 | 16 | 213 | 0 | 0 | 0 | 0 | 23 | 501 | 31 |
| Future Volume (vph) | 0 | 282 | 208 | 16 | 213 | 0 | 0 | 0 | 0 | 23 | 501 | 31 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | 4.7 | | | | | | 4.7 | |
| Lane Util. Factor | | 0.95 | | | 0.95 | | | | | | 0.95 | |
| Frpb, ped/bikes | | 0.99 | | | 1.00 | | | | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | | | | | 1.00 | |
| Frt | | 0.94 | | | 1.00 | | | | | | 0.99 | |
| Flt Protected | | 1.00 | | | 1.00 | | | | | | 1.00 | |
| Satd. Flow (prot) | | 3315 | | | 3562 | | | | | | 3532 | |
| Flt Permitted | | 1.00 | | | 0.75 | | | | | | 1.00 | |
| Satd. Flow (perm) | | 3315 | | | 2672 | | | | | | 3532 | |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 0 | 310 | 229 | 18 | 234 | 0 | 0 | 0 | 0 | 25 | 551 | 34 |
| RTOR Reduction (vph) | 0 | 157 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 0 | 382 | 0 | 0 | 252 | 0 | 0 | 0 | 0 | 0 | 608 | 0 |
| Confl. Peds. (#/hr) | | | 5 | | | 1 | | | 4 | | | 8 |
| Confl. Bikes (#/hr) | | | 2 | | | 2 | | | 2 | | | 1 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | | NA | | Perm | NA | | | | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | | 8 | | | | | | 6 | | |
| Actuated Green, G (s) | | 18.8 | | | 18.8 | | | | | | 81.8 | |
| Effective Green, g (s) | | 18.8 | | | 18.8 | | | | | | 81.8 | |
| Actuated g/C Ratio | | 0.17 | | | 0.17 | | | | | | 0.74 | |
| Clearance Time (s) | | 4.7 | | | 4.7 | | | | | | 4.7 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | | 566 | | | 456 | | | | | | 2626 | |
| v/s Ratio Prot | | c0.12 | | | | | | | | | | |
| v/s Ratio Perm | | | | | 0.09 | | | | | | 0.17 | |
| v/c Ratio | | 0.68 | | | 0.55 | | | | | | 0.23 | |
| Uniform Delay, d1 | | 42.7 | | | 41.7 | | | | | | 4.4 | |
| Progression Factor | | 1.00 | | | 1.00 | | | | | | 1.00 | |
| Incremental Delay, d2 | | 3.2 | | | 1.5 | | | | | | 0.2 | |
| Delay (s) | | 45.9 | | | 43.2 | | | | | | 4.6 | |
| Level of Service | | D | | | D | | | | | | A | |
| Approach Delay (s) | | 45.9 | | | 43.2 | | | 0.0 | | | 4.6 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 27.4 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.31 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 44.8% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
### 35: Pine St & South St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 119 | 224 | 0 | 0 | 149 | 39 | 130 | 762 | 23 | 0 | 0 | 0 |
| Future Volume (vph) | 119 | 224 | 0 | 0 | 149 | 39 | 130 | 762 | 23 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | | | 4.7 | | | 4.7 | | | | |
| Lane Util. Factor | | 0.95 | | | 0.95 | | | 0.91 | | | | |
| Frpb, ped/bikes | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Frt | | 1.00 | | | 0.97 | | | 1.00 | | | | |
| Flt Protected | | 0.98 | | | 1.00 | | | 0.99 | | | | |
| Satd. Flow (prot) | | 3513 | | | 3453 | | | 5078 | | | | |
| Flt Permitted | | 0.75 | | | 1.00 | | | 0.99 | | | | |
| Satd. Flow (perm) | | 2682 | | | 3453 | | | 5078 | | | | |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 135 | 255 | 0 | 0 | 169 | 44 | 148 | 866 | 26 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 390 | 0 | 0 | 178 | 0 | 0 | 1039 | 0 | 0 | 0 | 0 |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 3 | | | 4 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Perm | NA | | | NA | | Perm | NA | | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | | | | |
| Actuated Green, G (s) | | 21.9 | | | 21.9 | | | 78.7 | | | | |
| Effective Green, g (s) | | 21.9 | | | 21.9 | | | 78.7 | | | | |
| Actuated g/C Ratio | | 0.20 | | | 0.20 | | | 0.72 | | | | |
| Clearance Time (s) | | 4.7 | | | 4.7 | | | 4.7 | | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | | 3.0 | | | | |
| Lane Grp Cap (vph) | | 533 | | | 687 | | | 3633 | | | | |
| v/s Ratio Prot | | | | | 0.05 | | | | | | | |
| v/s Ratio Perm | | c0.15 | | | | | | 0.20 | | | | |
| v/c Ratio | | 0.73 | | | 0.26 | | | 0.29 | | | | |
| Uniform Delay, d1 | | 41.3 | | | 37.2 | | | 5.6 | | | | |
| Progression Factor | | 1.00 | | | 1.00 | | | 1.00 | | | | |
| Incremental Delay, d2 | | 5.1 | | | 0.2 | | | 0.2 | | | | |
| Delay (s) | | 46.4 | | | 37.4 | | | 5.8 | | | | |
| Level of Service | | D | | | D | | | A | | | | |
| Approach Delay (s) | | 46.4 | | | 37.4 | | | 5.8 | | | 0.0 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 19.5 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.38 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 9.4 | |
| Intersection Capacity Utilization | 49.9% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Unsignalized Intersection Capacity Analysis
### 36: East St & South St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Traffic Volume (vph) | 126 | 88 | 33 | 24 | 95 | 29 | 34 | 156 | 38 | 43 | 164 | 59 |
| Future Volume (vph) | 126 | 88 | 33 | 24 | 95 | 29 | 34 | 156 | 38 | 43 | 164 | 59 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Hourly flow rate (vph) | 135 | 95 | 35 | 26 | 102 | 31 | 37 | 168 | 41 | 46 | 176 | 63 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|---|
| Volume Total (vph) | 183 | 83 | 77 | 82 | 37 | 209 | 46 | 239 |
| Volume Left (vph) | 135 | 0 | 26 | 0 | 37 | 0 | 46 | 0 |
| Volume Right (vph) | 0 | 35 | 0 | 31 | 0 | 41 | 0 | 63 |
| Hadj (s) | 0.39 | -0.28 | 0.19 | -0.25 | 0.52 | -0.12 | 0.52 | -0.17 |
| Departure Headway (s) | 6.6 | 5.9 | 6.6 | 6.1 | 6.6 | 6.0 | 6.6 | 5.9 |
| Degree Utilization, x | 0.33 | 0.14 | 0.14 | 0.14 | 0.07 | 0.35 | 0.08 | 0.39 |
| Capacity (veh/h) | 516 | 569 | 508 | 543 | 512 | 569 | 517 | 581 |
| Control Delay (s) | 11.7 | 8.7 | 9.4 | 8.9 | 8.9 | 11.0 | 9.0 | 11.5 |
| Approach Delay (s) | 10.7 | | 9.2 | | 10.7 | | 11.1 | |
| Approach LOS | B | | A | | B | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Delay | 10.6 | | | |
| Level of Service | B | | | |
| Intersection Capacity Utilization | 40.9% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

## HCM Signalized Intersection Capacity Analysis
### 38: Gold St & Market St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 19 | 35 | 592 | 11 | 0 | 5 | 0 | 0 | 0 | 2 | 115 | 0 |
| Future Volume (vph) | 19 | 35 | 592 | 11 | 0 | 5 | 0 | 0 | 0 | 2 | 115 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.7 | 4.7 | 4.7 | | 4.7 | | | | | 4.7 | |
| Lane Util. Factor | | 0.95 | 0.95 | 1.00 | | 1.00 | | | | | 0.95 | |
| Frpb, ped/bikes | | 1.00 | 1.00 | 1.00 | | 0.93 | | | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | 1.00 | 1.00 | | 1.00 | | | | | 1.00 | |
| Frt | | 0.87 | 0.85 | 1.00 | | 0.85 | | | | | 1.00 | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | | 1.00 | | | | | 1.00 | |
| Satd. Flow (prot) | | 1559 | 1519 | 1787 | | 1486 | | | | | 3572 | |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | | 1.00 | | | | | 1.00 | |
| Satd. Flow (perm) | | 1559 | 1519 | 1787 | | 1486 | | | | | 3572 | |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 21 | 39 | 658 | 12 | 0 | 6 | 0 | 0 | 0 | 2 | 128 | 0 |
| RTOR Reduction (vph) | 0 | 80 | 94 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 283 | 261 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 0 |
| Confl. Peds. (#/hr) | | | | | | 3 | | | 3 | | | 2 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | 3 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Split | NA | Perm | Prot | | Perm | | | | Perm | NA | |
| Protected Phases | 6 | 6 | | 5 | | | | | | | 4 | |
| Permitted Phases | | | 6 | | | 5 | | | | 4 | | |
| Actuated Green, G (s) | | 80.9 | 80.9 | 3.2 | | 3.2 | | | | | 11.8 | |
| Effective Green, g (s) | | 80.9 | 80.9 | 3.2 | | 3.2 | | | | | 11.8 | |
| Actuated g/C Ratio | | 0.74 | 0.74 | 0.03 | | 0.03 | | | | | 0.11 | |
| Clearance Time (s) | | 4.7 | 4.7 | 4.7 | | 4.7 | | | | | 4.7 | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | | 3.0 | | | | | 3.0 | |
| Lane Grp Cap (vph) | | 1146 | 1117 | 51 | | 43 | | | | | 383 | |
| v/s Ratio Prot | | c0.18 | | c0.01 | | | | | | | | |
| v/s Ratio Perm | | | 0.17 | | | 0.00 | | | | | 0.04 | |
| v/c Ratio | | 0.25 | 0.23 | 0.24 | | 0.00 | | | | | 0.34 | |
| Uniform Delay, d1 | | 4.7 | 4.6 | 52.2 | | 51.9 | | | | | 45.5 | |
| Progression Factor | | 2.91 | 4.14 | 1.00 | | 1.00 | | | | | 1.00 | |
| Incremental Delay, d2 | | 0.5 | 0.5 | 2.4 | | 0.0 | | | | | 0.5 | |
| Delay (s) | | 14.2 | 19.7 | 54.6 | | 51.9 | | | | | 46.0 | |
| Level of Service | | B | B | D | | D | | | | | D | |
| Approach Delay (s) | | 16.9 | | | 53.7 | | | 0.0 | | | 46.0 | |
| Approach LOS | | B | | | D | | | A | | | D | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 22.1 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.26 | | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 14.1 | |
| Intersection Capacity Utilization | 47.4% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Signalized Intersection Capacity Analysis
### 45: Market St/Cypress Ave & East St

Timing Plan:

| Movement | EBL | EBT | WBL | NBT | NBR |
|---|---|---|---|---|---|
| Lane Configurations | | | | | |
| Traffic Volume (vph) | 23 | 360 | 367 | 531 | 193 |
| Future Volume (vph) | 23 | 360 | 367 | 531 | 193 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | 4.2 | 4.2 | 4.6 | 4.6 |
| Lane Util. Factor | 1.00 | 0.95 | 0.97 | 0.91 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1787 | 3574 | 3467 | 5136 | 1570 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1787 | 3574 | 3467 | 5136 | 1570 |
| Peak-hour factor, PHF | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Adj. Flow (vph) | 26 | 414 | 422 | 610 | 222 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 26 | 414 | 422 | 610 | 222 |
| Confl. Peds. (#/hr) | | | | | 8 |
| Confl. Bikes (#/hr) | | | | | 1 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Split | NA | Prot | NA | Perm |
| Protected Phases | 3 | 3 | 4 | 6 | |
| Permitted Phases | | | | | 6 |
| Actuated Green, G (s) | 15.1 | 15.1 | 16.6 | 23.3 | 23.3 |
| Effective Green, g (s) | 15.1 | 15.1 | 16.6 | 23.3 | 23.3 |
| Actuated g/C Ratio | 0.20 | 0.20 | 0.22 | 0.31 | 0.31 |
| Clearance Time (s) | 4.2 | 4.2 | 4.2 | 4.6 | 4.6 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 359 | 719 | 767 | 1595 | 487 |
| v/s Ratio Prot | 0.01 | c0.12 | c0.12 | 0.12 | |
| v/s Ratio Perm | | | | | c0.14 |
| v/c Ratio | 0.07 | 0.58 | 0.55 | 0.38 | 0.46 |
| Uniform Delay, d1 | 24.3 | 27.1 | 25.9 | 20.2 | 20.8 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.1 | 1.1 | 0.9 | 0.2 | 0.7 |
| Delay (s) | 24.4 | 28.2 | 26.7 | 20.4 | 21.4 |
| Level of Service | C | C | C | C | C |
| Approach Delay (s) | | 28.0 | | 20.7 | |
| Approach LOS | | C | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 24.1 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.50 | | | |
| Actuated Cycle Length (s) | 75.0 | Sum of lost time (s) | 17.6 | |
| Intersection Capacity Utilization | 45.6% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
## 51: Market St & Grange St

Timing Plan:

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 42 | 36 | 661 | 30 | 30 | 864 |
| Future Volume (vph) | 42 | 36 | 661 | 30 | 30 | 864 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.2 | | 5.4 | | 4.2 | 5.4 |
| Lane Util. Factor | 1.00 | | 0.95 | | 1.00 | 0.95 |
| Frpb, ped/bikes | 0.99 | | 1.00 | | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | | 1.00 | | 1.00 | 1.00 |
| Frt | 0.94 | | 0.99 | | 1.00 | 1.00 |
| Flt Protected | 0.97 | | 1.00 | | 0.95 | 1.00 |
| Satd. Flow (prot) | 1703 | | 3546 | | 1787 | 3574 |
| Flt Permitted | 0.97 | | 1.00 | | 0.95 | 1.00 |
| Satd. Flow (perm) | 1703 | | 3546 | | 1787 | 3574 |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Adj. Flow (vph) | 45 | 38 | 703 | 32 | 32 | 919 |
| RTOR Reduction (vph) | 32 | 0 | 4 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 51 | 0 | 731 | 0 | 32 | 919 |
| Confl. Peds. (#/hr) | | 14 | | 6 | | |
| Confl. Bikes (#/hr) | | | | 4 | | |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Perm | | NA | | Prot | NA |
| Protected Phases | | | 2 | | 1 | 6 |
| Permitted Phases | 8 | | | | | |
| Actuated Green, G (s) | 7.7 | | 28.1 | | 1.1 | 33.4 |
| Effective Green, g (s) | 7.7 | | 28.1 | | 1.1 | 33.4 |
| Actuated g/C Ratio | 0.15 | | 0.55 | | 0.02 | 0.66 |
| Clearance Time (s) | 4.2 | | 5.4 | | 4.2 | 5.4 |
| Vehicle Extension (s) | 3.0 | | 3.0 | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 258 | | 1965 | | 38 | 2354 |
| v/s Ratio Prot | | | 0.21 | | 0.02 | c0.26 |
| v/s Ratio Perm | c0.03 | | | | | |
| v/c Ratio | 0.20 | | 0.37 | | 0.84 | 0.39 |
| Uniform Delay, d1 | 18.8 | | 6.3 | | 24.7 | 4.0 |
| Progression Factor | 1.00 | | 1.00 | | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.4 | | 0.1 | | 85.4 | 0.1 |
| Delay (s) | 19.2 | | 6.5 | | 110.1 | 4.1 |
| Level of Service | B | | A | | F | A |
| Approach Delay (s) | 19.2 | | 6.5 | | | 7.6 |
| Approach LOS | B | | A | | | A |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 7.7 | HCM 2000 Level of Service | A | |
| HCM 2000 Volume to Capacity ratio | 0.39 | | | |
| Actuated Cycle Length (s) | 50.7 | Sum of lost time (s) | 13.8 | |
| Intersection Capacity Utilization | 47.2% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
## 54: Westside Rd/Railroad Ave & Buenaventura Blvd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 33 | 405 | 26 | 14 | 510 | 166 | 20 | 43 | 19 | 342 | 58 | 69 |
| Future Volume (vph) | 33 | 405 | 26 | 14 | 510 | 166 | 20 | 43 | 19 | 342 | 58 | 69 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 3.5 | 5.3 | | 3.5 | 5.3 | 5.3 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.97 | 1.00 |
| Satd. Flow (prot) | 1787 | 3537 | | 1787 | 3574 | 1599 | 1787 | 1881 | 1577 | 1698 | 1726 | 1599 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.97 | 1.00 |
| Satd. Flow (perm) | 1787 | 3537 | | 1787 | 3574 | 1599 | 1787 | 1881 | 1577 | 1698 | 1726 | 1599 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 38 | 460 | 30 | 16 | 580 | 189 | 23 | 49 | 22 | 389 | 66 | 78 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 127 | 0 | 0 | 19 | 0 | 0 | 58 |
| Lane Group Flow (vph) | 38 | 487 | 0 | 16 | 580 | 62 | 23 | 49 | 3 | 226 | 229 | 20 |
| Confl. Peds. (#/hr) | | | 1 | | | | | | 2 | | | |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Prot | NA | | Prot | NA | Perm | Split | NA | Perm | Split | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 3 | | 4 | 4 | |
| Permitted Phases | | | | | | 6 | | | 3 | | | 4 |
| Actuated Green, G (s) | 4.0 | 24.7 | | 0.9 | 21.6 | 21.6 | 7.7 | 7.7 | 7.7 | 17.1 | 17.1 | 17.1 |
| Effective Green, g (s) | 4.0 | 24.7 | | 0.9 | 21.6 | 21.6 | 7.7 | 7.7 | 7.7 | 17.1 | 17.1 | 17.1 |
| Actuated g/C Ratio | 0.06 | 0.37 | | 0.01 | 0.33 | 0.33 | 0.12 | 0.12 | 0.12 | 0.26 | 0.26 | 0.26 |
| Clearance Time (s) | 3.5 | 5.3 | | 3.5 | 5.3 | 5.3 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 107 | 1319 | | 24 | 1166 | 521 | 207 | 218 | 183 | 438 | 445 | 413 |
| v/s Ratio Prot | c0.02 | c0.14 | | 0.01 | c0.16 | | 0.01 | c0.03 | | c0.13 | 0.13 | |
| v/s Ratio Perm | | | | | | 0.04 | | | 0.00 | | | 0.01 |
| v/c Ratio | 0.36 | 0.37 | | 0.67 | 0.50 | 0.12 | 0.11 | 0.22 | 0.01 | 0.52 | 0.51 | 0.05 |
| Uniform Delay, d1 | 29.9 | 15.1 | | 32.5 | 17.9 | 15.6 | 26.2 | 26.5 | 25.9 | 21.0 | 21.0 | 18.4 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.0 | 0.2 | | 52.8 | 0.3 | 0.1 | 0.2 | 0.5 | 0.0 | 1.0 | 1.0 | 0.0 |
| Delay (s) | 31.9 | 15.3 | | 85.3 | 18.3 | 15.7 | 26.4 | 27.1 | 25.9 | 22.0 | 22.0 | 18.5 |
| Level of Service | C | B | | F | B | B | C | C | C | C | C | B |
| Approach Delay (s) | | 16.5 | | | 19.0 | | | 26.6 | | | 21.5 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 19.4 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.44 | | | |
| Actuated Cycle Length (s) | 66.2 | Sum of lost time (s) | 15.8 | |
| Intersection Capacity Utilization | 46.2% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
## 55: SR 273 & Buenaventura Blvd

Timing Plan:

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 195 | 571 | 402 | 384 | 522 | 288 |
| Future Volume (vph) | 195 | 571 | 402 | 384 | 522 | 288 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.2 | 4.2 | 5.8 | 5.8 | 4.6 |
| Lane Util. Factor | 1.00 | 0.88 | 0.97 | 0.95 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 0.99 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1787 | 2786 | 3467 | 3574 | 3574 | 1587 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1787 | 2786 | 3467 | 3574 | 3574 | 1587 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 212 | 621 | 437 | 417 | 567 | 313 |
| RTOR Reduction (vph) | 0 | 182 | 0 | 0 | 0 | 40 |
| Lane Group Flow (vph) | 212 | 439 | 437 | 417 | 567 | 273 |
| Confl. Peds. (#/hr) | | 1 | | | | 2 |
| Heavy Vehicles (%) | 1% | 1% | 1% | 1% | 1% | 1% |
| Turn Type | Prot | pm+ov | Prot | NA | NA | pm+ov |
| Protected Phases | 4 | 5 | 5 | 2 | 6 | 4 |
| Permitted Phases | | 4 | | | | 6 |
| Actuated Green, G (s) | 13.5 | 28.5 | 15.0 | 35.5 | 16.3 | 29.8 |
| Effective Green, g (s) | 13.5 | 28.5 | 15.0 | 35.5 | 16.3 | 29.8 |
| Actuated g/C Ratio | 0.23 | 0.48 | 0.25 | 0.60 | 0.27 | 0.50 |
| Clearance Time (s) | 4.6 | 4.2 | 4.2 | 5.8 | 5.8 | 4.6 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 406 | 1336 | 875 | 2135 | 980 | 796 |
| v/s Ratio Prot | c0.12 | 0.08 | c0.13 | 0.12 | c0.16 | 0.08 |
| v/s Ratio Perm | | 0.07 | | | | 0.09 |
| v/c Ratio | 0.52 | 0.33 | 0.50 | 0.20 | 0.58 | 0.34 |
| Uniform Delay, d1 | 20.1 | 9.5 | 19.0 | 5.4 | 18.6 | 8.9 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.2 | 0.1 | 0.5 | 0.0 | 0.8 | 0.3 |
| Delay (s) | 21.3 | 9.7 | 19.4 | 5.5 | 19.4 | 9.2 |
| Level of Service | C | A | B | A | B | A |
| Approach Delay (s) | 12.7 | | | 12.6 | 15.8 | |
| Approach LOS | B | | | B | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 13.7 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.53 | | | |
| Actuated Cycle Length (s) | 59.4 | Sum of lost time (s) | 14.6 | |
| Intersection Capacity Utilization | 48.9% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Unsignalized Intersection Capacity Analysis
## 57: SR 273 & Kenyon Dr

Timing Plan:

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 26 | 70 | 65 | 569 | 940 | 27 |
| Future Volume (Veh/h) | 26 | 70 | 65 | 569 | 940 | 27 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Hourly flow rate (vph) | 29 | 77 | 71 | 625 | 1033 | 30 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | 2 | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1488 | 516 | 1063 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1488 | 516 | 1063 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 72 | 85 | 89 | | | |
| cM capacity (veh/h) | 102 | 504 | 651 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|
| Volume Total | 106 | 71 | 312 | 312 | 516 | 516 | 30 |
| Volume Left | 29 | 71 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 77 | 0 | 0 | 0 | 0 | 0 | 30 |
| cSH | 374 | 651 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.28 | 0.11 | 0.18 | 0.18 | 0.30 | 0.30 | 0.02 |
| Queue Length 95th (ft) | 29 | 9 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 24.4 | 11.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | B | | | | | |
| Approach Delay (s) | 24.4 | 1.1 | | | 0.0 | | |
| Approach LOS | C | | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.8 | | | |
| Intersection Capacity Utilization | 42.9% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

## HCM Unsignalized Intersection Capacity Analysis
## 58: SR 273 & Branstetter Ln

Timing Plan:

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 33 | 0 | 634 | 971 | 39 |
| Future Volume (Veh/h) | 0 | 33 | 0 | 634 | 971 | 39 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Hourly flow rate (vph) | 0 | 36 | 0 | 697 | 1067 | 43 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1416 | 534 | 1110 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1416 | 534 | 1110 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 100 | 93 | 100 | | | |
| cM capacity (veh/h) | 128 | 491 | 625 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|
| Volume Total | 36 | 348 | 348 | 534 | 534 | 43 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 36 | 0 | 0 | 0 | 0 | 43 |
| cSH | 491 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.07 | 0.20 | 0.20 | 0.31 | 0.31 | 0.03 |
| Queue Length 95th (ft) | 6 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 12.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | | | | | |
| Approach Delay (s) | 12.9 | 0.0 | | 0.0 | | |
| Approach LOS | B | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | | 0.3 | | |
| Intersection Capacity Utilization | 36.8% | ICU Level of Service | | A |
| Analysis Period (min) | 15 | | | |



## HCM Signalized Intersection Capacity Analysis
## 59: SR 273 & Cedars Rd/Bonnyview Rd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 3 | 50 | 48 | 565 | 91 | 194 | 42 | 437 | 421 | 287 | 710 | 7 |
| Future Volume (vph) | 3 | 50 | 48 | 565 | 91 | 194 | 42 | 437 | 421 | 287 | 710 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | 4.6 | 4.9 | 4.9 | 4.9 | 4.2 | 6.5 | 4.9 | 4.2 | 6.5 | 6.5 |
| Lane Util. Factor | 0.91 | 0.91 | 1.00 | 0.97 | 0.95 | 0.95 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 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 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1610 | 3390 | 1562 | 3433 | 1666 | 1504 | 1770 | 3539 | 1574 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1610 | 3390 | 1562 | 3433 | 1666 | 1504 | 1770 | 3539 | 1574 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 3 | 55 | 53 | 621 | 100 | 213 | 46 | 480 | 463 | 315 | 780 | 8 |
| RTOR Reduction (vph) | 0 | 0 | 46 | 0 | 0 | 0 | 0 | 0 | 138 | 0 | 0 | 5 |
| Lane Group Flow (vph) | 3 | 55 | 7 | 621 | 164 | 149 | 46 | 480 | 325 | 315 | 780 | 3 |
| Confl. Peds. (#/hr) | | | 2 | | | | | | 1 | | | |
| Turn Type | Split | NA | Perm | Split | NA | Perm | Prot | NA | pm+ov | Prot | NA | Perm |
| Protected Phases | 8 | 8 | | 7 | 7 | | 1 | 6 | 7 | 5 | 2 | |
| Permitted Phases | | | 8 | | | 7 | | | 6 | | | 2 |
| Actuated Green, G (s) | 14.0 | 14.0 | 14.0 | 32.0 | 32.0 | 32.0 | 8.5 | 26.6 | 58.6 | 17.3 | 35.4 | 35.4 |
| Effective Green, g (s) | 14.0 | 14.0 | 14.0 | 32.0 | 32.0 | 32.0 | 8.5 | 26.6 | 58.6 | 17.3 | 35.4 | 35.4 |
| Actuated g/C Ratio | 0.13 | 0.13 | 0.13 | 0.29 | 0.29 | 0.29 | 0.08 | 0.24 | 0.53 | 0.16 | 0.32 | 0.32 |
| Clearance Time (s) | 4.6 | 4.6 | 4.6 | 4.9 | 4.9 | 4.9 | 4.2 | 6.5 | 4.9 | 4.2 | 6.5 | 6.5 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 204 | 431 | 198 | 997 | 484 | 437 | 136 | 855 | 837 | 539 | 1137 | 508 |
| v/s Ratio Prot | 0.00 | c0.02 | | c0.18 | 0.10 | | 0.03 | 0.14 | 0.11 | c0.09 | c0.22 | |
| v/s Ratio Perm | | | 0.00 | | | 0.10 | | | 0.09 | | | 0.00 |
| v/c Ratio | 0.01 | 0.13 | 0.03 | 0.62 | 0.34 | 0.34 | 0.34 | 0.56 | 0.39 | 0.58 | 0.69 | 0.01 |
| Uniform Delay, d1 | 42.0 | 42.6 | 42.1 | 33.8 | 30.7 | 30.7 | 48.1 | 36.6 | 15.2 | 43.1 | 32.5 | 25.4 |
| Progression 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 |
| Incremental Delay, d2 | 0.0 | 0.1 | 0.1 | 1.2 | 0.4 | 0.5 | 1.5 | 0.8 | 0.3 | 1.6 | 1.7 | 0.0 |
| Delay (s) | 42.0 | 42.8 | 42.2 | 35.0 | 31.1 | 31.2 | 49.6 | 37.5 | 15.5 | 44.7 | 34.2 | 25.4 |
| Level of Service | D | D | D | D | C | C | D | D | B | D | C | C |
| Approach Delay (s) | | 42.5 | | | 33.7 | | | 27.7 | | | 37.2 | |
| Approach LOS | | D | | | C | | | C | | | D | |

| Intersection Summary | | | | | |
|---|---|---|---|---|---|
| HCM 2000 Control Delay | 33.4 | HCM 2000 Level of Service | | C | |
| HCM 2000 Volume to Capacity ratio | 0.58 | | | | |
| Actuated Cycle Length (s) | 110.1 | Sum of lost time (s) | | 20.2 | |
| Intersection Capacity Utilization | 64.6% | ICU Level of Service | | C | |
| Analysis Period (min) | 15 | | | | |
| c Critical Lane Group | | | | | |

## HCM Signalized Intersection Capacity Analysis
## 60: Eastside Rd & Bonnyview Rd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 36 | 679 | 43 | 250 | 776 | 51 | 51 | 18 | 158 | 76 | 45 | 23 |
| Future Volume (vph) | 36 | 679 | 43 | 250 | 776 | 51 | 51 | 18 | 158 | 76 | 45 | 23 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 3.5 | 4.9 | 4.9 | 3.5 | 4.9 | 4.9 | 4.2 | 4.2 | 4.2 | | 4.2 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.97 | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1545 | 1770 | 1863 | 1583 | | 1772 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.97 | |
| Satd. Flow (perm) | 1770 | 3539 | 1583 | 1770 | 3539 | 1545 | 1770 | 1863 | 1583 | | 1772 | |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Adj. Flow (vph) | 39 | 730 | 46 | 269 | 834 | 55 | 55 | 19 | 170 | 82 | 48 | 25 |
| RTOR Reduction (vph) | 0 | 0 | 33 | 0 | 0 | 32 | 0 | 0 | 145 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 39 | 730 | 13 | 269 | 834 | 23 | 55 | 19 | 25 | 0 | 149 | 0 |
| Confl. Peds. (#/hr) | | | | | | 2 | | | | | | 1 |
| Confl. Bikes (#/hr) | | | | | | 1 | | | | | | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Split | NA | Perm | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 3 | | 4 | 4 | |
| Permitted Phases | | | 2 | | | 6 | | | 3 | | | |
| Actuated Green, G (s) | 6.9 | 25.7 | 25.7 | 18.5 | 37.3 | 37.3 | 13.1 | 13.1 | 13.1 | | 14.5 | |
| Effective Green, g (s) | 6.9 | 25.7 | 25.7 | 18.5 | 37.3 | 37.3 | 13.1 | 13.1 | 13.1 | | 14.5 | |
| Actuated g/C Ratio | 0.08 | 0.29 | 0.29 | 0.21 | 0.42 | 0.42 | 0.15 | 0.15 | 0.15 | | 0.16 | |
| Clearance Time (s) | 3.5 | 4.9 | 4.9 | 3.5 | 4.9 | 4.9 | 4.2 | 4.2 | 4.2 | | 4.2 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 137 | 1026 | 459 | 369 | 1489 | 650 | 261 | 275 | 234 | | 290 | |
| v/s Ratio Prot | 0.02 | c0.21 | | c0.15 | 0.24 | | c0.03 | 0.01 | | | c0.08 | |
| v/s Ratio Perm | | | 0.01 | | | 0.01 | | | 0.02 | | | |
| v/c Ratio | 0.28 | 0.71 | 0.03 | 0.73 | 0.56 | 0.04 | 0.21 | 0.07 | 0.11 | | 0.51 | |
| Uniform Delay, d1 | 38.5 | 28.1 | 22.5 | 32.7 | 19.4 | 15.1 | 33.2 | 32.5 | 32.7 | | 33.8 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 1.1 | 2.4 | 0.0 | 7.0 | 0.5 | 0.0 | 0.4 | 0.1 | 0.2 | | 1.5 | |
| Delay (s) | 39.7 | 30.5 | 22.5 | 39.8 | 19.9 | 15.1 | 33.6 | 32.6 | 32.9 | | 35.4 | |
| Level of Service | D | C | C | D | B | B | C | C | C | | D | |
| Approach Delay (s) | | 30.5 | | | 24.3 | | | 33.0 | | | 35.4 | |
| Approach LOS | | C | | | C | | | C | | | D | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 28.0 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.58 | | | |
| Actuated Cycle Length (s) | 88.6 | Sum of lost time (s) | 16.8 | |
| Intersection Capacity Utilization | 58.7% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
## 62: SR 273 & Clear Creek Rd

Timing Plan:

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 103 | 63 | 40 | 711 | 1029 | 81 |
| Future Volume (vph) | 103 | 63 | 40 | 711 | 1029 | 81 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 5.1 | 5.1 | 4.2 | 6.5 | 6.5 | 5.1 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1752 | 1568 | 1752 | 3505 | 3505 | 1544 |
| Flt Permitted | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1752 | 1568 | 1752 | 3505 | 3505 | 1544 |
| Peak-hour factor, PHF | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Adj. Flow (vph) | 107 | 66 | 42 | 741 | 1072 | 84 |
| RTOR Reduction (vph) | 0 | 50 | 0 | 0 | 0 | 27 |
| Lane Group Flow (vph) | 107 | 16 | 42 | 741 | 1072 | 57 |
| Confl. Peds. (#/hr) | | | | | | 2 |
| Confl. Bikes (#/hr) | | | | | | 1 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Prot | Perm | Prot | NA | NA | pm+ov |
| Protected Phases | 7 | | 5 | 2 | 6 | 7 |
| Permitted Phases | | 7 | | | | 6 |
| Actuated Green, G (s) | 13.4 | 13.4 | 5.3 | 41.1 | 31.6 | 45.0 |
| Effective Green, g (s) | 13.4 | 13.4 | 5.3 | 41.1 | 31.6 | 45.0 |
| Actuated g/C Ratio | 0.20 | 0.20 | 0.08 | 0.62 | 0.48 | 0.68 |
| Clearance Time (s) | 5.1 | 5.1 | 4.2 | 6.5 | 6.5 | 5.1 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 355 | 317 | 140 | 2179 | 1675 | 1051 |
| v/s Ratio Prot | c0.06 | | 0.02 | c0.21 | c0.31 | 0.01 |
| v/s Ratio Perm | | 0.01 | | | | 0.03 |
| v/c Ratio | 0.30 | 0.05 | 0.30 | 0.34 | 0.64 | 0.05 |
| Uniform Delay, d1 | 22.4 | 21.2 | 28.7 | 6.0 | 13.0 | 3.5 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.5 | 0.1 | 1.2 | 0.1 | 0.8 | 0.0 |
| Delay (s) | 22.9 | 21.3 | 29.9 | 6.1 | 13.8 | 3.5 |
| Level of Service | C | C | C | A | B | A |
| Approach Delay (s) | 22.3 | | | 7.4 | 13.1 | |
| Approach LOS | C | | | A | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 11.7 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.53 | | | |
| Actuated Cycle Length (s) | 66.1 | Sum of lost time (s) | 15.8 | |
| Intersection Capacity Utilization | 52.9% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
## 64: SR 273 & Canyon Rd

Timing Plan:

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 318 | 64 | 34 | 438 | 539 | 505 |
| Future Volume (vph) | 318 | 64 | 34 | 438 | 539 | 505 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | | 4.6 | 6.5 | 6.5 | 6.5 |
| Lane Util. Factor | 0.97 | | 1.00 | 0.95 | 0.95 | 0.88 |
| Frpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 0.98 |
| Flpb, ped/bikes | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.97 | | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.96 | | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3337 | | 1752 | 3505 | 3505 | 2694 |
| Flt Permitted | 0.96 | | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3337 | | 1752 | 3505 | 3505 | 2694 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 335 | 67 | 36 | 461 | 567 | 532 |
| RTOR Reduction (vph) | 14 | 0 | 0 | 0 | 0 | 376 |
| Lane Group Flow (vph) | 388 | 0 | 36 | 461 | 567 | 156 |
| Confl. Peds. (#/hr) | | 2 | | | | 1 |
| Confl. Bikes (#/hr) | | | | | | 2 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% |
| Turn Type | Prot | | Prot | NA | NA | Perm |
| Protected Phases | 8 | | 5 | 2 | 6 | |
| Permitted Phases | | | | | | 6 |
| Actuated Green, G (s) | 26.8 | | 11.5 | 38.5 | 22.4 | 22.4 |
| Effective Green, g (s) | 26.8 | | 11.5 | 38.5 | 22.4 | 22.4 |
| Actuated g/C Ratio | 0.35 | | 0.15 | 0.50 | 0.29 | 0.29 |
| Clearance Time (s) | 4.6 | | 4.6 | 6.5 | 6.5 | 6.5 |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 1170 | | 263 | 1766 | 1027 | 789 |
| v/s Ratio Prot | c0.12 | | 0.02 | c0.13 | c0.16 | |
| v/s Ratio Perm | | | | | | 0.06 |
| v/c Ratio | 0.33 | | 0.14 | 0.26 | 0.55 | 0.20 |
| Uniform Delay, d1 | 18.2 | | 28.1 | 10.8 | 22.8 | 20.3 |
| Progression Factor | 0.43 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.2 | | 0.2 | 0.1 | 0.6 | 0.1 |
| Delay (s) | 7.9 | | 28.4 | 10.9 | 23.4 | 20.4 |
| Level of Service | A | | C | B | C | C |
| Approach Delay (s) | 7.9 | | | 12.2 | 21.9 | |
| Approach LOS | A | | | B | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 16.7 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.44 | | | |
| Actuated Cycle Length (s) | 76.4 | Sum of lost time (s) | 20.3 | |
| Intersection Capacity Utilization | 48.6% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Unsignalized Intersection Capacity Analysis
## 65: SR 273 & Whitehouse Dr

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 13 | 0 | 0 | 3 | 0 | 52 | 2 | 407 | 3 | 40 | 536 | 27 |
| Future Volume (Veh/h) | 13 | 0 | 0 | 3 | 0 | 52 | 2 | 407 | 3 | 40 | 536 | 27 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| 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 |
| Hourly flow rate (vph) | 14 | 0 | 0 | 3 | 0 | 57 | 2 | 442 | 3 | 43 | 583 | 29 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 951 | 1118 | 292 | 824 | 1144 | 221 | 612 | | | 445 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 951 | 1118 | 292 | 824 | 1144 | 221 | 612 | | | 445 | | |
| tC, single (s) | 7.6 | 6.6 | 7.0 | 7.6 | 6.6 | 7.0 | 4.2 | | | 4.2 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 93 | 100 | 100 | 99 | 100 | 93 | 100 | | | 96 | | |
| cM capacity (veh/h) | 190 | 194 | 699 | 254 | 187 | 777 | 950 | | | 1097 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | NB 4 | SB 1 | SB 2 | SB 3 | SB 4 |
|---|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 14 | 60 | 2 | 221 | 221 | 3 | 43 | 292 | 292 | 29 |
| Volume Left | 14 | 3 | 2 | 0 | 0 | 0 | 43 | 0 | 0 | 0 |
| Volume Right | 0 | 57 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 29 |
| cSH | 190 | 704 | 950 | 1700 | 1700 | 1700 | 1097 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.07 | 0.09 | 0.00 | 0.13 | 0.13 | 0.00 | 0.04 | 0.17 | 0.17 | 0.02 |
| Queue Length 95th (ft) | 6 | 7 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Control Delay (s) | 25.5 | 10.6 | 8.8 | 0.0 | 0.0 | 0.0 | 8.4 | 0.0 | 0.0 | 0.0 |
| Lane LOS | D | B | A | | | | A | | | |
| Approach Delay (s) | 25.5 | 10.6 | 0.0 | | | | 0.6 | | | |
| Approach LOS | D | B | | | | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.2 | | | |
| Intersection Capacity Utilization | 34.1% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

## HCM Signalized Intersection Capacity Analysis
## 66: SR 273 & Happy V Rd

Timing Plan:

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 55 | 75 | 103 | 357 | 441 | 98 |
| Future Volume (vph) | 55 | 75 | 103 | 357 | 441 | 98 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | | 4.2 | 7.0 | 7.0 | 7.0 |
| Lane Util. Factor | 1.00 | | 1.00 | 0.95 | 0.95 | 1.00 |
| Frt | 0.92 | | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.98 | | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1650 | | 1736 | 3471 | 3471 | 1553 |
| Flt Permitted | 0.98 | | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1650 | | 1736 | 3471 | 3471 | 1553 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 58 | 79 | 108 | 376 | 464 | 103 |
| RTOR Reduction (vph) | 58 | 0 | 0 | 0 | 0 | 67 |
| Lane Group Flow (vph) | 79 | 0 | 108 | 376 | 464 | 36 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Perm | | Prot | NA | NA | Perm |
| Protected Phases | | | 5 | 2 | 6 | |
| Permitted Phases | 4 | | | | | 6 |
| Actuated Green, G (s) | 8.2 | | 8.3 | 29.7 | 17.2 | 17.2 |
| Effective Green, g (s) | 8.2 | | 8.3 | 29.7 | 17.2 | 17.2 |
| Actuated g/C Ratio | 0.17 | | 0.17 | 0.60 | 0.35 | 0.35 |
| Clearance Time (s) | 4.6 | | 4.2 | 7.0 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 273 | | 291 | 2082 | 1206 | 539 |
| v/s Ratio Prot | | | c0.06 | 0.11 | c0.13 | |
| v/s Ratio Perm | c0.05 | | | | | 0.02 |
| v/c Ratio | 0.29 | | 0.37 | 0.18 | 0.38 | 0.07 |
| Uniform Delay, d1 | 18.1 | | 18.3 | 4.4 | 12.2 | 10.8 |
| Progression Factor | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.6 | | 0.8 | 0.0 | 0.2 | 0.1 |
| Delay (s) | 18.7 | | 19.1 | 4.5 | 12.4 | 10.8 |
| Level of Service | B | | B | A | B | B |
| Approach Delay (s) | 18.7 | | | 7.7 | 12.1 | |
| Approach LOS | B | | | A | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 11.1 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.36 | | | |
| Actuated Cycle Length (s) | 49.5 | Sum of lost time (s) | 15.8 | |
| Intersection Capacity Utilization | 43.7% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Unsignalized Intersection Capacity Analysis
## 67: SR 273 & Amen St/Latona Rd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 3 | 0 | 3 | 43 | 0 | 12 | 2 | 445 | 44 | 6 | 507 | 3 |
| Future Volume (Veh/h) | 3 | 0 | 3 | 43 | 0 | 12 | 2 | 445 | 44 | 6 | 507 | 3 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Hourly flow rate (vph) | 3 | 0 | 3 | 46 | 0 | 13 | 2 | 478 | 47 | 6 | 545 | 3 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 813 | 1086 | 272 | 770 | 1042 | 239 | 548 | | | 525 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 813 | 1086 | 272 | 770 | 1042 | 239 | 548 | | | 525 | | |
| tC, single (s) | 7.6 | 6.6 | 7.0 | 7.6 | 6.6 | 7.0 | 4.2 | | | 4.2 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 99 | 100 | 100 | 84 | 100 | 98 | 100 | | | 99 | | |
| cM capacity (veh/h) | 259 | 209 | 716 | 282 | 222 | 753 | 997 | | | 1017 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | NB 4 | SB 1 | SB 2 | SB 3 | SB 4 |
|---|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 6 | 59 | 2 | 239 | 239 | 47 | 6 | 272 | 272 | 3 |
| Volume Left | 3 | 46 | 2 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Volume Right | 3 | 13 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 3 |
| cSH | 380 | 327 | 997 | 1700 | 1700 | 1700 | 1017 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.02 | 0.18 | 0.00 | 0.14 | 0.14 | 0.03 | 0.01 | 0.16 | 0.16 | 0.00 |
| Queue Length 95th (ft) | 1 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 14.6 | 18.4 | 8.6 | 0.0 | 0.0 | 0.0 | 8.6 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | C | A | | | | A | | | |
| Approach Delay (s) | 14.6 | 18.4 | 0.0 | | | | 0.1 | | | |
| Approach LOS | B | C | | | | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.1 | | | |
| Intersection Capacity Utilization | 25.5% | ICU Level of Service | | A |
| Analysis Period (min) | 15 | | | |

## HCM Signalized Intersection Capacity Analysis
### 69: SR 273 & Ox Yoke Rd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 0 | 2 | 61 | 0 | 318 | 0 | 273 | 39 | 271 | 375 | 0 |
| Future Volume (vph) | 1 | 0 | 2 | 61 | 0 | 318 | 0 | 273 | 39 | 271 | 375 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.2 | | | 4.4 | 4.4 | | 7.0 | 7.0 | 4.2 | 7.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frpb, ped/bikes | | 0.98 | | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | | 0.91 | | | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1609 | | | 1736 | 1553 | | 3471 | 1553 | 1736 | 3471 | |
| Flt Permitted | | 0.98 | | | 0.95 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1609 | | | 1736 | 1553 | | 3471 | 1553 | 1736 | 3471 | |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Adj. Flow (vph) | 1 | 0 | 2 | 66 | 0 | 342 | 0 | 294 | 42 | 291 | 403 | 0 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 278 | 0 | 0 | 33 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 66 | 64 | 0 | 294 | 9 | 291 | 403 | 0 |
| Confl. Peds. (#/hr) | | | 1 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 2 |
| Heavy Vehicles (%) | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| Turn Type | Split | NA | | Split | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 8 | 8 | | 7 | 7 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | | | | 7 | | | 6 | | | |
| Actuated Green, G (s) | | 1.5 | | | 11.4 | 11.4 | | 12.5 | 12.5 | 15.8 | 32.5 | |
| Effective Green, g (s) | | 1.5 | | | 11.4 | 11.4 | | 12.5 | 12.5 | 15.8 | 32.5 | |
| Actuated g/C Ratio | | 0.02 | | | 0.19 | 0.19 | | 0.20 | 0.20 | 0.26 | 0.53 | |
| Clearance Time (s) | | 4.2 | | | 4.4 | 4.4 | | 7.0 | 7.0 | 4.2 | 7.0 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 39 | | | 324 | 290 | | 711 | 318 | 449 | 1849 | |
| v/s Ratio Prot | | c0.00 | | | 0.04 | | | c0.08 | | c0.17 | 0.12 | |
| v/s Ratio Perm | | | | | | c0.04 | | | 0.01 | | | |
| v/c Ratio | | 0.00 | | | 0.20 | 0.22 | | 0.41 | 0.03 | 0.65 | 0.22 | |
| Uniform Delay, d1 | | 29.0 | | | 21.0 | 21.0 | | 21.1 | 19.4 | 20.1 | 7.5 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.0 | | | 0.3 | 0.4 | | 0.4 | 0.0 | 3.2 | 0.1 | |
| Delay (s) | | 29.0 | | | 21.3 | 21.4 | | 21.5 | 19.4 | 23.3 | 7.6 | |
| Level of Service | | C | | | C | C | | C | B | C | A | |
| Approach Delay (s) | | 29.0 | | | 21.4 | | | 21.2 | | | 14.2 | |
| Approach LOS | | C | | | C | | | C | | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 17.9 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.43 | | | |
| Actuated Cycle Length (s) | 61.0 | Sum of lost time (s) | 19.8 | |
| Intersection Capacity Utilization | 51.0% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Signalized Intersection Capacity Analysis
### 72: SR 273 & North St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 17 | 102 | 43 | 139 | 121 | 71 | 40 | 191 | 127 | 77 | 313 | 18 |
| Future Volume (vph) | 17 | 102 | 43 | 139 | 121 | 71 | 40 | 191 | 127 | 77 | 313 | 18 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | | 4.6 | 4.6 | 4.6 | 4.2 | 5.8 | 5.8 | 4.2 | 5.8 | 5.8 |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1770 | 1772 | | 1770 | 1863 | 1561 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1770 | 1772 | | 1770 | 1863 | 1561 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Peak-hour factor, PHF | 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) | 18 | 111 | 47 | 151 | 132 | 77 | 43 | 208 | 138 | 84 | 340 | 20 |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 0 | 63 | 0 | 0 | 111 | 0 | 0 | 15 |
| Lane Group Flow (vph) | 18 | 148 | 0 | 151 | 132 | 14 | 43 | 208 | 27 | 84 | 340 | 5 |
| Confl. Peds. (#/hr) | | | 4 | | | | | | | | | |
| Confl. Bikes (#/hr) | | | | | | 2 | | | | | | |
| Turn Type | Split | NA | | Split | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 8 | 8 | | 7 | 7 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | | | | 7 | | | 6 | | | 2 |
| Actuated Green, G (s) | 14.7 | 14.7 | | 12.7 | 12.7 | 12.7 | 4.7 | 13.3 | 13.3 | 7.6 | 16.2 | 16.2 |
| Effective Green, g (s) | 14.7 | 14.7 | | 12.7 | 12.7 | 12.7 | 4.7 | 13.3 | 13.3 | 7.6 | 16.2 | 16.2 |
| Actuated g/C Ratio | 0.22 | 0.22 | | 0.19 | 0.19 | 0.19 | 0.07 | 0.20 | 0.20 | 0.11 | 0.24 | 0.24 |
| Clearance Time (s) | 4.6 | 4.6 | | 4.6 | 4.6 | 4.6 | 4.2 | 5.8 | 5.8 | 4.2 | 5.8 | 5.8 |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 385 | 385 | | 333 | 350 | 293 | 123 | 697 | 311 | 199 | 849 | 379 |
| v/s Ratio Prot | 0.01 | c0.08 | | c0.09 | 0.07 | | 0.02 | 0.06 | | c0.05 | c0.10 | |
| v/s Ratio Perm | | | | | | 0.01 | | | 0.02 | | | 0.00 |
| v/c Ratio | 0.05 | 0.38 | | 0.45 | 0.38 | 0.05 | 0.35 | 0.30 | 0.09 | 0.42 | 0.40 | 0.01 |
| Uniform Delay, d1 | 20.9 | 22.5 | | 24.3 | 23.9 | 22.5 | 29.9 | 23.1 | 22.1 | 27.9 | 21.6 | 19.6 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.1 | 0.6 | | 1.0 | 0.7 | 0.1 | 1.7 | 0.2 | 0.1 | 1.4 | 0.3 | 0.0 |
| Delay (s) | 20.9 | 23.2 | | 25.3 | 24.6 | 22.5 | 31.7 | 23.4 | 22.3 | 29.3 | 21.9 | 19.6 |
| Level of Service | C | C | | C | C | C | C | C | C | C | C | B |
| Approach Delay (s) | | 22.9 | | | 24.5 | | | 23.9 | | | 23.2 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 23.7 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.43 | | | |
| Actuated Cycle Length (s) | 67.5 | Sum of lost time (s) | 19.2 | |
| Intersection Capacity Utilization | 50.0% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

## HCM Signalized Intersection Capacity Analysis
## 73: SR 273 & South St

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 91 | 90 | 108 | 114 | 126 | 34 | 70 | 233 | 97 | 61 | 328 | 106 |
| Future Volume (vph) | 91 | 90 | 108 | 114 | 126 | 34 | 70 | 233 | 97 | 61 | 328 | 106 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.6 | | 4.6 | 4.6 | | 4.2 | 5.8 | 5.8 | 4.2 | 5.8 | 5.8 |
| Lane Util. Factor | | 0.95 | | 0.95 | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frpb, ped/bikes | | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.94 | | 1.00 | 0.97 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 0.98 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 3272 | | 1681 | 1707 | | 1770 | 3539 | 1562 | 1770 | 3539 | 1583 |
| Flt Permitted | | 0.98 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 3272 | | 1681 | 1707 | | 1770 | 3539 | 1562 | 1770 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 96 | 95 | 114 | 120 | 133 | 36 | 74 | 245 | 102 | 64 | 345 | 112 |
| RTOR Reduction (vph) | 0 | 58 | 0 | 0 | 5 | 0 | 0 | 0 | 80 | 0 | 0 | 89 |
| Lane Group Flow (vph) | 0 | 247 | 0 | 108 | 176 | 0 | 74 | 245 | 22 | 64 | 345 | 23 |
| Confl. Peds. (#/hr) | | | 3 | | | 2 | | | 1 | | | |
| Turn Type | Split | NA | | Split | NA | | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 8 | 8 | | 7 | 7 | | 1 | 6 | | 5 | 2 | |
| Permitted Phases | | | | | | | | | 6 | | | 2 |
| Actuated Green, G (s) | | 15.0 | | 16.6 | 16.6 | | 8.2 | 15.7 | 15.7 | 7.5 | 15.0 | 15.0 |
| Effective Green, g (s) | | 15.0 | | 16.6 | 16.6 | | 8.2 | 15.7 | 15.7 | 7.5 | 15.0 | 15.0 |
| Actuated g/C Ratio | | 0.20 | | 0.22 | 0.22 | | 0.11 | 0.21 | 0.21 | 0.10 | 0.20 | 0.20 |
| Clearance Time (s) | | 4.6 | | 4.6 | 4.6 | | 4.2 | 5.8 | 5.8 | 4.2 | 5.8 | 5.8 |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 663 | | 377 | 382 | | 196 | 750 | 331 | 179 | 717 | 320 |
| v/s Ratio Prot | | c0.08 | | 0.06 | c0.10 | | c0.04 | 0.07 | | 0.04 | c0.10 | |
| v/s Ratio Perm | | | | | | | | | 0.01 | | | 0.01 |
| v/c Ratio | | 0.37 | | 0.29 | 0.46 | | 0.38 | 0.33 | 0.07 | 0.36 | 0.48 | 0.07 |
| Uniform Delay, d1 | | 25.4 | | 23.8 | 24.8 | | 30.5 | 24.7 | 23.3 | 31.0 | 26.1 | 23.9 |
| Progression Factor | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.4 | | 0.4 | 0.9 | | 1.2 | 0.3 | 0.1 | 1.2 | 0.5 | 0.1 |
| Delay (s) | | 25.8 | | 24.2 | 25.7 | | 31.8 | 24.9 | 23.4 | 32.2 | 26.6 | 24.0 |
| Level of Service | | C | | C | C | | C | C | C | C | C | C |
| Approach Delay (s) | | 25.8 | | | 25.1 | | | 25.8 | | | 26.7 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 26.0 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.43 | | | |
| Actuated Cycle Length (s) | 74.0 | Sum of lost time (s) | 19.2 | |
| Intersection Capacity Utilization | 52.8% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |



## HCM Signalized Intersection Capacity Analysis
## 76: SR 273 & Factory Outlets Dr

Timing Plan:

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 397 | 219 | 296 | 203 | 178 | 359 |
| Future Volume (vph) | 397 | 219 | 296 | 203 | 178 | 359 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | 6.0 | 4.6 | 4.2 | 6.0 |
| Lane Util. Factor | 0.97 | 0.91 | 0.95 | 1.00 | 1.00 | 0.95 |
| Frpb, ped/bikes | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.99 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.96 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3418 | 1441 | 3539 | 1567 | 1770 | 3539 |
| Flt Permitted | 0.96 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3418 | 1441 | 3539 | 1567 | 1770 | 3539 |
| Peak-hour factor, PHF | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Adj. Flow (vph) | 414 | 228 | 308 | 211 | 185 | 374 |
| RTOR Reduction (vph) | 4 | 145 | 0 | 101 | 0 | 0 |
| Lane Group Flow (vph) | 440 | 53 | 308 | 110 | 185 | 374 |
| Confl. Peds. (#/hr) | | | | 1 | | |
| Confl. Bikes (#/hr) | | | | 1 | | |
| Turn Type | Prot | Perm | NA | pm+ov | Prot | NA |
| Protected Phases | 3 | | 2 | 3 | 1 | 6 |
| Permitted Phases | | 3 | | 2 | | |
| Actuated Green, G (s) | 16.0 | 16.0 | 15.5 | 31.5 | 13.9 | 33.6 |
| Effective Green, g (s) | 16.0 | 16.0 | 15.5 | 31.5 | 13.9 | 33.6 |
| Actuated g/C Ratio | 0.27 | 0.27 | 0.26 | 0.52 | 0.23 | 0.56 |
| Clearance Time (s) | 4.6 | 4.6 | 6.0 | 4.6 | 4.2 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 908 | 382 | 911 | 819 | 408 | 1975 |
| v/s Ratio Prot | c0.13 | | c0.09 | 0.04 | c0.10 | 0.11 |
| v/s Ratio Perm | | 0.04 | | 0.03 | | |
| v/c Ratio | 0.48 | 0.14 | 0.34 | 0.13 | 0.45 | 0.19 |
| Uniform Delay, d1 | 18.6 | 16.8 | 18.2 | 7.4 | 19.9 | 6.6 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.4 | 0.2 | 0.2 | 0.1 | 0.8 | 0.0 |
| Delay (s) | 19.0 | 17.0 | 18.4 | 7.4 | 20.7 | 6.6 |
| Level of Service | B | B | B | A | C | A |
| Approach Delay (s) | 18.4 | | 13.9 | | 11.3 | |
| Approach LOS | B | | B | | B | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 14.7 | HCM 2000 Level of Service | B | |
| HCM 2000 Volume to Capacity ratio | 0.46 | | | |
| Actuated Cycle Length (s) | 60.2 | Sum of lost time (s) | 18.3 | |
| Intersection Capacity Utilization | 45.2% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

## HCM Signalized Intersection Capacity Analysis
## 77: SR 273 & Pleasant Hills Dr

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 348 | 25 | 144 | 45 | 25 | 43 | 101 | 108 | 22 | 26 | 276 | 454 |
| Future Volume (vph) | 348 | 25 | 144 | 45 | 25 | 43 | 101 | 108 | 22 | 26 | 276 | 454 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 7.0 | 7.0 | 4.6 | 7.0 | 7.0 |
| Lane Util. Factor | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 1863 | 1583 | 1770 | 1863 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 1863 | 1583 | 1770 | 1863 | 1583 | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 387 | 28 | 160 | 50 | 28 | 48 | 112 | 120 | 24 | 29 | 307 | 504 |
| RTOR Reduction (vph) | 0 | 0 | 119 | 0 | 0 | 42 | 0 | 0 | 16 | 0 | 0 | 378 |
| Lane Group Flow (vph) | 387 | 28 | 41 | 50 | 28 | 6 | 112 | 120 | 8 | 29 | 307 | 126 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm | Prot | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 14.6 | 18.2 | 18.2 | 5.3 | 8.9 | 8.9 | 8.7 | 23.0 | 23.0 | 3.4 | 17.7 | 17.7 |
| Effective Green, g (s) | 14.6 | 18.2 | 18.2 | 5.3 | 8.9 | 8.9 | 8.7 | 23.0 | 23.0 | 3.4 | 17.7 | 17.7 |
| Actuated g/C Ratio | 0.21 | 0.26 | 0.26 | 0.07 | 0.13 | 0.13 | 0.12 | 0.33 | 0.33 | 0.05 | 0.25 | 0.25 |
| Clearance Time (s) | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 7.0 | 7.0 | 4.6 | 7.0 | 7.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 708 | 479 | 407 | 132 | 234 | 199 | 422 | 1151 | 514 | 85 | 886 | 396 |
| v/s Ratio Prot | c0.11 | 0.02 | | 0.03 | 0.02 | | c0.03 | 0.03 | | 0.02 | c0.09 | |
| v/s Ratio Perm | | | c0.03 | | | 0.00 | | | 0.00 | | | 0.08 |
| v/c Ratio | 0.55 | 0.06 | 0.10 | 0.38 | 0.12 | 0.03 | 0.27 | 0.10 | 0.02 | 0.34 | 0.35 | 0.32 |
| Uniform Delay, d1 | 25.1 | 19.8 | 20.0 | 31.1 | 27.4 | 27.1 | 28.1 | 16.7 | 16.2 | 32.6 | 21.8 | 21.6 |
| Progression 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 |
| Incremental Delay, d2 | 0.9 | 0.1 | 0.1 | 1.8 | 0.2 | 0.1 | 0.3 | 0.0 | 0.0 | 2.4 | 0.2 | 0.5 |
| Delay (s) | 26.0 | 19.8 | 20.1 | 33.0 | 27.7 | 27.2 | 28.4 | 16.7 | 16.2 | 35.0 | 22.0 | 22.1 |
| Level of Service | C | B | C | C | C | C | C | B | B | C | C | C |
| Approach Delay (s) | | 24.0 | | | 29.6 | | | 21.8 | | | 22.5 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM 2000 Control Delay | 23.4 | HCM 2000 Level of Service | C | |
| HCM 2000 Volume to Capacity ratio | 0.35 | | | |
| Actuated Cycle Length (s) | 70.7 | Sum of lost time (s) | 20.8 | |
| Intersection Capacity Utilization | 60.8% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group



## HCM Unsignalized Intersection Capacity Analysis
## 78: Branstetter Ln & Westside Rd

Timing Plan:

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 16 | 17 | 4 | 6 | 33 | 0 | 7 | 12 | 1 | 15 | 12 | 12 |
| Future Volume (Veh/h) | 16 | 17 | 4 | 6 | 33 | 0 | 7 | 12 | 1 | 15 | 12 | 12 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Hourly flow rate (vph) | 18 | 20 | 5 | 7 | 38 | 0 | 8 | 14 | 1 | 17 | 14 | 14 |
| Pedestrians | | 3 | | | | | | | | | | |
| Lane Width (ft) | | 12.0 | | | | | | | | | | |
| Walking Speed (ft/s) | | 3.5 | | | | | | | | | | |
| Percent Blockage | | 0 | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 38 | | | 25 | | | 134 | 110 | 22 | 118 | 113 | 41 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 38 | | | 25 | | | 134 | 110 | 22 | 118 | 113 | 41 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 100 | | | 99 | 98 | 100 | 98 | 98 | 99 |
| cM capacity (veh/h) | 1566 | | | 1583 | | | 800 | 765 | 1052 | 832 | 763 | 1024 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 43 | 45 | 23 | 45 |
| Volume Left | 18 | 7 | 8 | 17 |
| Volume Right | 5 | 0 | 1 | 14 |
| cSH | 1566 | 1583 | 786 | 858 |
| Volume to Capacity | 0.01 | 0.00 | 0.03 | 0.05 |
| Queue Length 95th (ft) | 1 | 0 | 2 | 4 |
| Control Delay (s) | 3.1 | 1.2 | 9.7 | 9.4 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 3.1 | 1.2 | 9.7 | 9.4 |
| Approach LOS | | | A | A |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 5.3 | | | |
| Intersection Capacity Utilization | 15.5% | ICU Level of Service | A | |
| Analysis Period (min) | 15 | | | |

# Appendix C.

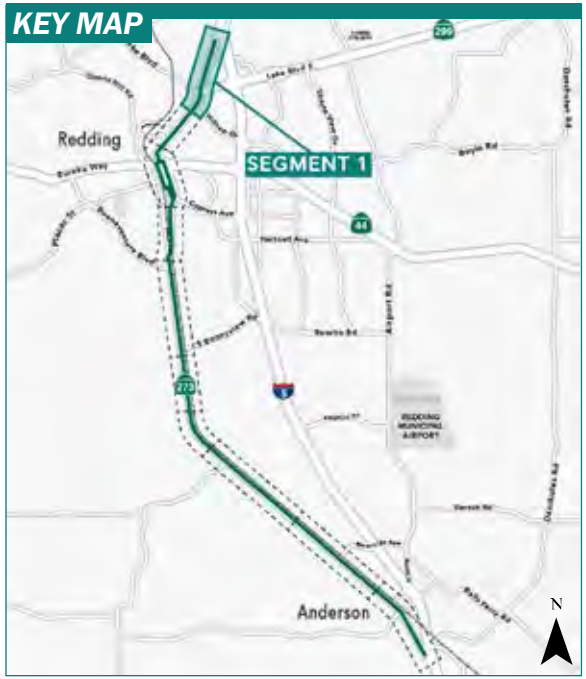
## Corridor Segment System Profiles

# STATE ROUTE (SR) 273 SEGMENT 1

## *I-5 Ramps to south of Lake Blvd*

## *EXISTING CONDITIONS SEGMENT OVERVIEW*

### *KEY MAP*




### *SEGMENT AERIAL*

- **Adjacent Land Use:**
  Industrial, residential, commercial
- **Place Type:**
  Transitional Corridor/Suburban Community
- **Key Destinations:**
  North Point and Lake Boulevard Plaza Centers, Masonic Temple, Shasta Opportunity Center, Shasta Head Start, Shasta Early Childhood Services, Shasta Lanes, Water Works Park
- **Key Features:**
  Access to I-5 at both north and south segment ends, access to Highway 299 Bikeway Class I Path at Lake Blvd, minimal place-based activities, barriers to pedestrian and bike mobility along corridor

- **Segment Length:**
  1.8 miles
- **Roadway Classification:**
  Freeway/Expressway
- **Jurisdiction of Adjacent Land Use:**
  City of Redding
- **Posted Speed(s):**
  50 to 55 mph
- **Cross-Section:**
  4-lane divided with dirt median and left turn pockets at intersections
- **Daily Traffic Volume:**
  ~ 9,900 vehicles per day

### *TYPICAL SECTION*

EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 1

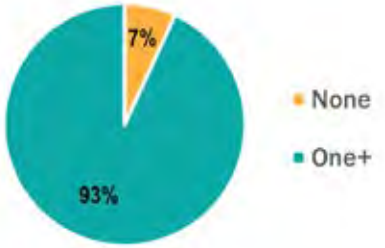
## *I-5 Ramps to south of Lake Blvd*

## *EXISTING CONDITIONS MOBILITY TRENDS*

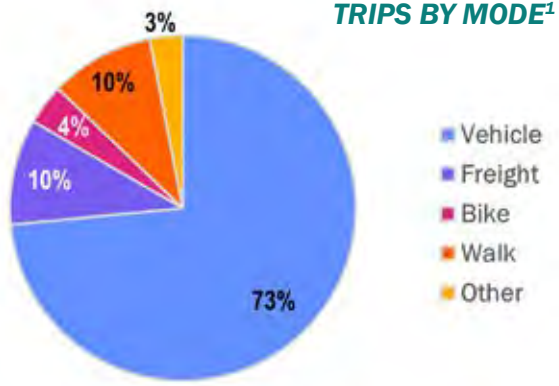
### *EXISTING MULTIMODAL FACILITIES*

- The most common trip mode is motor vehicles, with 73 percent of trips made by a private automobile and 10 percent by a freight vehicle.
- Ten percent of trips within the segment are also made by pedestrians.
- Among all modes, freight vehicles have the highest average trip distance, followed by private vehicles.
- Most people traveling within the segment have access to a car, with 93% of trips made by individuals living in households with access to at least one vehicle.
- Seven percent of trips are made by people without access to a car, and people who do not have access to car are 30 times more likely to bike and 5 times more likely to walk than those who do have access to a car.

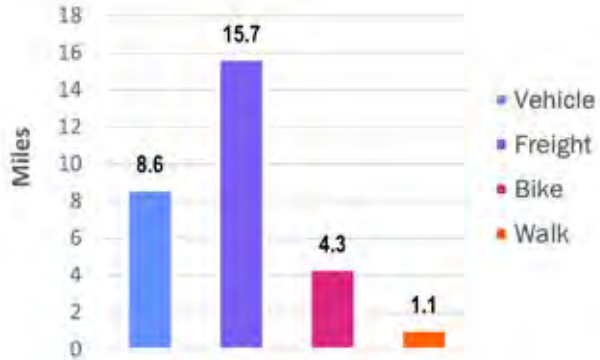
### *PRIVATE AUTO OWNERSHIP*




### *TRIPS BY MODE[1]*



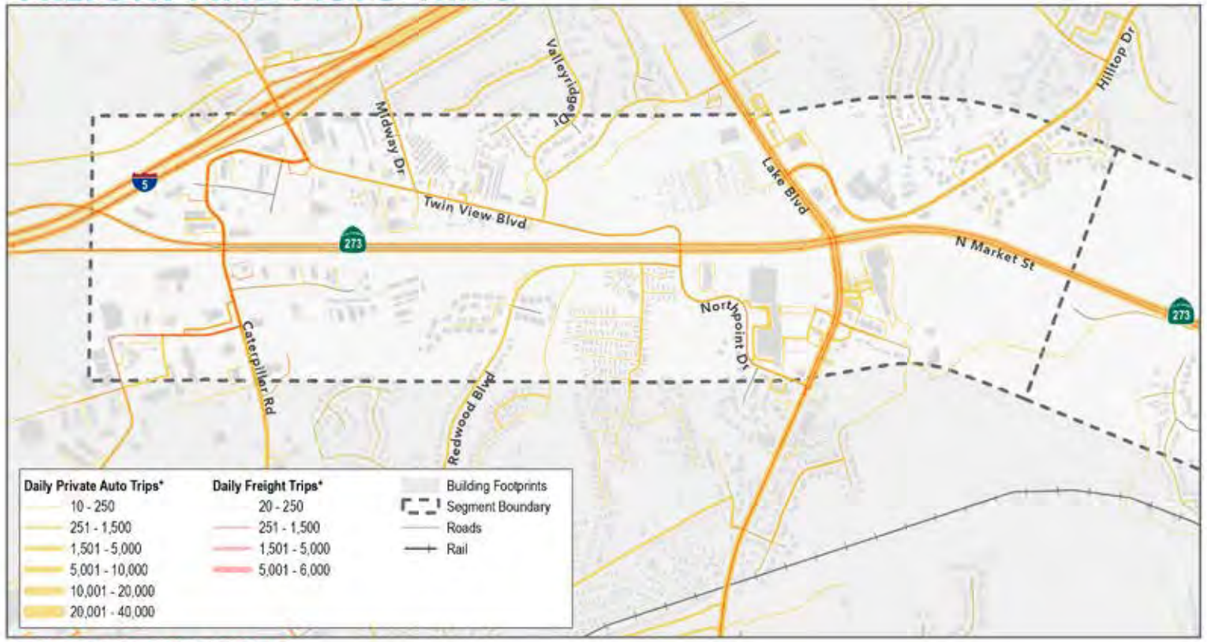

### *AVERAGE TRIP DISTANCE BY MODE[1]*



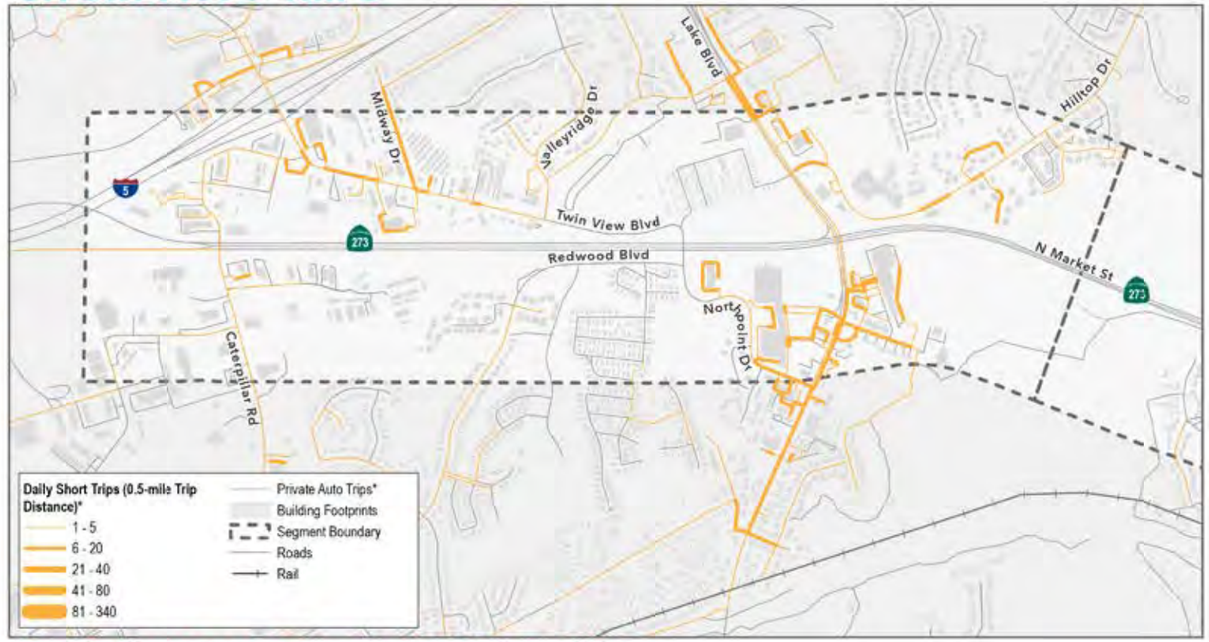

- Bicycle trips traveling along the segment are most concentrated along Lake Blvd and SR 273 east of Lake Blvd.
- Pedestrian trips, and especially walking trips made by those who do not own a car, are also concentrated along Lake Blvd, as well as Twin View Blvd, and Hilltop Dr.
- Transit activity is also highest concentrated near Lake Blvd, with transit boarding and disembarking highest in this location due to the presence of the Masonic Transfer Center.
- Short vehicle trips are concentrated along Lake Blvd near local commercial destinations.
- Freight and private automobile trips are concentrated along I-5 and major roadways intersecting the corridor segment. Of all vehicle trips, 87% are made by private automobiles and 13% by freight vehicles.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

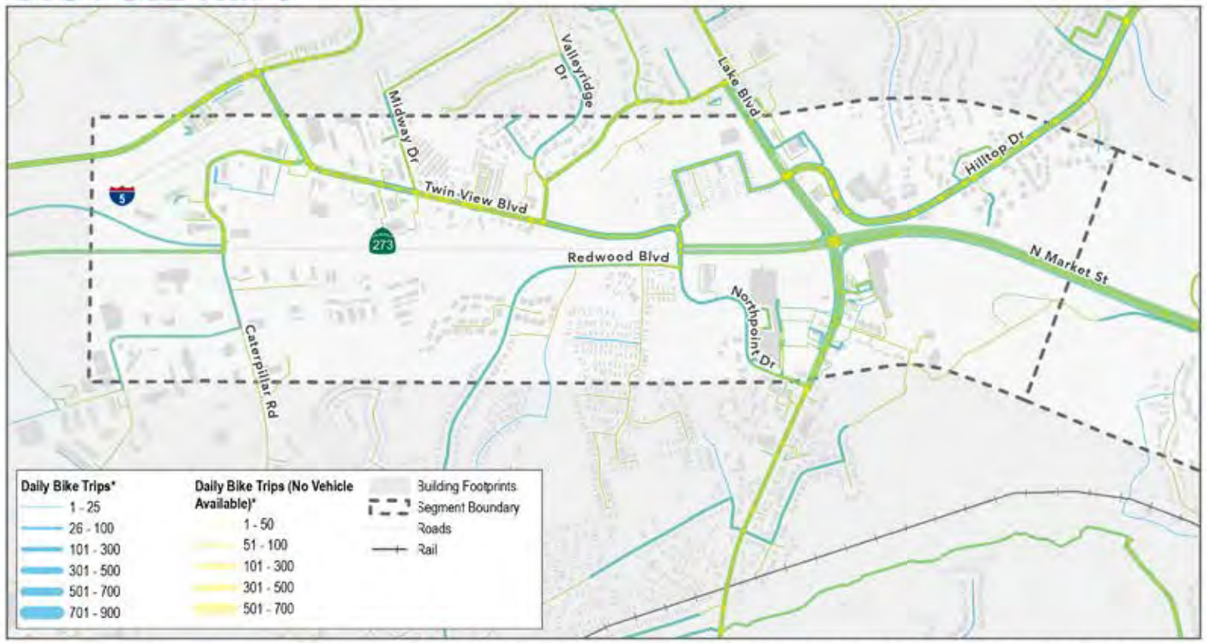
## FREIGHT AND AUTO TRIPS



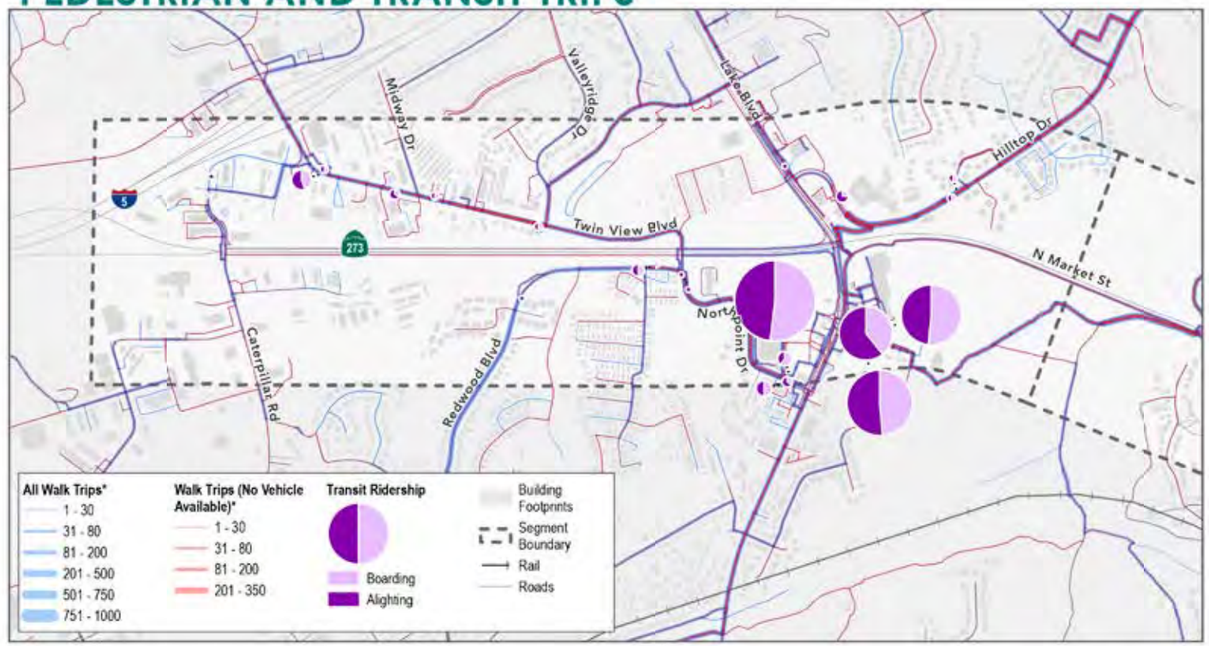

## SHORT AUTO TRIPS




## BICYCLE TRIPS




## PEDESTRIAN AND TRANSIT TRIPS




Data source: Human Geography Base: Esri Community Maps Contributors, City of Redding GIS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Trip data: Replica Typical Weekday in Fall 2022, Building Footprints: City of Redding, Shasta County, 2023, Transit Ridership: RABA, City of Redding, SHB, 2023, Roads: Shasta County, 2023, Rail: CA State Hwy, 2023
Created by: jcowell
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Print date: 04 Oct 2023 - 20:32

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

N

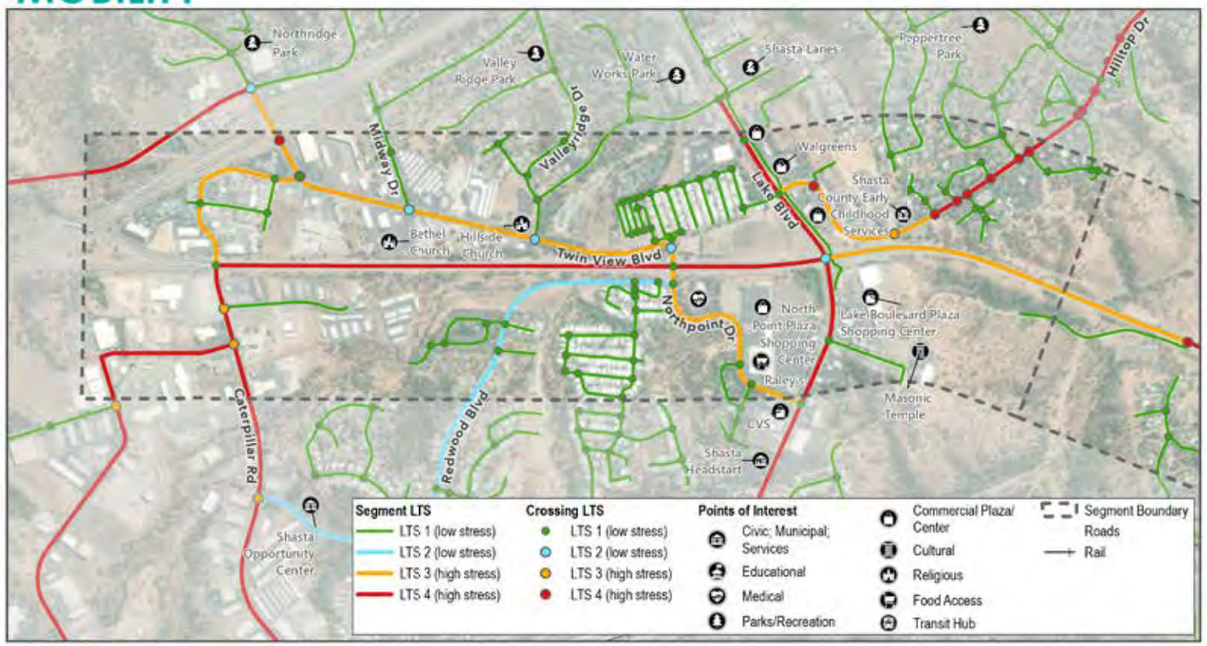
0 500 1,000 1,500
US Feet

# STATE ROUTE (SR) 273 SEGMENT 1

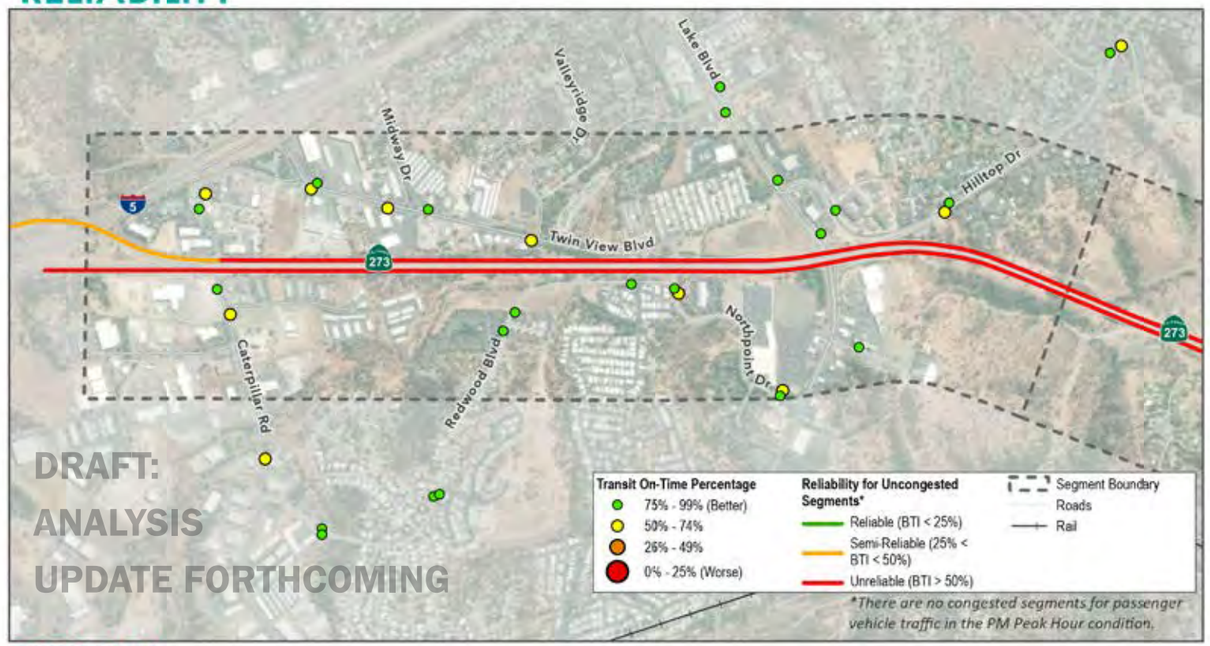
*I-5 Ramps to south of Lake Blvd*

***EXISTING CONDITIONS PERFORMANCE RESULTS***

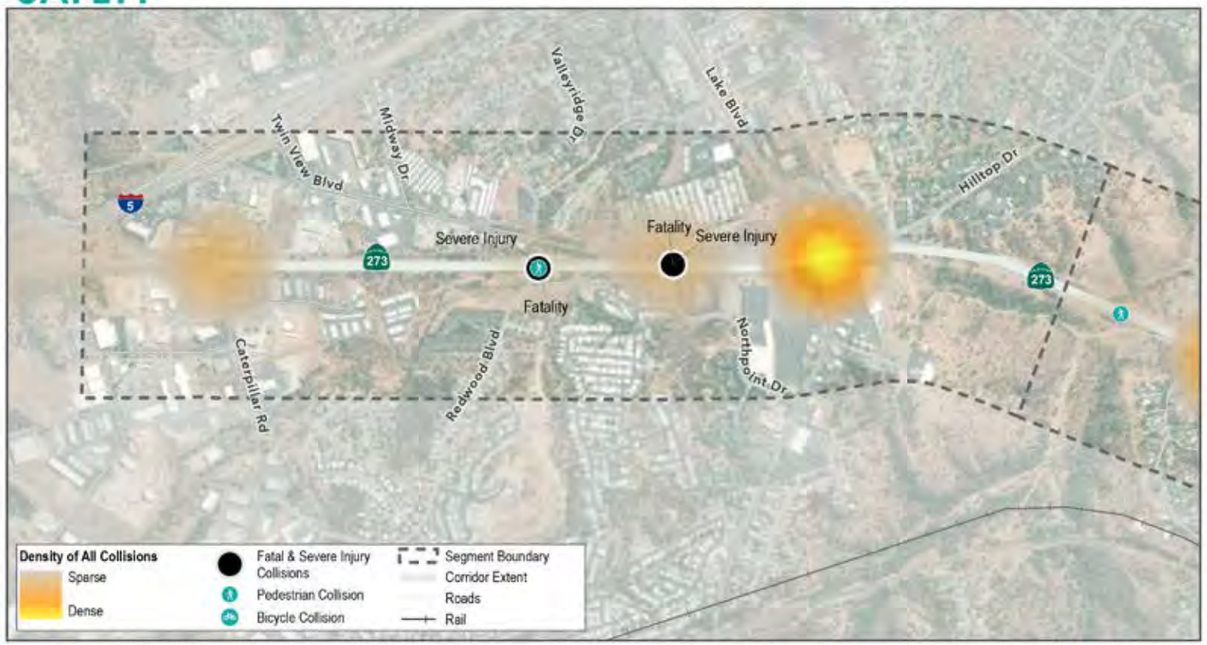
## MOBILITY



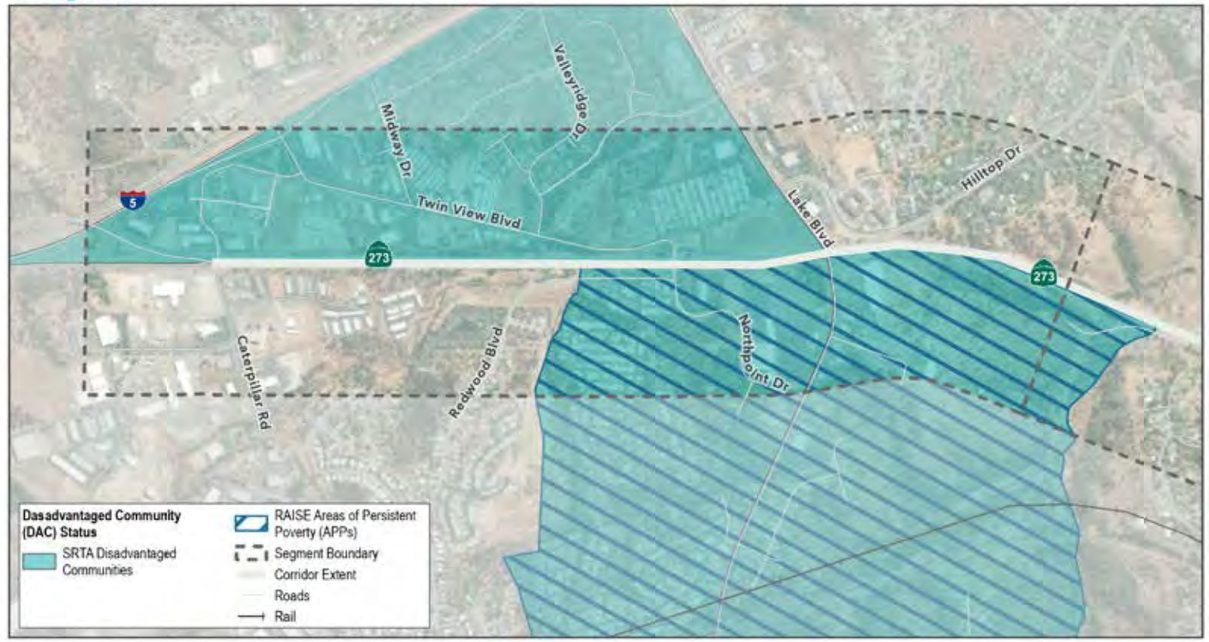

## RELIABILITY




## SAFETY




## EQUITY




Data source: Hexel Imagery (Firefly). Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2018-2022; DAC: SRTA/RTP-SCS, 2018; PDI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2019

Created by: sperl

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Print date: 04 Oct 2023 - 20:44

0 500 1,000 1,500

US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 1

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Poor | 4 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Typically no bench/shelter | 4 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | No stops on SR 273 | 4 |
| **Sidewalk Coverage** | Minimal; Connectivity near developed area | 3 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 3 (0%) | |
| Education Destinations | 1 (1%) | |
| Community Services and Shopping Destinations | 10 (5%) | |
| Health Care Destinations | 1 (0%) | |
| Food Access | 1 (0%) | |
| Transit Service Destinations (includes Bike Share locations) | 41 (9%) | |
| Civic Service Destinations | 1 (1%) | |
| Parks/Open Space & Recreation Destinations | 5 (18%) | |
| **Overall Mobility Score** | **Poor** | **4** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 29 | - |
| Total Fatal Crashes | 2 | 4 |
| Total Severe Crashes | - | |
| **Total Crashes Involving a Pedestrian** | 1 | 4 |
| Total Pedestrian Fatalities | 1 | 4 |
| **Total Crashes Involving a Bicyclist** | - | |
| Total Bicyclists Fatalities | - | |
| % Occurred at Night (Non-Daylight Crashes) | 31% | - |
| **Primary Crash Types** | Broadside | - |
| **Primary Crash Cause** | Unsafe Speed & Vehicle Driver Error | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **0.89** | 3 |
| Statewide Crash Rate | 0.94 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | | |
| Vehicle - PM Peak Hour (shown on map) | | |
| Truck - AM Peak Hour | | |
| Truck - PM Peak Hour | | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | **3** |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | Majority | 4 |
| RAISE Areas of Persistent Poverty Criteria | Partially | 3 |
| Climate & Economic Justice Criteria | Fully | 4 |
| SB 535 CalEPA Criteria | No | 1 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **4** |
| **SAFETY** | Poor | **4** |
| **RELIABILITY** | Poor | **3** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **4** |

## SEGMENT ISSUES

- High speeds and minimal bicycle and pedestrian infrastructure along SR 273 results in a high stress barrier to connectivity between destinations to the east and west of the highway.
- The intersection of Lake Blvd and SR 273 is a collision hotspot. With seven percent of collisions resulting in fatality, one of which involved a pedestrian, and a crash rate above the statewide average, safety is a concern.
- Transit service is mostly reliable with many of the routes serving stops in the segment arriving on-time between 75 and 99 percent of the time. Updated travel time reliability analysis i s forthcoming. Results shown are a placeholder.
- Equity is a concern with block groups to the east and west of the corridor meeting the DAC criteria for three of the four measures of disadvantage.

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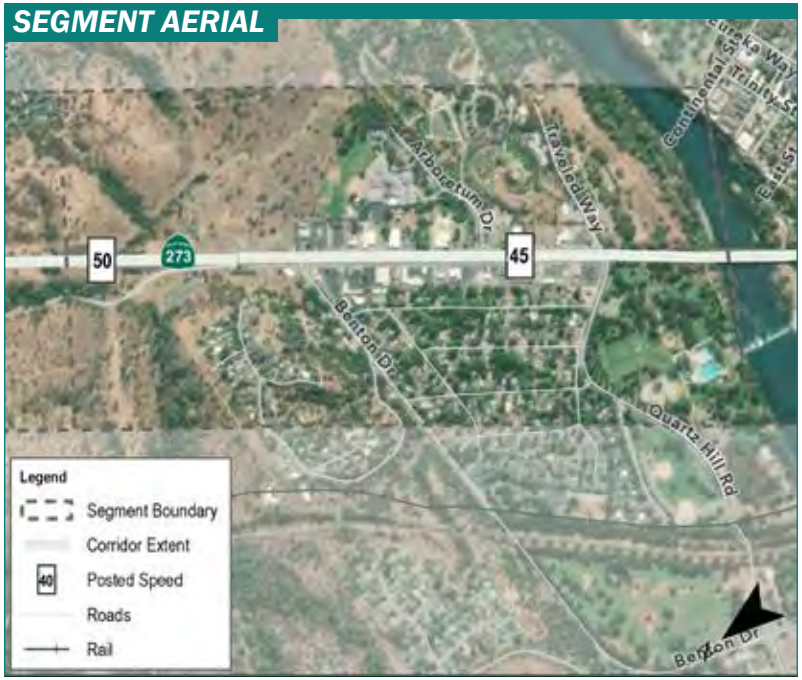
# STATE ROUTE (SR) 273 SEGMENT 2

## *South of Lake Blvd to Sacramento River*

## *EXISTING CONDITIONS SEGMENT OVERVIEW*

### KEY MAP

### SEGMENT AERIAL




- **Adjacent Land Use:**
  Residential, commercial, public/semi-public, park
- **Place Type:**
  Suburban Corridor/Suburban Neighborhood/Transitional Corridor
- **Key Destinations:**
  Commercial on west side of SR 273, Turtle Bay School, Turtle Bay Exploration Park and Botanical Gardens and Nursery on the east side, Caldwell Park and Redding Aquatic Park at the southwest
- **Key Features:**
  The North River Trail provide east-west connectivity under SR 273 between residential, commercial, and the public and semi-public uses on either side of the corridor, as well as to the River Trail that connects to Downtown Redding southwest of the segment area

- **Segment Length:**
  1.0 miles
- **Roadway Classification:**
  Freeway/Expressway; Principal Arterial
- **Jurisdiction of Adjacent Land Use:**
  City of Redding
- **Posted Speed(s):**
  45 to 50 mph
- **Cross-Section:**
  4 to 5-lane divided with landscaped median and left turn pockets at intersections
- **Daily Traffic Volume:**
  ~ 17,800 vehicles per day

### TYPICAL SECTION

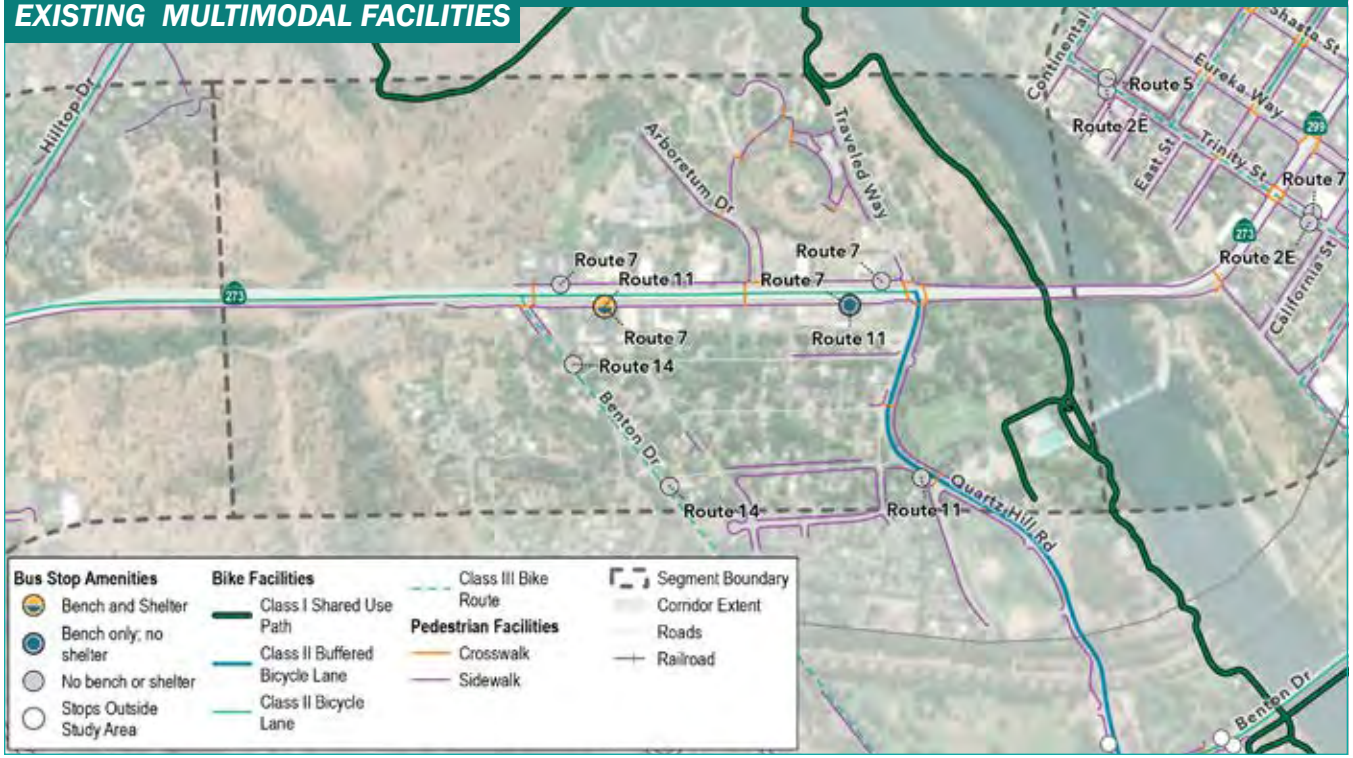
EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 2

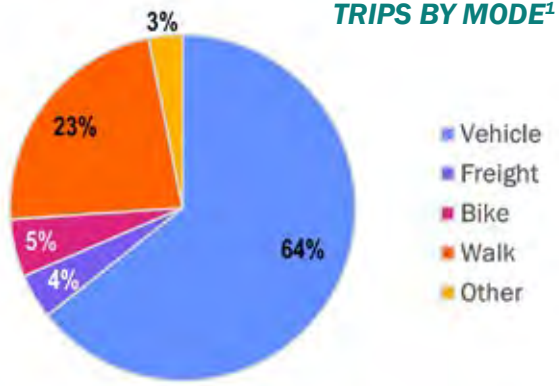
## *South of Lake Blvd to Sacramento River*

## *EXISTING CONDITIONS MOBILITY TRENDS*

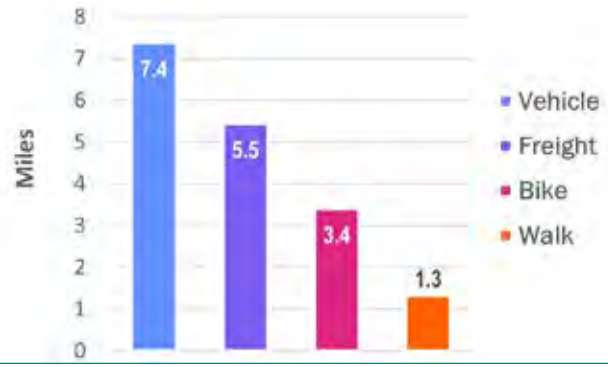
### *EXISTING MULTIMODAL FACILITIES*




### *TRIPS BY MODE[1]*

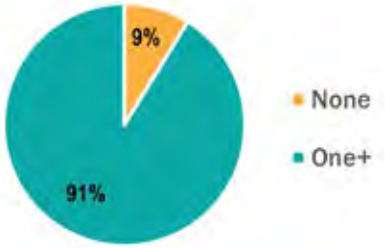



### *AVERAGE TRIP DISTANCE BY MODE[1]*




- The most common trip mode is motor vehicles, with 64 percent of trips made by a private automobile, followed by 23 percent of trips made by walking and 5 percent by bike.
- Most people traveling within the segment have access to a car, with 91% of trips made by individuals living in households with access to at least one vehicle.
- Most vehicle and freight trips are concentrated along SR 273, with a smaller share along Benton Dr.
- Short vehicle trips are concentrated near SR 273's commercial and residential uses, and the alley between Travelled Way and Arboretum Dr.
- Nine percent of trips are made by people without access to a car, and people who do not have access to car are 10 times more likely to bike and 4 times more likely to walk than those who do have access to a car.

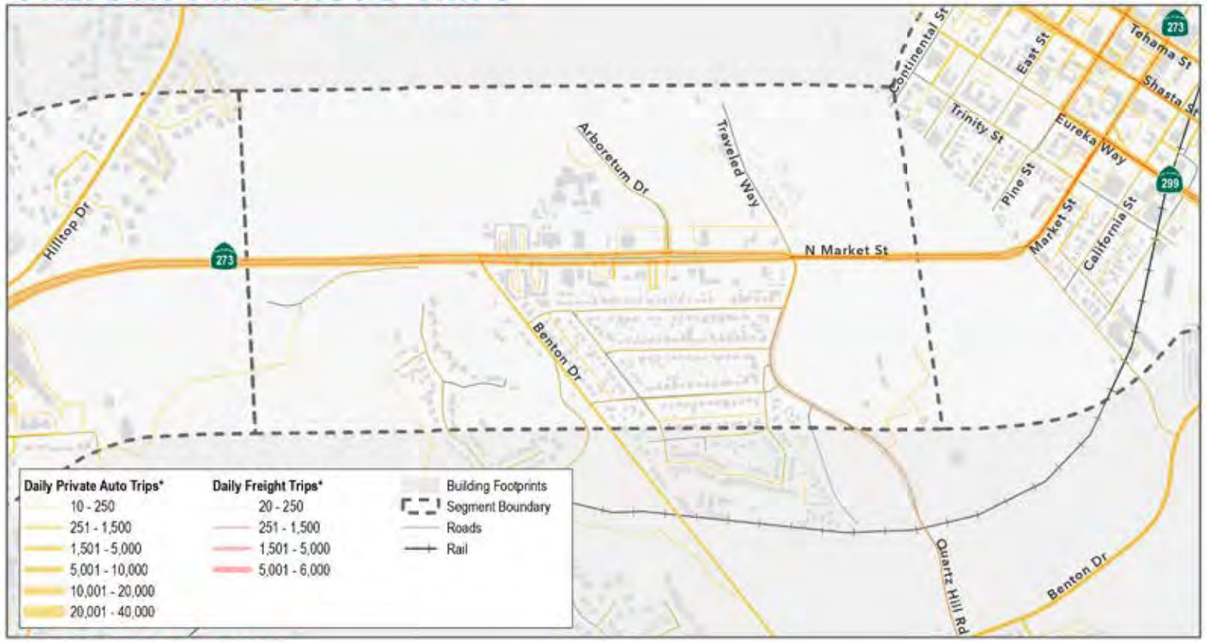
### *PRIVATE AUTO OWNERSHIP*



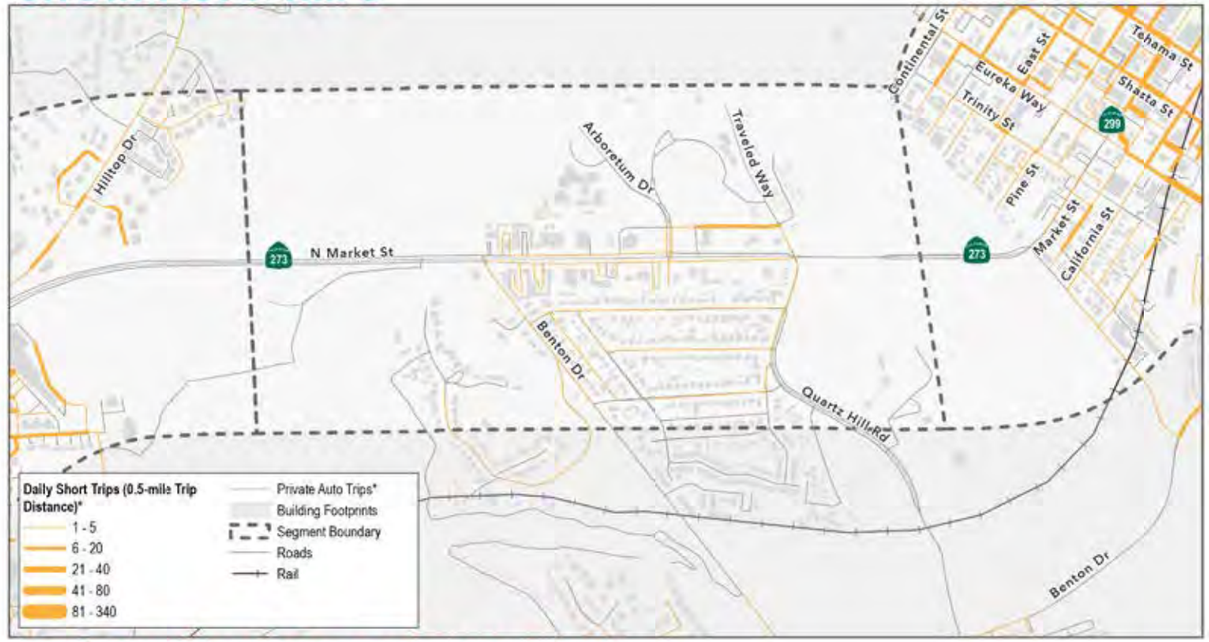

- Bicycle trips traveling along the segment are most concentrated at Benton Dr, Quartz Hill Rd and along Loma St, which is a lower stress roadway parallel to SR 273 on the west side.
- Bike trips made by people without access to a car are less concentrated along the River Trail and Benton Dr south of Loma St.
- Pedestrian trips, and especially walking trips made by those who do not own a car are also concentrated along Loma St, as well as along Sulpher Creek Rd and unmarked footpaths that connect to SR 273 at Sulpher Creek, as well as along SR 273, south of Quartz Hill Rd toward Downtown Redding.
- Transit activity is concentrated near the commercial strip along SR 273, and the stops north of Traveled Way and at Quartz Hill Rd near Caldwell Park.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

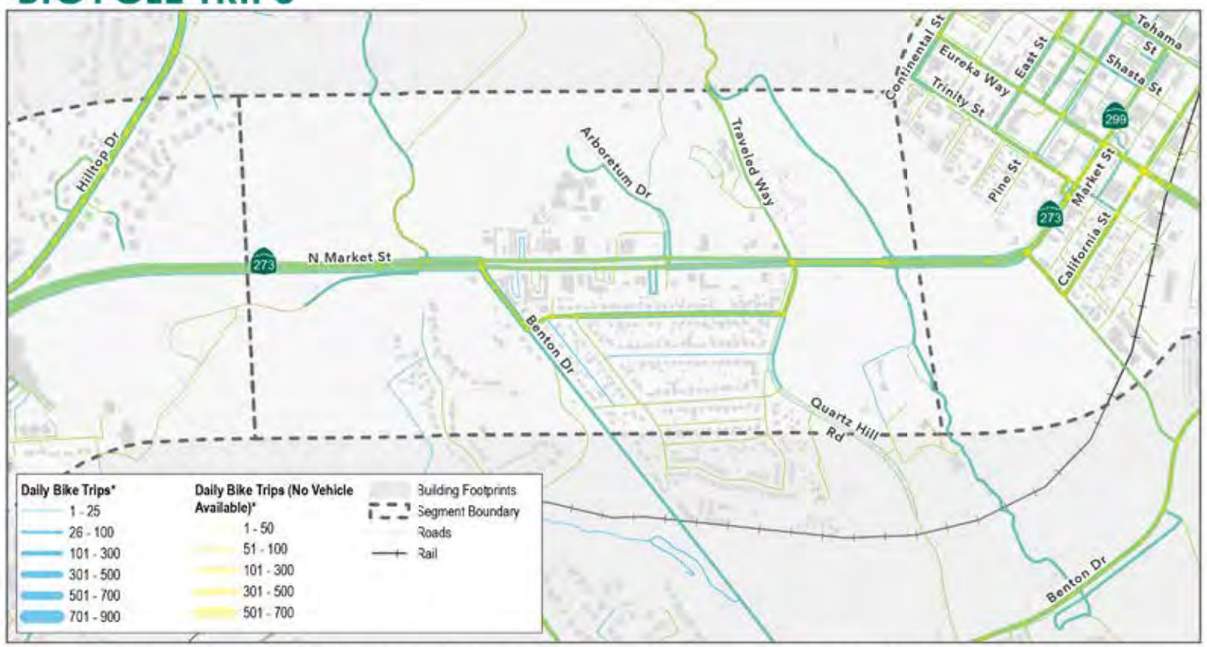
## FREIGHT AND AUTO TRIPS



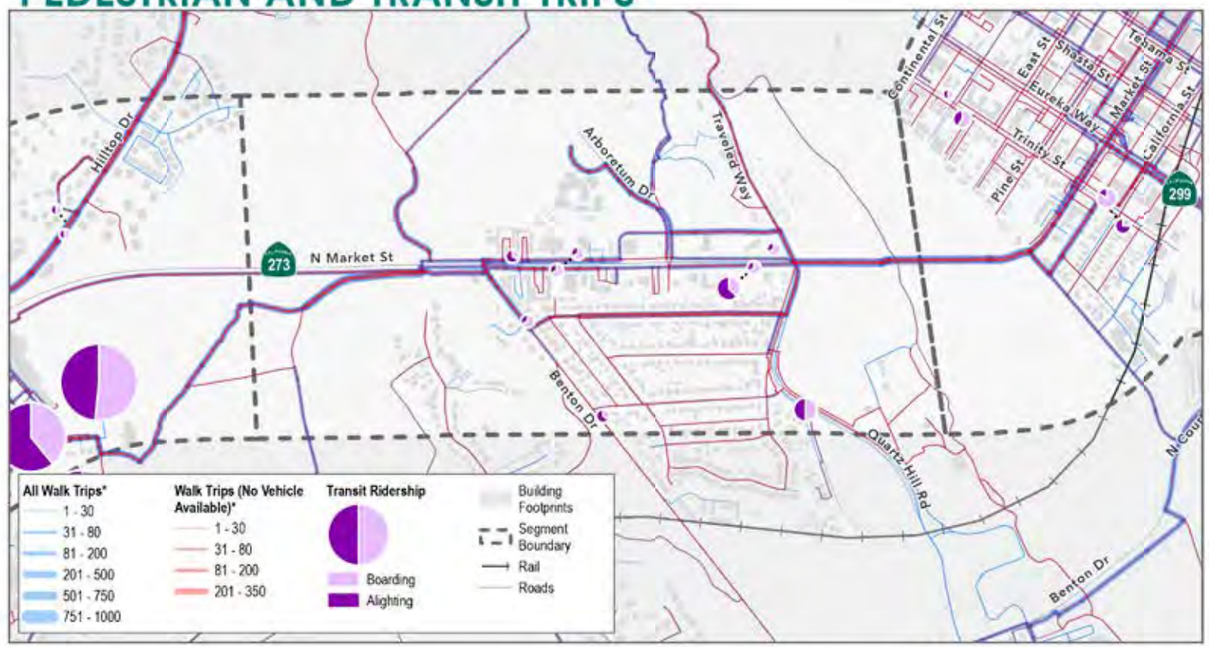

## SHORT AUTO TRIPS




## BICYCLE TRIPS




## PEDESTRIAN AND TRANSIT TRIPS




Data source: Human Geography Base: Esri Community Maps Contributors, City of Redding GIS, California State Parks, Esri, HERE, Garmin, SafeGraph GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Trip data: Replica Typical Weekday in Fall 2022, Building Footprints: City of Redding, Shasta County, 2023, Transit Ridership: RABA, City of Redding, GHD, 2023, Roads: Shasta County, 2023, Rail: CA Data Hub, 2023

Created by: jcreel

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Print date: 04 Oct 2023 - 20:04

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

N

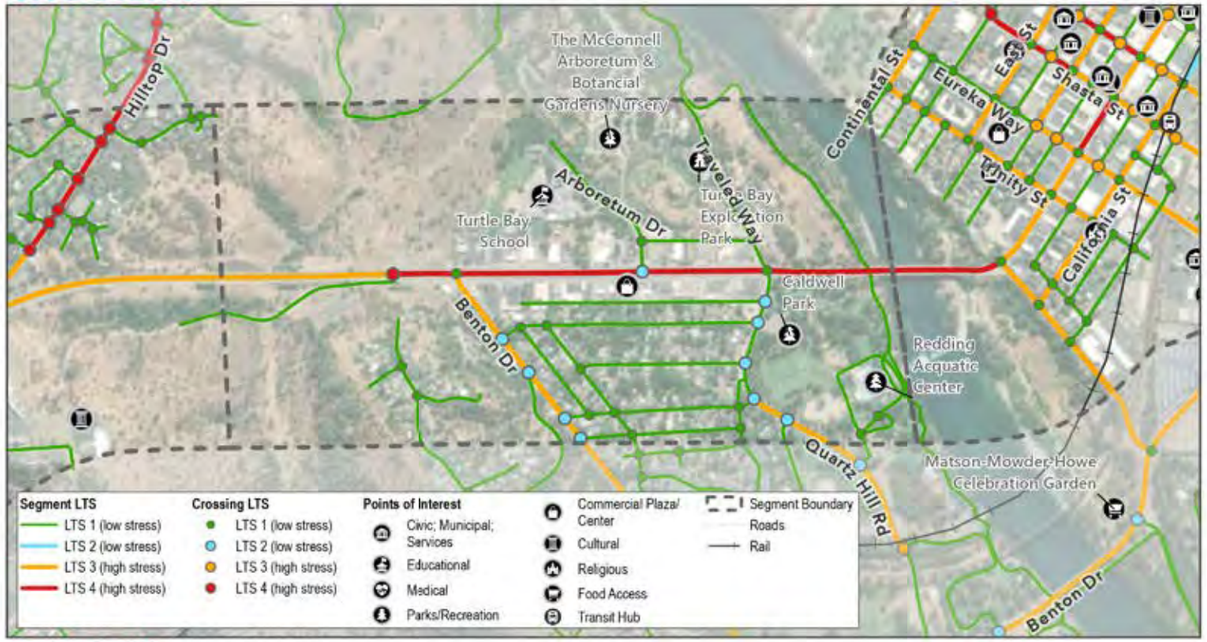
0 500 1,000 1,500
US Feet

# STATE ROUTE (SR) 273 SEGMENT 2

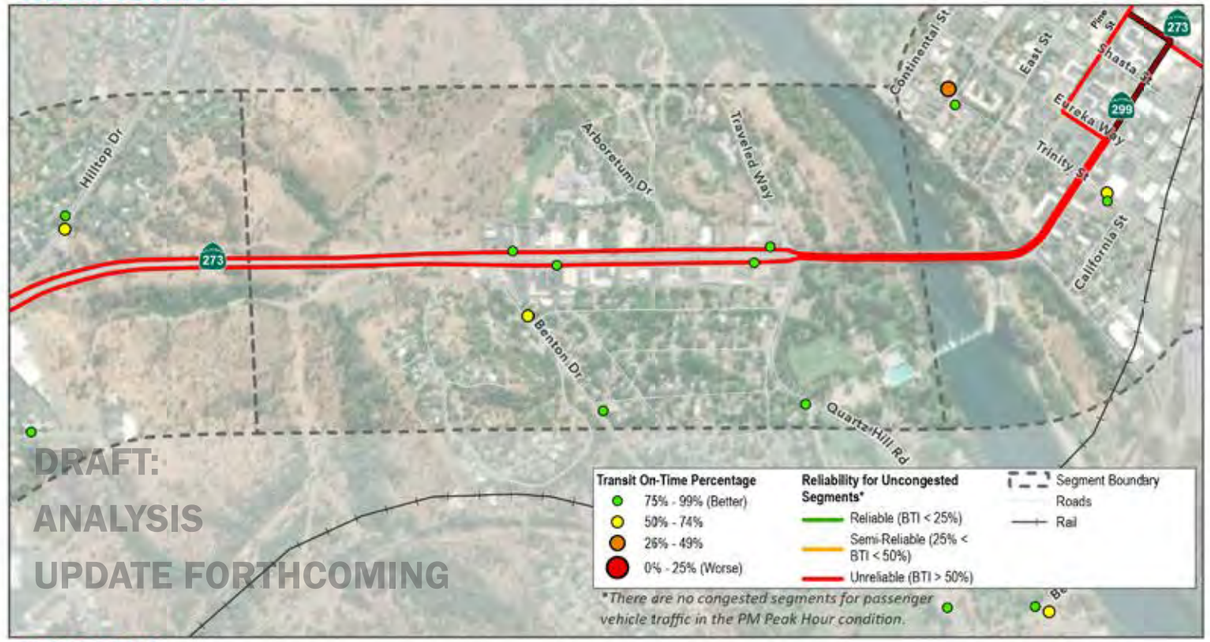
***South of Lake Blvd to Sacramento River***

***EXISTING CONDITIONS PERFORMANCE RESULTS***

## MOBILITY

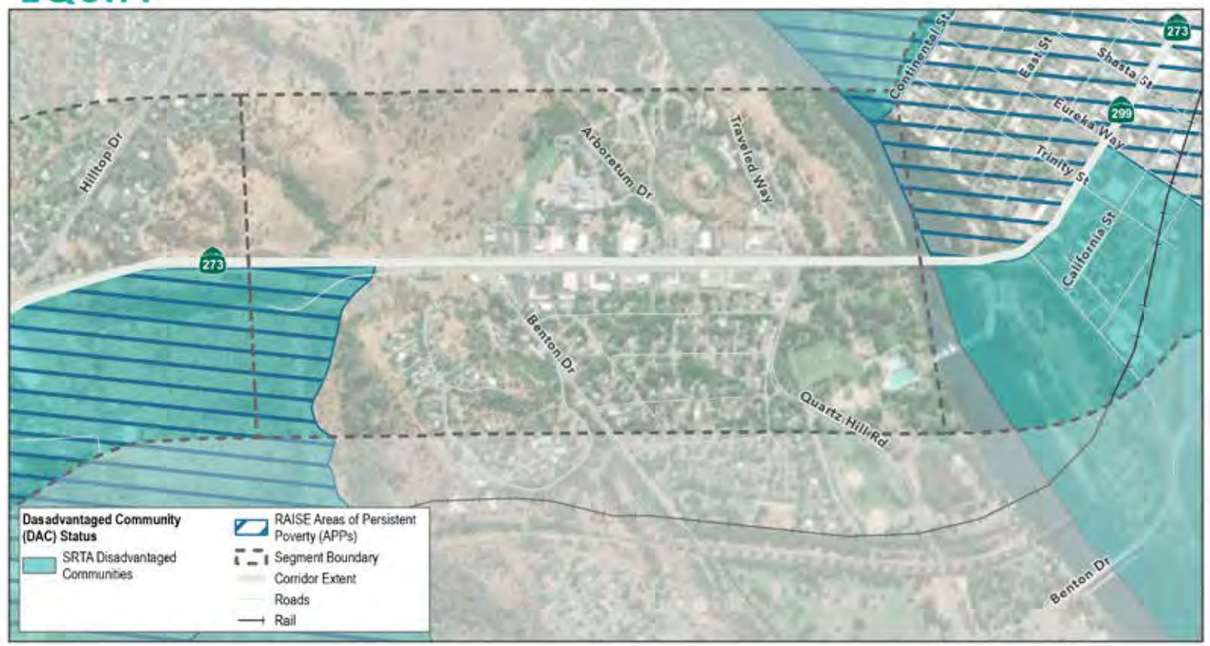



## RELIABILITY




## SAFETY

## EQUITY




Data source: Aerial Imagery (Firefly) Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2018-2022; DAC: SRTARTP-SCS, 2018; POI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2019

Created by: jgeil

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Print date: 04 Oct 2023 - 20:45

0 500 1,000 1,500

US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 2

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Fair | 0 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Typically no bench/shelter | 2 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | Yes, sidewalk at SR 273 stops | 2 |
| **Sidewalk Coverage** | Minimal; Connectivity near developed area | 3 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 0 (0%) | |
| Education Destinations | 1 (18%) | |
| Community Services and Shopping Destinations | 3 (3%) | |
| Health Care Destinations | 0 (0%) | |
| Food Access | 0 (0%) | |
| Transit Service Destinations (includes Bike Share locations) | 10 (0%) | |
| Civic Service Destinations | 0 (0%) | |
| Parks/Open Space & Recreation Destinations | 4 (34%) | |
| **Overall Mobility Score** | **Poor** | **3** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 33 | - |
| Total Fatal Crashes | 1 | 4 |
| Total Severe Crashes | 1 | |
| **Total Crashes Involving a Pedestrian** | 2 | 4 |
| Total Pedestrian Fatalities | - | 0 |
| **Total Crashes Involving a Bicyclist** | 1 | |
| Total Bicyclists Fatalities | - | 0 |
| % Occurred at Night (Non-Daylight Crashes) | 21% | - |
| **Primary Crash Types** | Rear End | - |
| **Primary Crash Cause** | Unsafe Speed | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **1.02** | 4 |
| Statewide Crash Rate | 0.94 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | 3 |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | Partially | 3 |
| RAISE Areas of Persistent Poverty Criteria | Partially | 3 |
| Climate & Economic Justice Criteria | Partially | 3 |
| SB 535 CalEPA Criteria | No | 1 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **3** |
| **SAFETY** | Poor | **4** |
| **RELIABILITY** | Poor | **3** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **3** |

## SEGMENT ISSUES

- High speeds along SR 273 results in a high stress barrier to connectivity between destinations to the east and west of the corridor.
- The intersection of Benton Dr and SR 273 is a collision hotspot where fatal and sever injury collisions have occurred. Additionally, the crash rate along the segment exceeds the statewide average, making safety a concern.
- Transit service is mostly reliable with many of the routes serving stops in the segment arriving on-time between 75 and 99 percent of the time. Updated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is a concern with block groups throughout the segment study area meeting the DAC criteria for three of the four measures of disadvantage.

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# STATE ROUTE (SR) 273 SEGMENT 3

## *Sacramento River to south of Cypress Ave*

## *EXISTING CONDITIONS SEGMENT OVERVIEW*

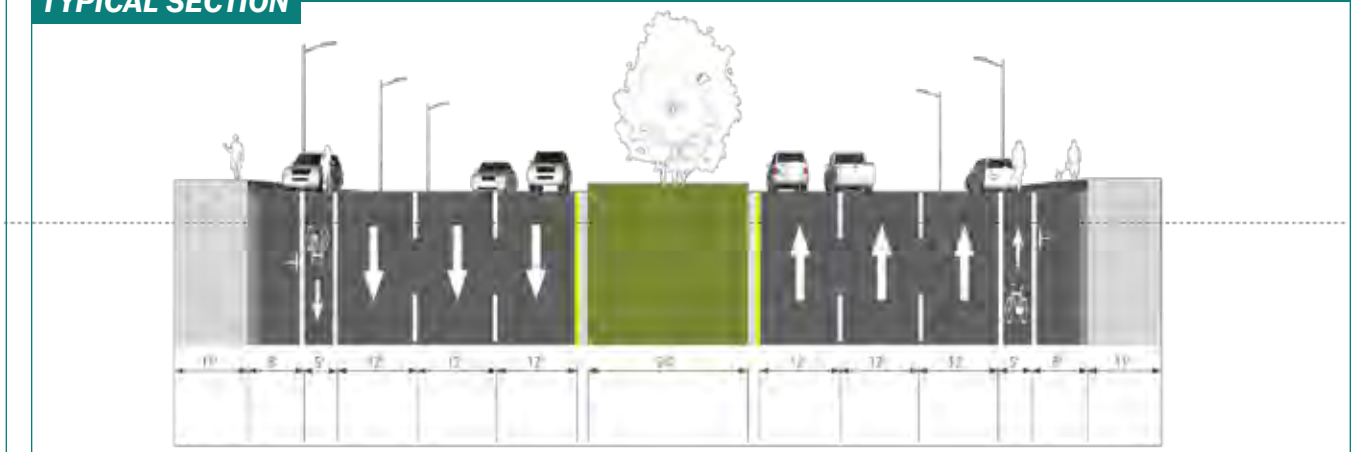
### KEY MAP

### SEGMENT AERIAL

- **Adjacent Land Use:**
  Mixed use, commercial, public/semi-public, park, single family residential
- **Place Type:**
  Urban Center/Suburban Community/ Suburban Corridor
- **Key Destinations:**
  Downtown Transit Center, variety of commercial destinations, aide/services offices, community organizations, and hospitals/clinics, Safeway, Redding Library and South City Park at the south end of the segment
- **Key Features:**
  Main urban center for the area, River Trail South connects to across the River to North Redding, streets near Market Center provide bike- and pedestrian-friendly thoroughfares.

- **Segment Length:**
  1.4 miles (2.5 total centerline, including couplets on California and Pine Streets)
- **Roadway Classification:**
  Principal Arterial
- **Jurisdiction of Adjacent Land Use:**
  City of Redding
- **Posted Speed(s):**
  25 to 35 mph
- **Cross-Section:**
  2-3 lane undivided with left turn lanes at some intersections
- **Daily Traffic Volume:**
  ~ 16,200 vehicles per day

### TYPICAL SECTION



EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 3

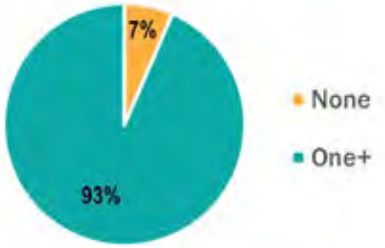
## *Sacramento River to south of Cypress Ave*

## *EXISTING CONDITIONS MOBILITY TRENDS*

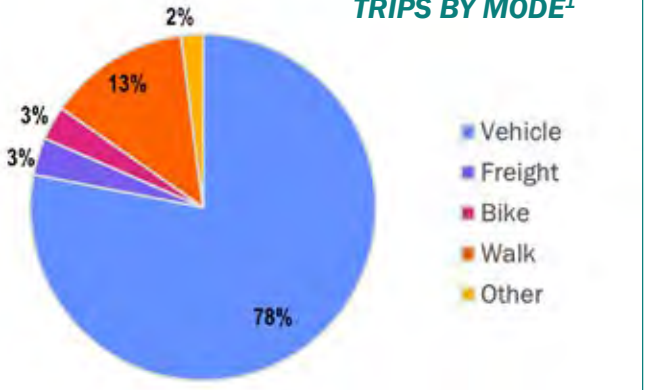
### *EXISTING MULTIMODAL FACILITIES*

- The most common trip mode is private vehicles, with 78 percent of trips made by a private automobile, followed by 13 percent by walking.
- Among all modes, private vehicles have the highest average trip distance at 8.7 miles, followed by freight vehicles at 5.3 miles and bike trips at 4 miles.
- Most people traveling within the segment have access to a car, with 93 percent of trips made by individuals living in households with access to at least one vehicle. Seven percent of trips are made by people without access to a car, and people who do not have access to car are 48 times more likely to bike and 4 times more likely to walk than those who do have access to a car.
- Short vehicle trips are concentrated throughout the downtown core and on the northwest side of the segment area.

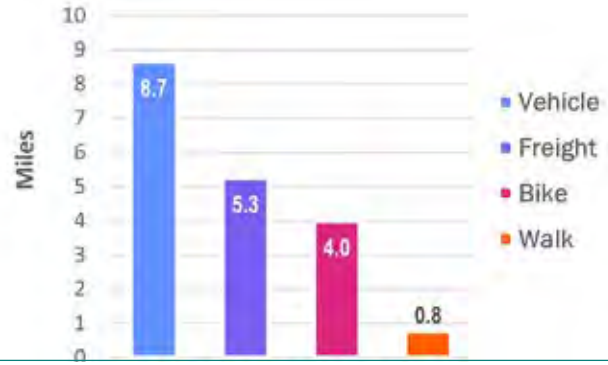
### *PRIVATE AUTO OWNERSHIP*




### *TRIPS BY MODE[1]*



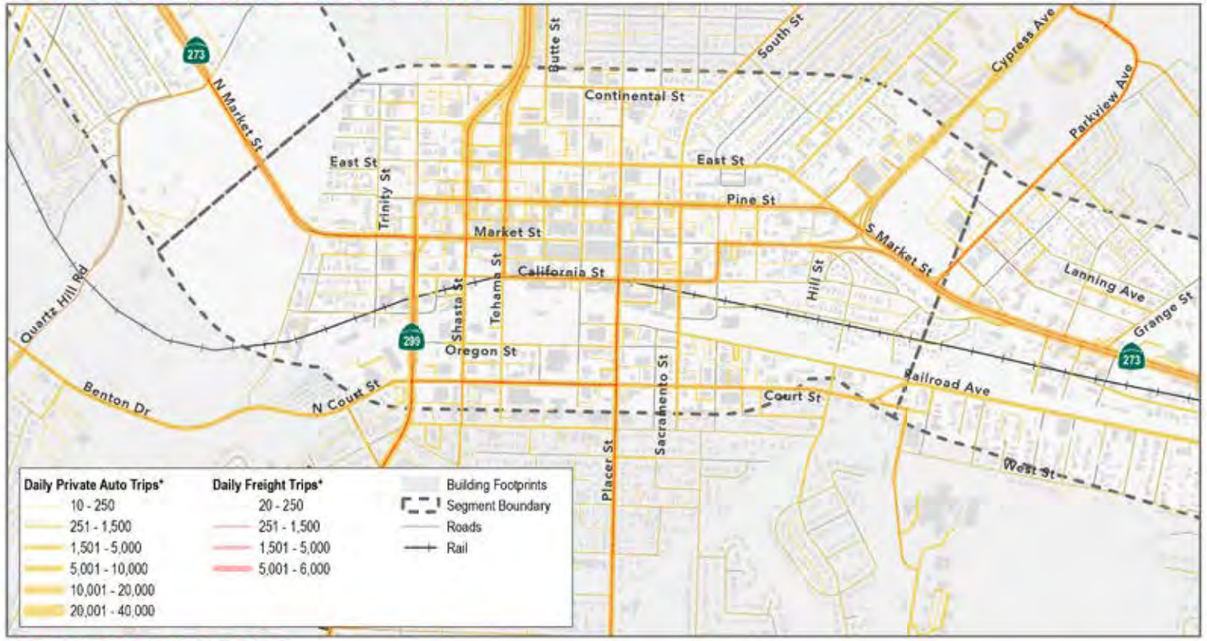

### *AVERAGE TRIP DISTANCE BY MODE[1]*




- Both vehicle and freight trips are concentrated along N and S Market Streets, Pine St, Placer St, and Eureka Way (SR 299), while East Street and Cypress Ave feature a concentration of vehicle trips with less concentration of freight trips.
- Bicycle trips traveling within the segment are concentrated similarly to vehicle trips with the exception of Shasta and Tehama Streets, where bike activity runs along Butte, Continental and Trinity Streets instead. Bike activity is also seen along the streets within the Garden Tract neighborhood, and West and Oregon Streets, where vehicle activity is less concentrated
- Pedestrian activity is seen throughout the segment area, but it is most pronounced along N Market Street, Eureka Way and Cypress Ave. Walking trips made by those without access to a vehicle are concentrated similarly, as well as along various alleys and side streets.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

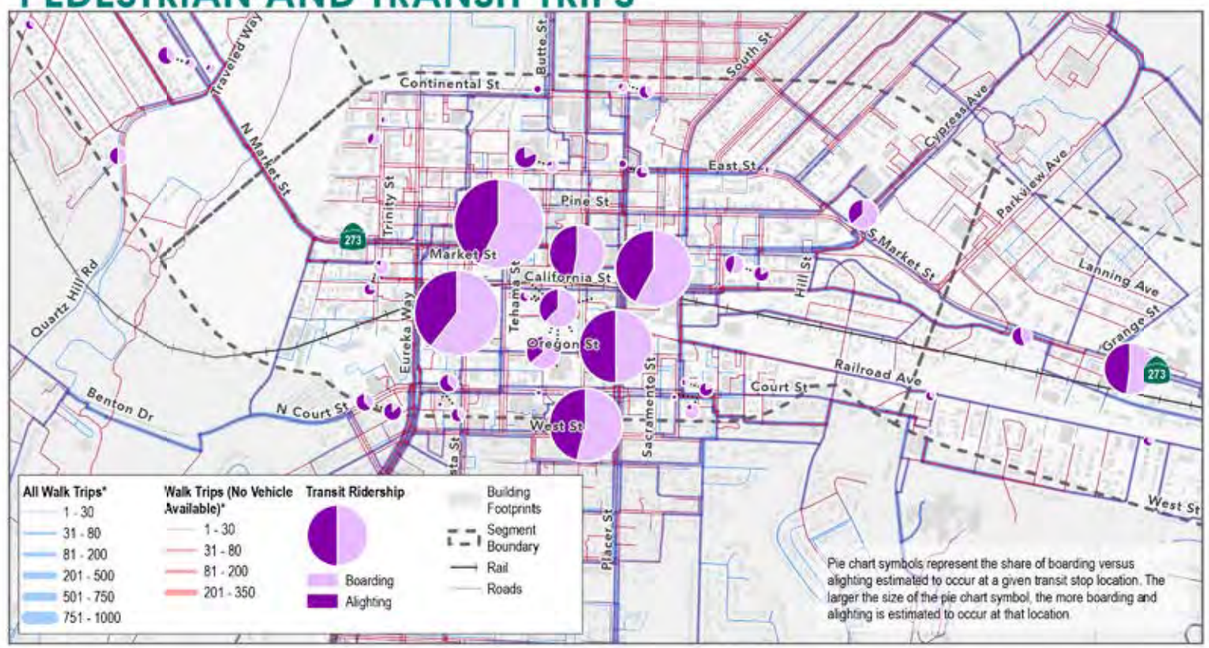
## FREIGHT AND AUTO TRIPS




## SHORT AUTO TRIPS

## BICYCLE TRIPS

## PEDESTRIAN AND TRANSIT TRIPS




*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

N

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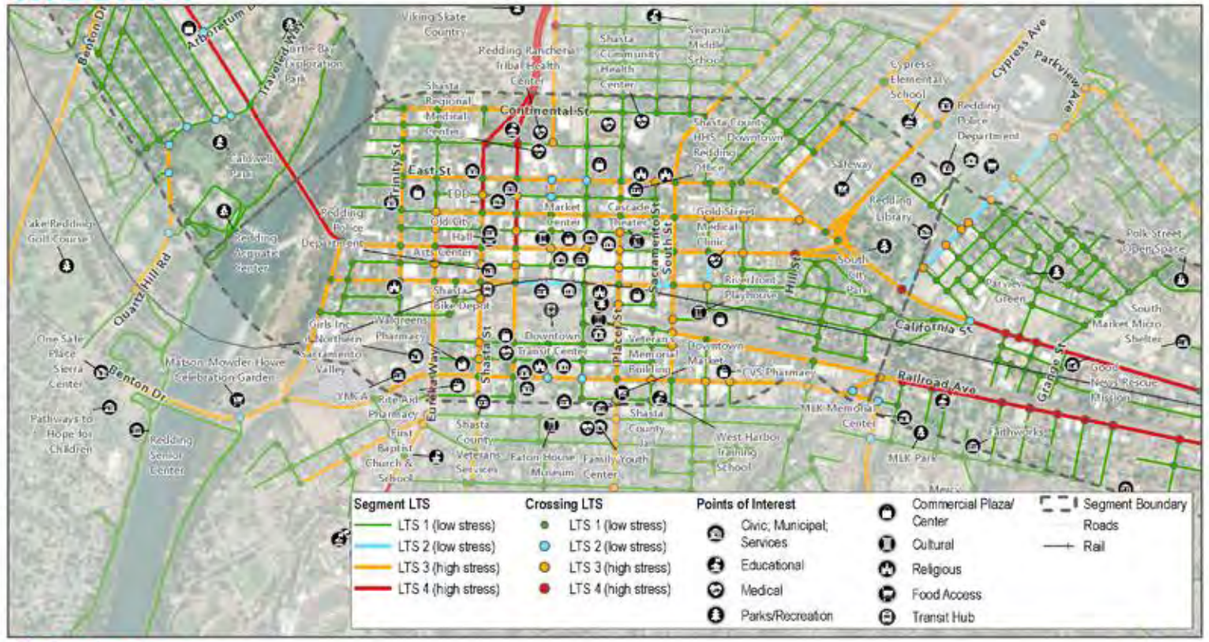
US Feet

# STATE ROUTE (SR) 273 SEGMENT 3

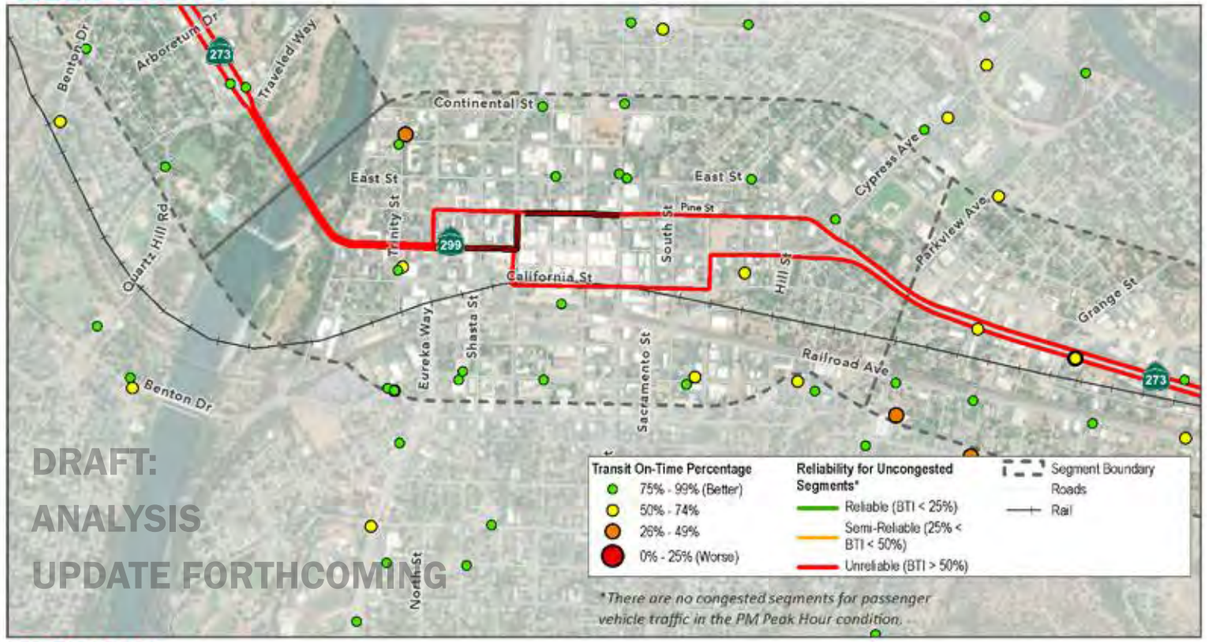
***Sacramento River to south of Cypress Ave***

***EXISTING CONDITIONS PERFORMANCE RESULTS***

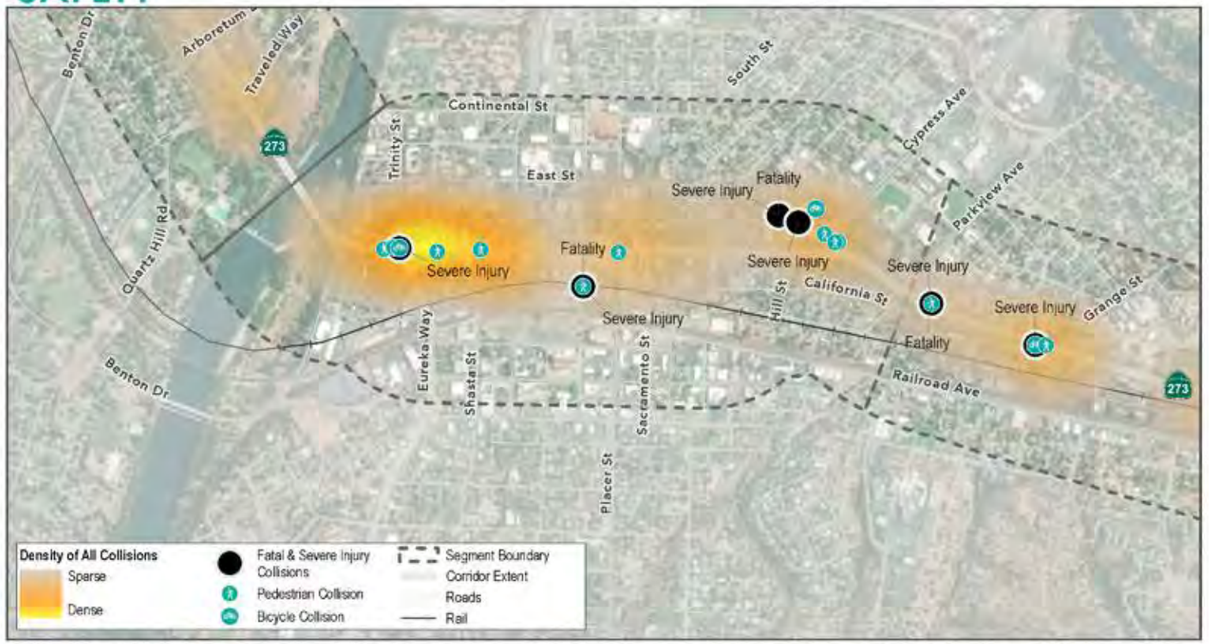
## MOBILITY




## RELIABILITY




## SAFETY




## EQUITY

Data source: World Imagery (Esri); Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITR, 2018-2022; DAC: SRTA/RTP-SCS, 2018; POI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2023
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Print date: 09 Oct 2023 - 12:01

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0 500 1,000 1,500
US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 3

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Fair | 0 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Typically no bench/shelter | 2 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | Yes, sidewalk at SR 273 stops | 2 |
| **Sidewalk Coverage** | High | 1 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 8 (8%) | |
| Education Destinations | 9 (14%) | |
| Community Services and Shopping Destinations | 71 (13%) | |
| Health Care Destinations | 27 (12%) | |
| Food Access | 4 (0%) | |
| Transit Service Destinations (includes Bike Share locations) | 93 (13%) | |
| Civic Service Destinations | 16 (15%) | |
| Parks/Open Space & Recreation Destinations | 4 (3%) | |
| **Overall Mobility Score** | **Poor** | **3** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 100 | - |
| Total Fatal Crashes | 2 | 4 |
| Total Severe Crashes | 2 | 4 |
| **Total Crashes Involving a Pedestrian** | 8 | 4 |
| Total Pedestrian Fatalities | 1 | 4 |
| **Total Crashes Involving a Bicyclist** | 3 | 4 |
| Total Bicyclists Fatalities | - | 0 |
| % Occurred at Night (Non-Daylight Crashes) | 30% | - |
| **Primary Crash Types** | Broadside & Rear End | - |
| **Primary Crash Cause** | Unsafe Speed & Vehicle Driver Error | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **1.35** | 3 |
| Statewide Crash Rate | 1.61 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | 3 |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | Majority | 4 |
| RAISE Areas of Persistent Poverty Criteria | Majority | 4 |
| Climate & Economic Justice Criteria | Majority | 4 |
| SB 535 CalEPA Criteria | No | 1 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **3** |
| **SAFETY** | Poor | **3** |
| **RELIABILITY** | Poor | **4** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **3** |

## SEGMENT ISSUES

- Lower speed local streets and alleys provide some low stress connectivity within the segment, however, higher stress streets and crossings associated with arterial roadways result in a high-stress barrier to connectivity between many major destinations.
- Collision hotspots are seen along SR 273 between Trinity and Shasta Streets, as well as Placer Street and Cypress Ave. Ten percent of collisions involved a bicyclist or pedestrian and the crash rate within the segment significantly exceeds the statewide average, making safety a concern.
- Transit service is mostly reliable with many of the routes serving stops in the segment arriving on-time between 75 and 99 percent of the time. Updated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is a concern throughout the segment area with block groups meeting the DAC criteria for three of the four measures of disadvantage.

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# STATE ROUTE (SR) 273 SEGMENT 4

## *South of Cypress Ave to north of Buenaventura Blvd*

## *EXISTING CONDITIONS SEGMENT OVERVIEW*

### *KEY MAP*

### *SEGMENT AERIAL*

- **Adjacent Land Use:**
  Commercial with close access to residential and railroad
- **Place Type:**
  Suburban Neighborhood/Transitional Corridor
- **Key Destinations:**
  Several community and faith-based aid organizations, MLK Memorial Center and Park, Parkview Green, Polk Street Open Space, Juniper Academy High School,
- **Key Features:**
  Close proximity to Downtown Redding urban core and Redding Library just outside of segment area to the north, fairly comprehensive sidewalk network, Pilot Class IV separated bikeway project south of Wyndham Ln, several parks, Mercy Medical Center to the west of the segment area

- **Segment Length:**
  1.0 miles
- **Roadway Classification:**
  Principal Arterial; Freeway/Expressway (South of Wyndham Ln)
- **Jurisdiction of Adjacent Land Use:**
  City of Redding
- **Posted Speed(s):**
  40 to 45 mph
- **Cross-Section:**
  4 to 5 lane undivided with center turn lane with landscaped median and left turn pockets at some intersections
- **Daily Traffic Volume:**
  ~ 14,100 vehicles per day

### *TYPICAL SECTION*

EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 4

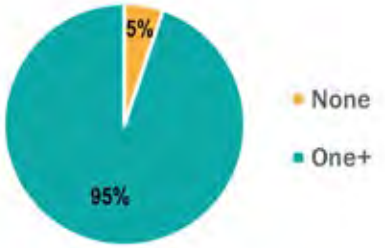
## *South of Cypress Ave to north of Buenaventura Blvd*

## *EXISTING CONDITIONS MOBILITY TRENDS*

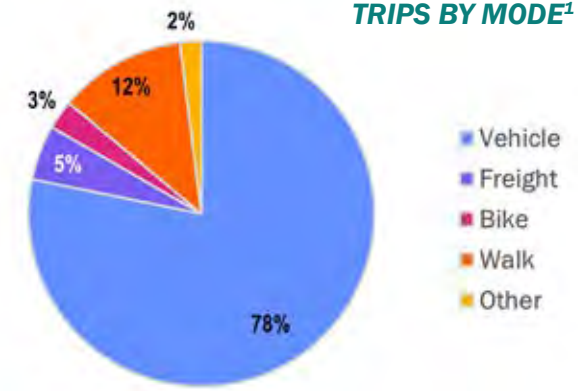
### *EXISTING MULTIMODAL FACILITIES*

- The most common trip mode is private vehicles, with 78 percent of trips made by a private automobile, followed by 12 percent of trips made by walking.
- Among all modes, freight vehicles have the highest average trip distance, followed by private vehicles.
- Most people traveling within the segment have access to a car, with 95 percent of trips made by individuals living in households with access to at least one vehicle.
- Five percent of trips are made by people without access to a car, and people who do not have access to car are 36 times more likely to bike and 4 times more likely to walk than those who do have access to a car.
- Most private auto trips are concentrated along SR 273. While freight trips are also seen along SR 273, Parkview Ave shows a slightly higher concentration.

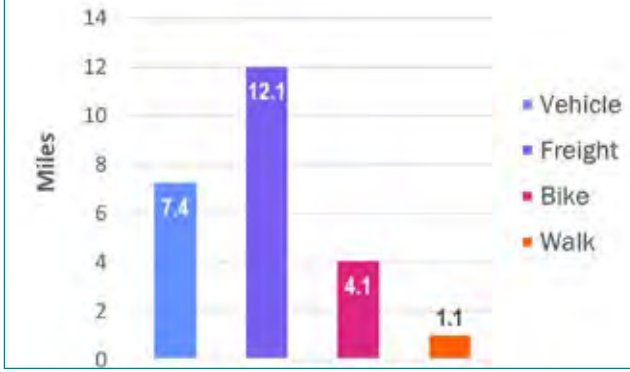
### *PRIVATE AUTO OWNERSHIP*




### *TRIPS BY MODE[1]*




### *AVERAGE TRIP DISTANCE BY MODE[1]*

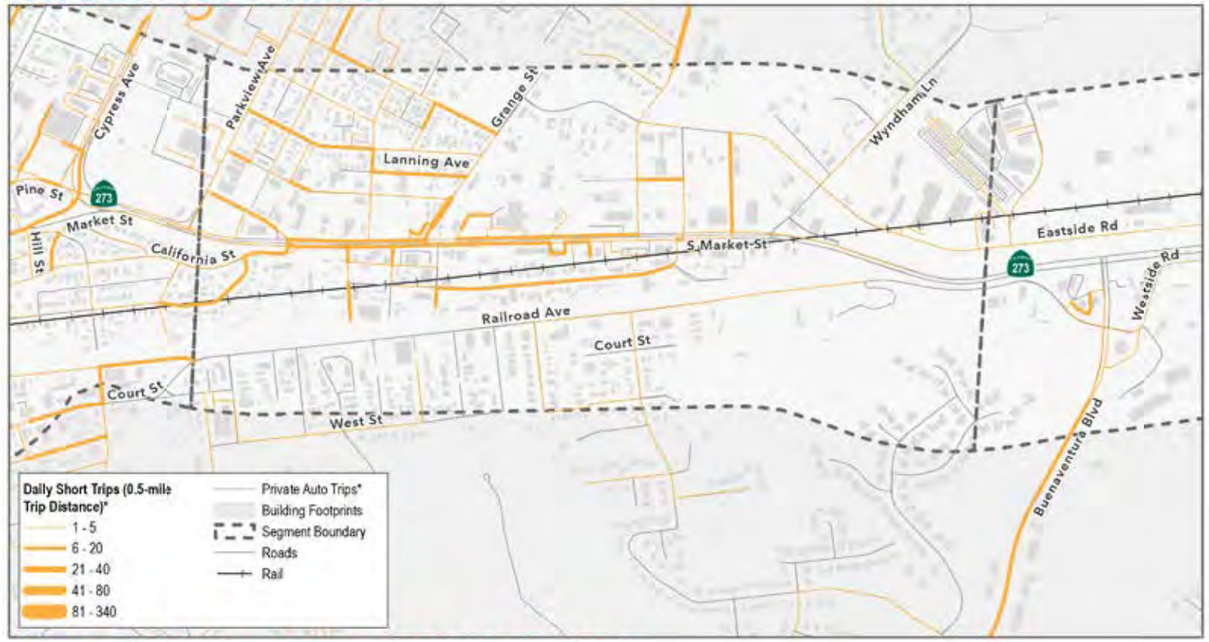



- Bicycle trips traveling within the segment are most concentrated along Railroad Ave and Eastside Rd
- Pedestrian trips, and particular those made by people without access to a car are concentrated along California St, SR 273, and Ellis Street near Juniper High School.
- Transit activity highest concentrated at the S market and Grange St stop, as well as near near the high school.
- Short vehicle trips are concentrated along Sr 273 between California and Ellis Street, near local commercial destinations, as well as along Veda Street, which is parallel to SR 273 to the west, and along Lanning and Leland Avenues near the Redding Library and City Hall.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

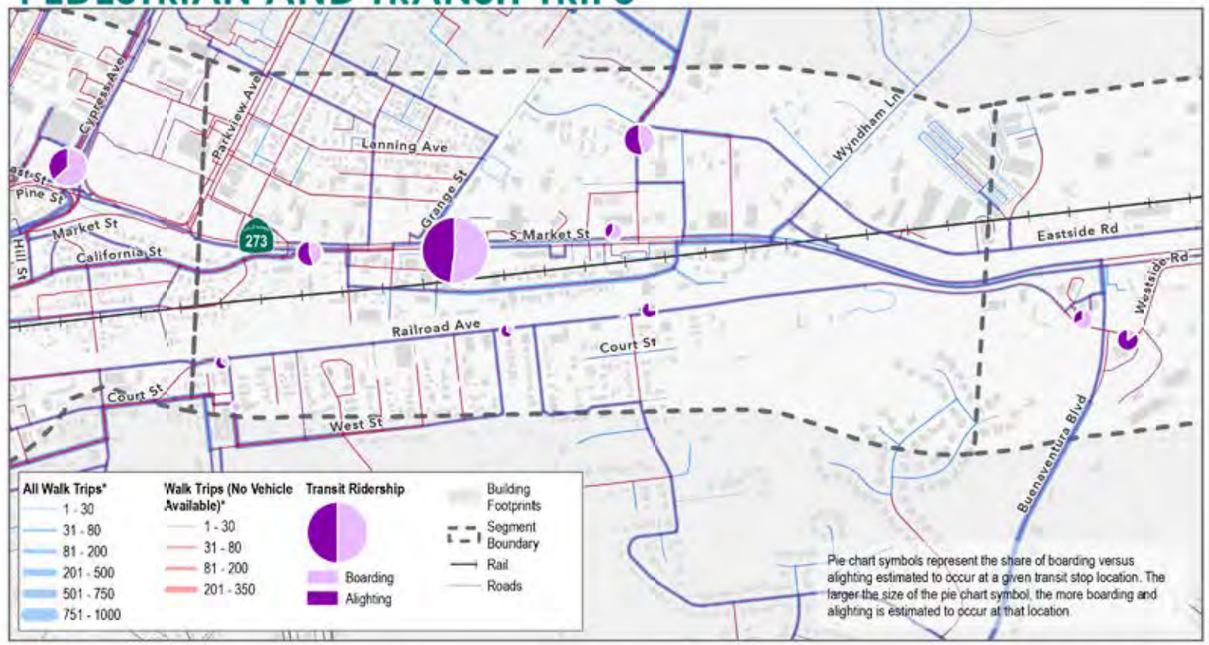
## FREIGHT AND AUTO TRIPS

## SHORT AUTO TRIPS




## BICYCLE TRIPS

## PEDESTRIAN AND TRANSIT TRIPS




Data source: Human Geography Base: Esri Community Maps Contributors, City of Redding GIS, California State Parks, Esri, HERE, Garmin, SafeGraph GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Trip data: Replica Typical Weekday in Fall 2022 Building Footprints: City of Redding, Shasta County, 2023; Transit Ridership: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Rail: CA State Hwy, 2023
Created by: cowell
C:\Users\cowell\Temp\ProjectFiles\Temp_RTA_SR273GIS\Maps\Naming\Existing_Segment_ProfileMaps_Working_20230927\Existing_Segment_ProfileMaps_Working.aprx - SEG4_03_Segment 4_11x17 (Page 3)
Print date: 04 Oct 2023 - 20:38

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

N

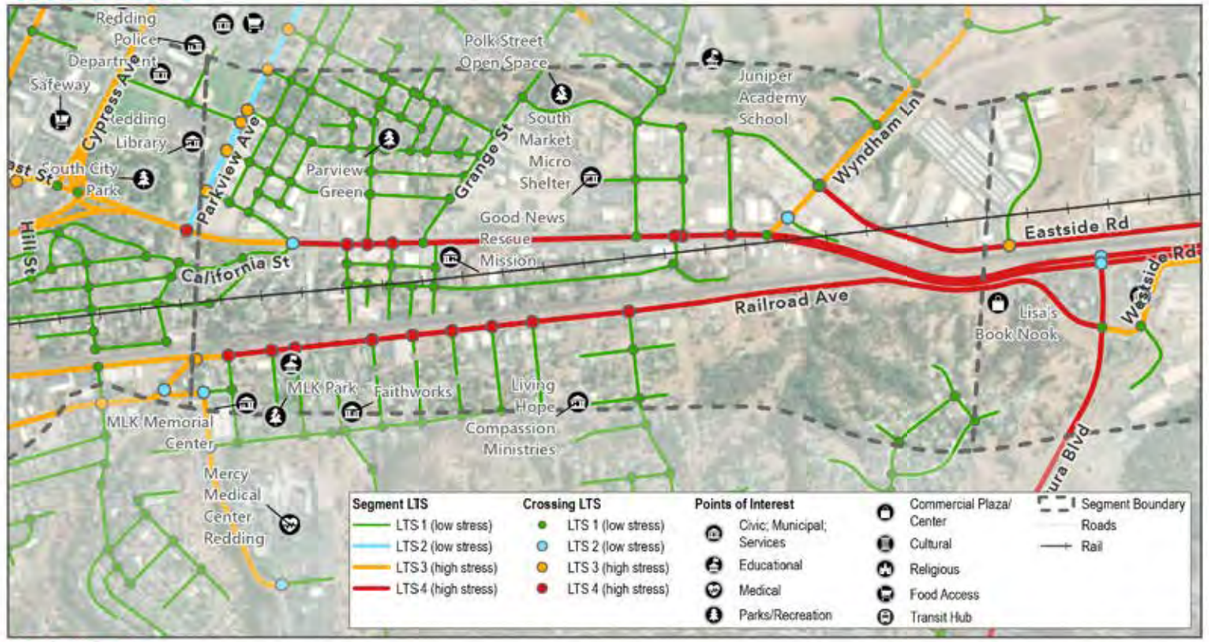
0 500 1,000 1,500
US Feet

# STATE ROUTE (SR) 273 SEGMENT 4

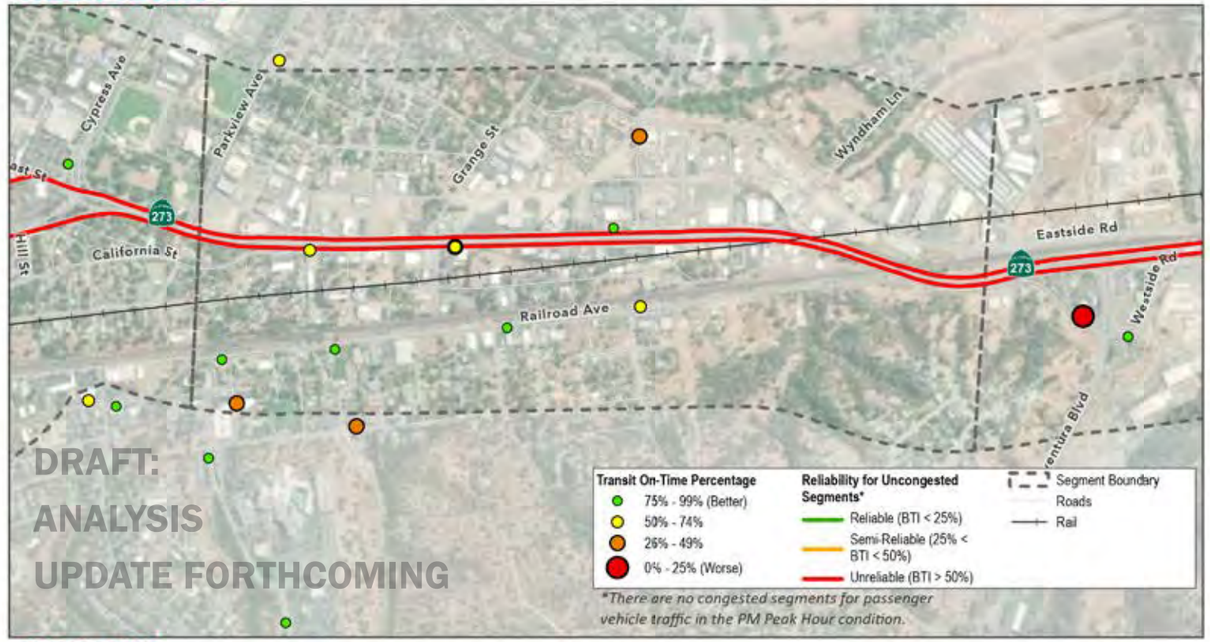
***South of Cypress Ave to north of Buenaventura Blvd***

***EXISTING CONDITIONS PERFORMANCE RESULTS***

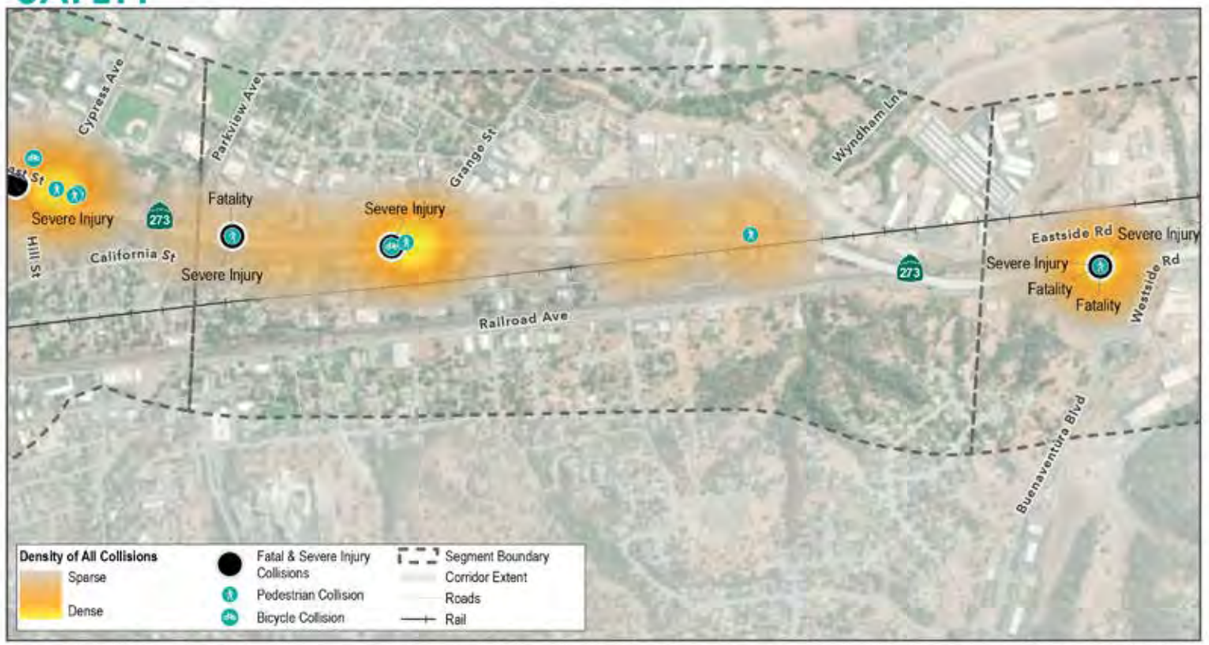
## MOBILITY



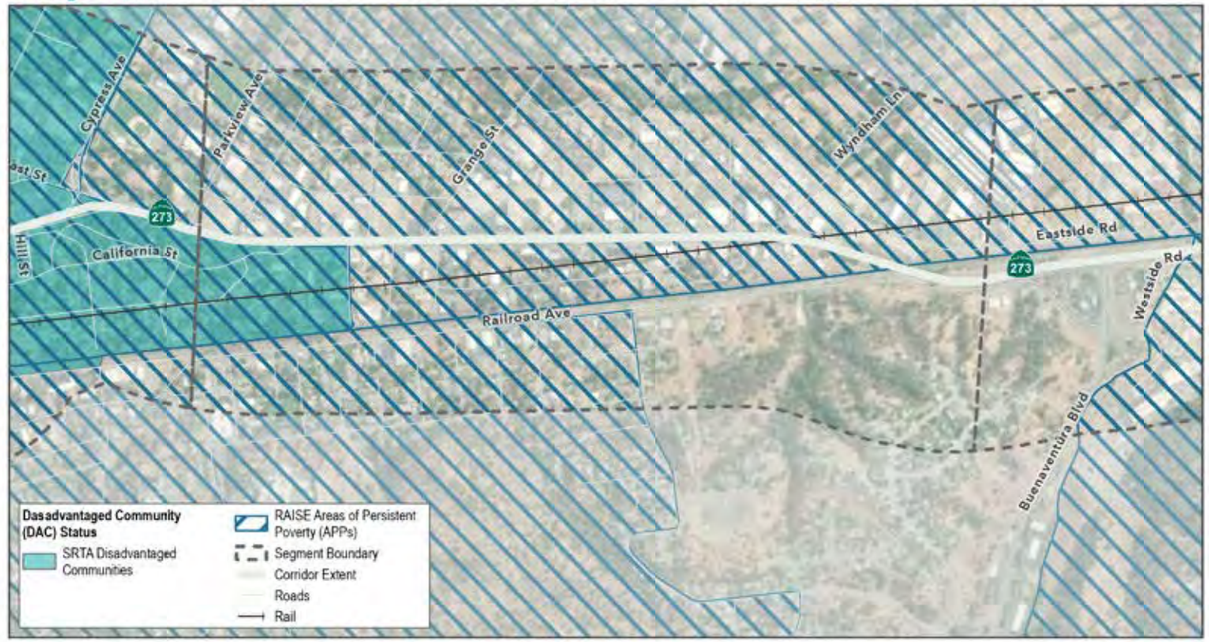

## RELIABILITY




## SAFETY




## EQUITY




Data source: Vexcel Imagery (Firefly); Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2016-2022; DAC: SRTA/FTA-5303, 2016; POI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2023

Created by: sjeel

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Print date: 04 Oct 2023 - 20:47

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0 500 1,000 1,500

US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 4

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Fair | 0 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Some with bench | 2 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | Some sidewalk at SR 273 stops | 2 |
| **Sidewalk Coverage** | Partially connected | 3 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 1 (0%) | |
| Education Destinations | 2 (14%) | |
| Community Services and Shopping Destinations | 6 (5%) | |
| Health Care Destinations | 4 (4%) | |
| Food Access | 1 (0%) | |
| Transit Service Destinations (includes Bike Share locations) | 20 (3%) | |
| Civic Service Destinations | 2 (5%) | |
| Parks/Open Space & Recreation Destinations | 3 (28%) | |
| **Overall Mobility Score** | **Poor** | **3** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 30 | - |
| Total Fatal Crashes | 1 | 4 |
| Total Severe Crashes | 1 | 4 |
| **Total Crashes Involving a Pedestrian** | 3 | 4 |
| Total Pedestrian Fatalities | 1 | 4 |
| **Total Crashes Involving a Bicyclist** | 1 | 4 |
| Total Bicyclists Fatalities | - | 0 |
| % Occurred at Night (Non-Daylight Crashes) | 33% | - |
| **Primary Crash Types** | Broadside | - |
| **Primary Crash Cause** | Vehicle Driver Error & Unsafe Speed | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **0.97** | 4 |
| Statewide Crash Rate | 0.94 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | **3** |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | Partially | 3 |
| RAISE Areas of Persistent Poverty Criteria | Majority | 4 |
| Climate & Economic Justice Criteria | Partially | 3 |
| SB 535 CalEPA Criteria | No | 1 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **3** |
| **SAFETY** | Poor | **3** |
| **RELIABILITY** | Poor | **4** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **3** |

## SEGMENT ISSUES

- High speeds and traffic volumes along SR 273 results in a high stress barrier to connectivity between destinations to the east and west, where pockets of low-stress connectivity exist.
- SR 273 between Parkview Ave and Grange St, as well as between Ellis St and Wyndham Ln are collision hotspots. With seven percent of collisions occurring along the corridor study segment resulting in a fatal or severe injury, and the crash rate slightly above the statewide average, safety is a concern.
- Transit service is somewhat unreliable with most routes serving stops in the segment arriving on-time between 50 and 74 percent of the time. Updated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is a concern with most block groups throughout the study segment area meeting the DAC criteria for three of the four measures of disadvantage.

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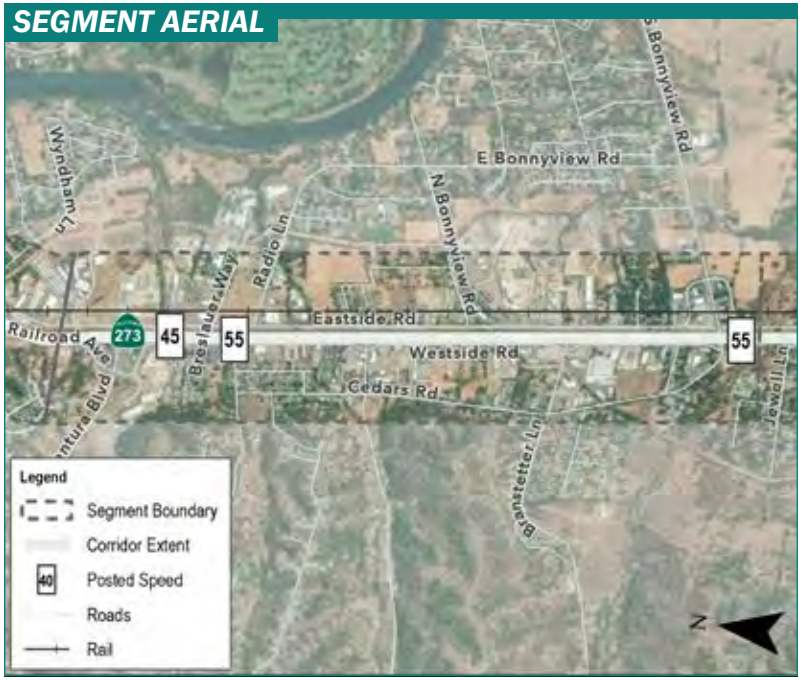
# STATE ROUTE (SR) 273 SEGMENT 5

***North of Buenaventura Blvd to south of S Bonnyview Rd***

***EXISTING CONDITIONS SEGMENT OVERVIEW***

## KEY MAP

## SEGMENT AERIAL

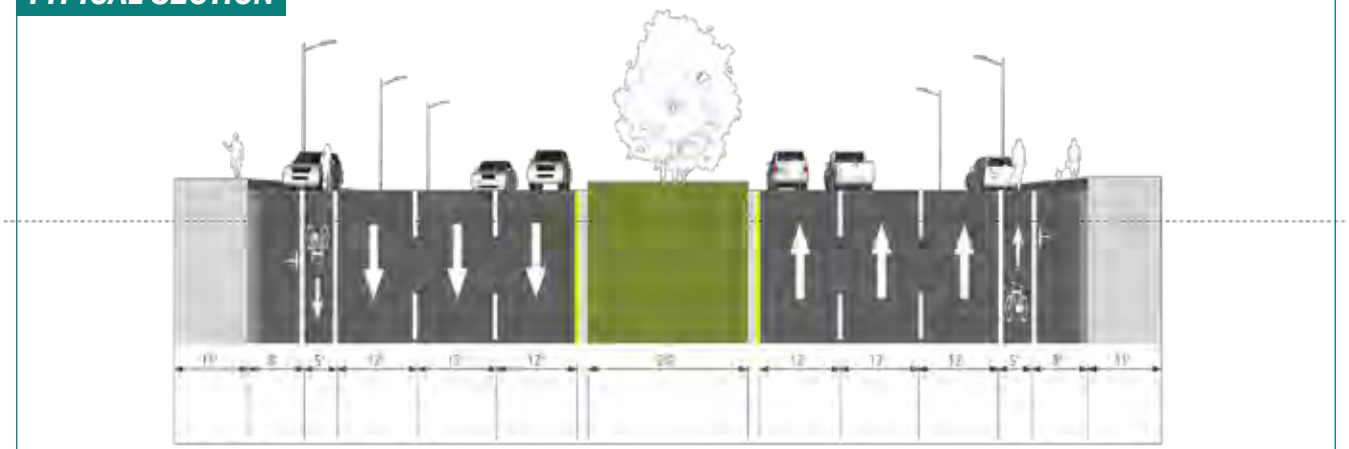



- **Adjacent Land Use:**
  Industrial, smaller-scale commercial with access to single-family and suburban residential areas
- **Place Type:**
  Transitional Corridor/Suburban Corridor
- **Key Destinations:**
  Shasta County Health and Human Services South Redding Office, Shasta-Trinity Regional Occupation Program School, Monarch Learning Center School (Elementary), bookstores

**Key Features:**
Critical connection to Downtown Redding and Bonneyview area neighborhoods, barriers to pedestrian mobility and minimal place-based activities make this area less of a destination for non-motorized travelers, however, shared use path connections at the south and pilot projects provide connectivity opportunities

- **Segment Length:**
  2.0 miles
- **Roadway Classification:**
  Freeway/Expressway
- **Jurisdiction of Adjacent Land Use:**
  City of Redding
- **Posted Speed(s):**
  45 to 55 mph
- **Cross-Section:**
  4-lane divided with dirt median and left turn pockets at intersections
- **Daily Traffic Volume:**
  ~ 15,600 vehicles per day

## TYPICAL SECTION



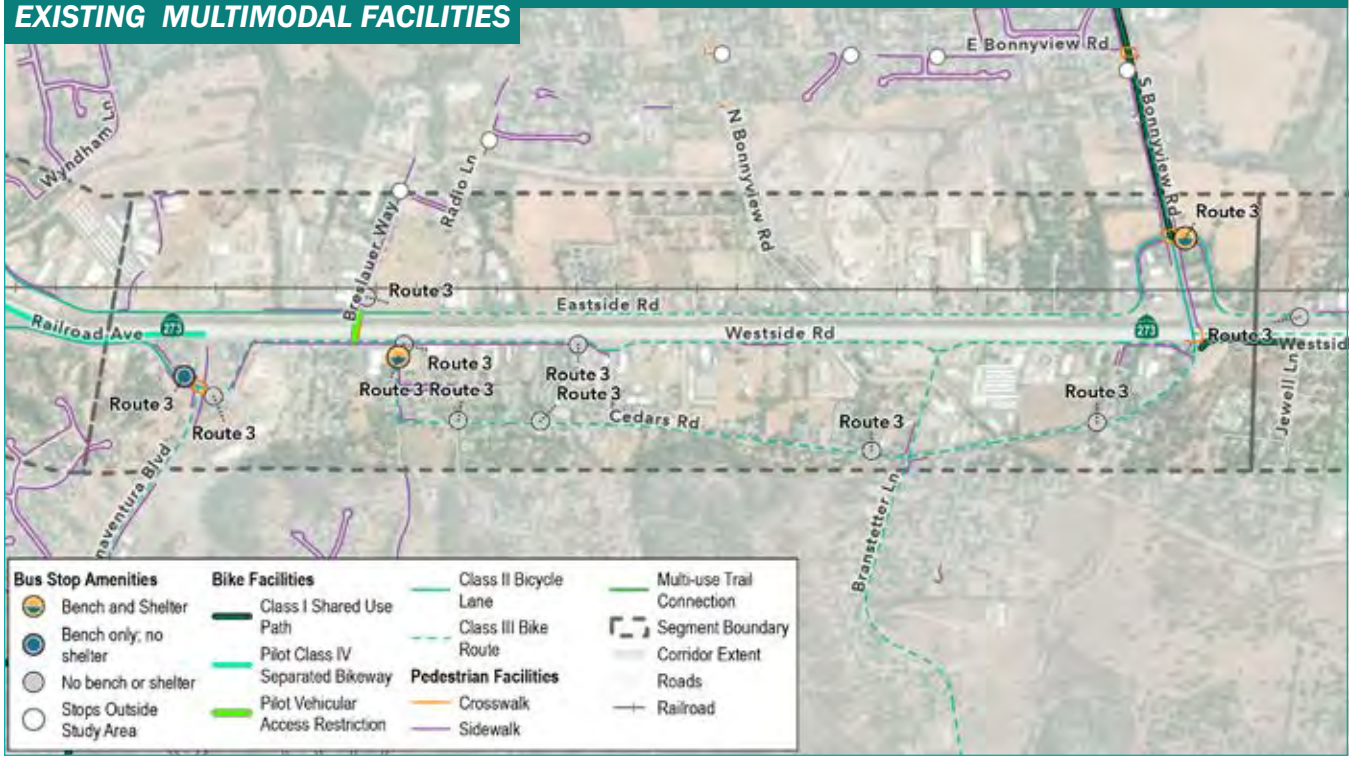
EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 5

## *North of Buenaventura Blvd to south of S Bonnyview Rd*

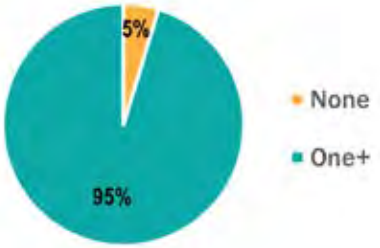
## *EXISTING CONDITIONS MOBILITY TRENDS*

### *EXISTING MULTIMODAL FACILITIES*

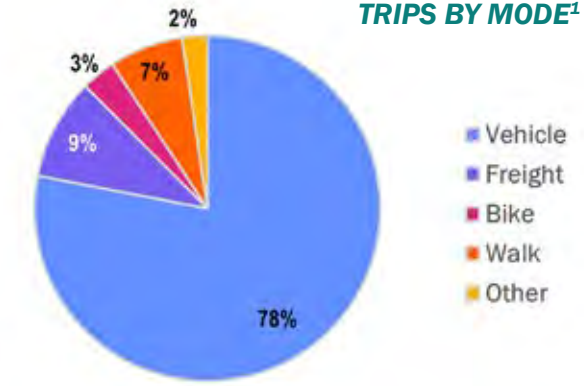



- The most common trip mode is motor vehicles, with 78 percent of trips made by a private automobile and 9 percent by a freight vehicle.
- Among all modes, freight vehicles have the highest average trip distance at 10.2 miles, followed by private vehicles at 8.2 miles, and bikes at 4.7 miles.
- Most people traveling within the segment have access to a car, with 95 percent of trips made by individuals living in households with access to at least one vehicle.
- Five percent of trips are made by people without access to a car, and people who do not have access to car are 44 times more likely to bike and 4 times more likely to walk than those who do have access to a car.

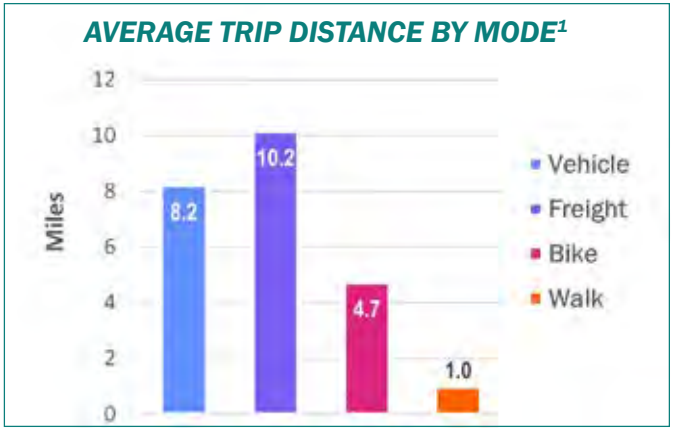
### *PRIVATE AUTO OWNERSHIP*




### *TRIPS BY MODE[1]*



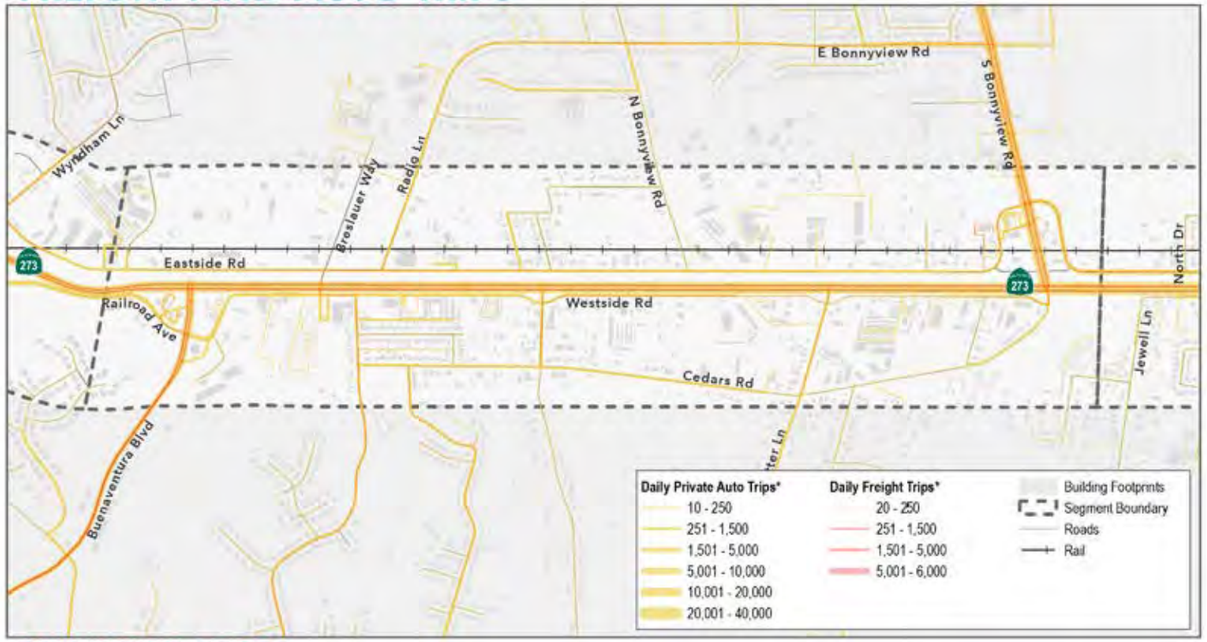

### *AVERAGE TRIP DISTANCE BY MODE[1]*



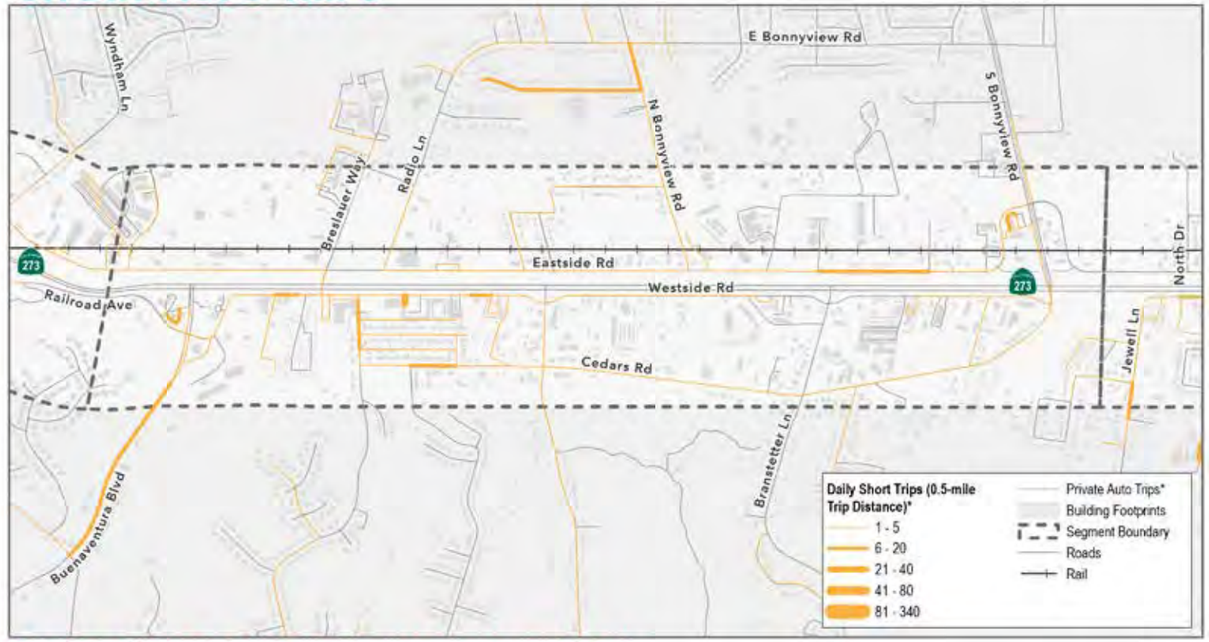

- Both private auto and freight travel is concentrated along SR 273, S Bonneyview Rd, and Buenaventura Blvd.
- Among all bicycle trips along the segment, most concentrated along Railroad Ave and Westside Rd, as well as Radio Ln and S Bonneyview Rd. Trips made by those without access to a vehicle are concentrated similarly, as well as along Eastside Rd.
- Few pedestrian trips are seen within this segment, although Cedars Rd, Railroad Ave, and S Bonneyview Rd west of Eastside Rd show the most trips.
- Transit activity is concentrated at the stops near SR 273 and Radio Ln
- Short vehicle trips are also less concentrated in this segment area, although some can be seen between the commercial and residential areas on the west side of SR 273.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

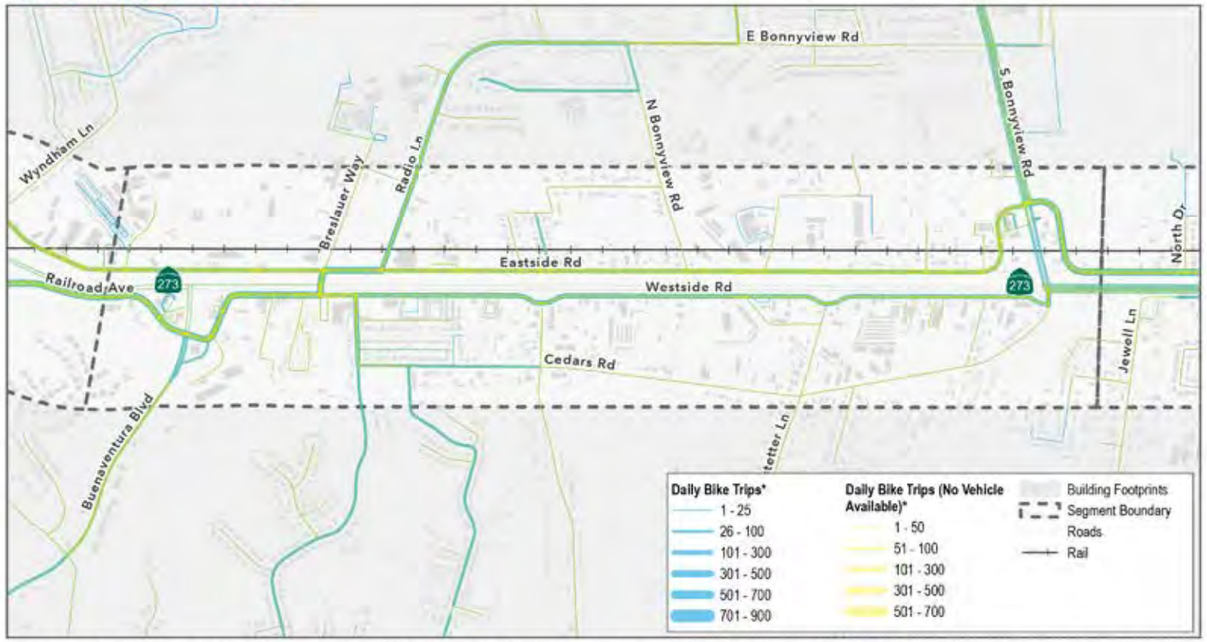
## FREIGHT AND AUTO TRIPS



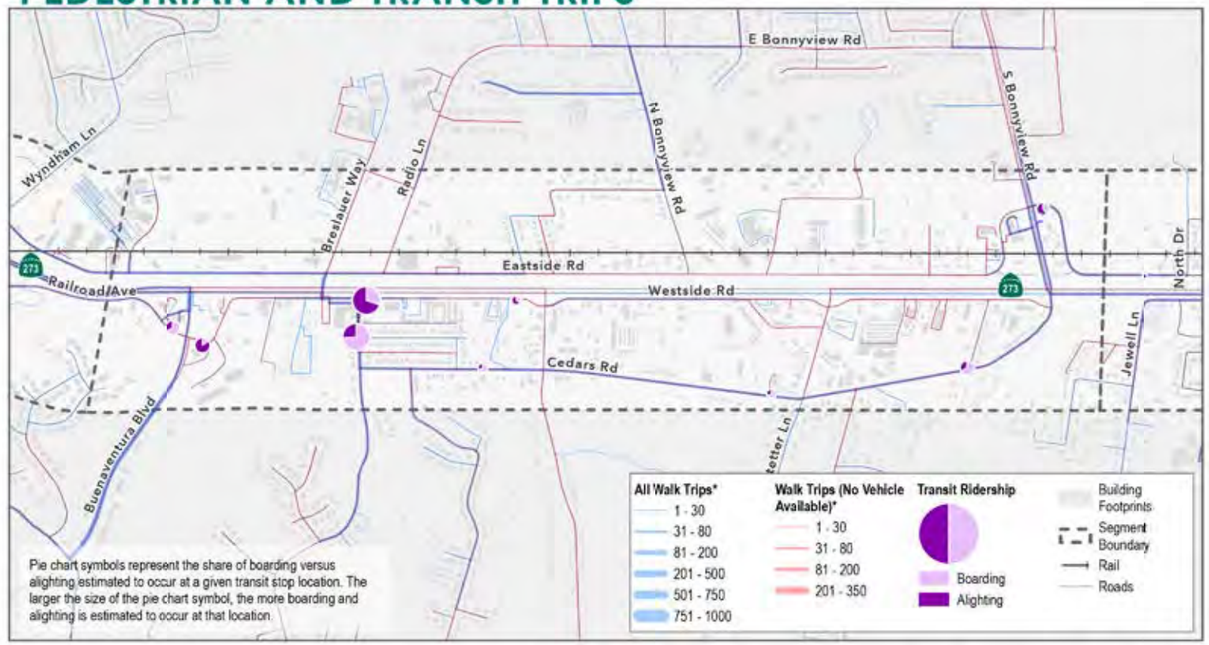

## SHORT AUTO TRIPS




## BICYCLE TRIPS




## PEDESTRIAN AND TRANSIT TRIPS




Pie chart symbols represent the share of boarding versus alighting estimated to occur at a given transit stop location. The larger the size of the pie chart symbol, the more boarding and alighting is estimated to occur at that location.

Data source: Human Geography Base: City of Redding GIS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA; Trip data: Replica Typical Weekday in Fall 2022; Building Footprints: City of Redding, Shasta County, 2023; Transit Ridership: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Rail: CADataMug, 2023

Created by: cpeel

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Print date: 06 Oct 2023 - 07:52

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

N

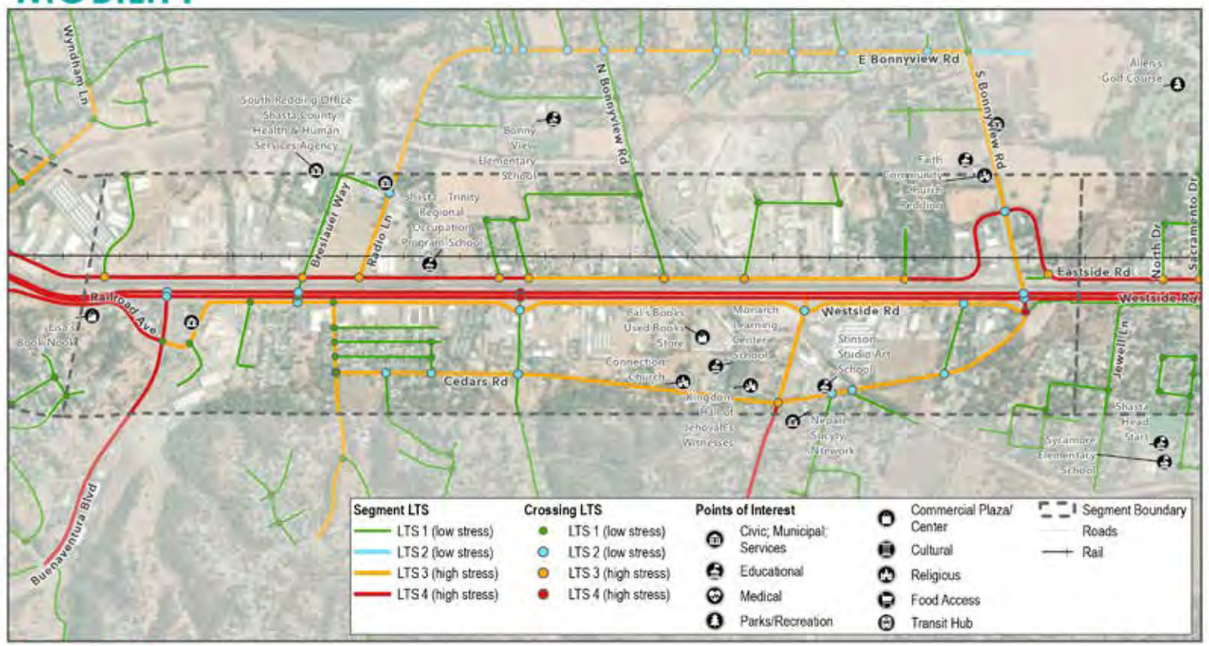
0 500 1,000 1,500
US Feet

# STATE ROUTE (SR) 273 SEGMENT 5

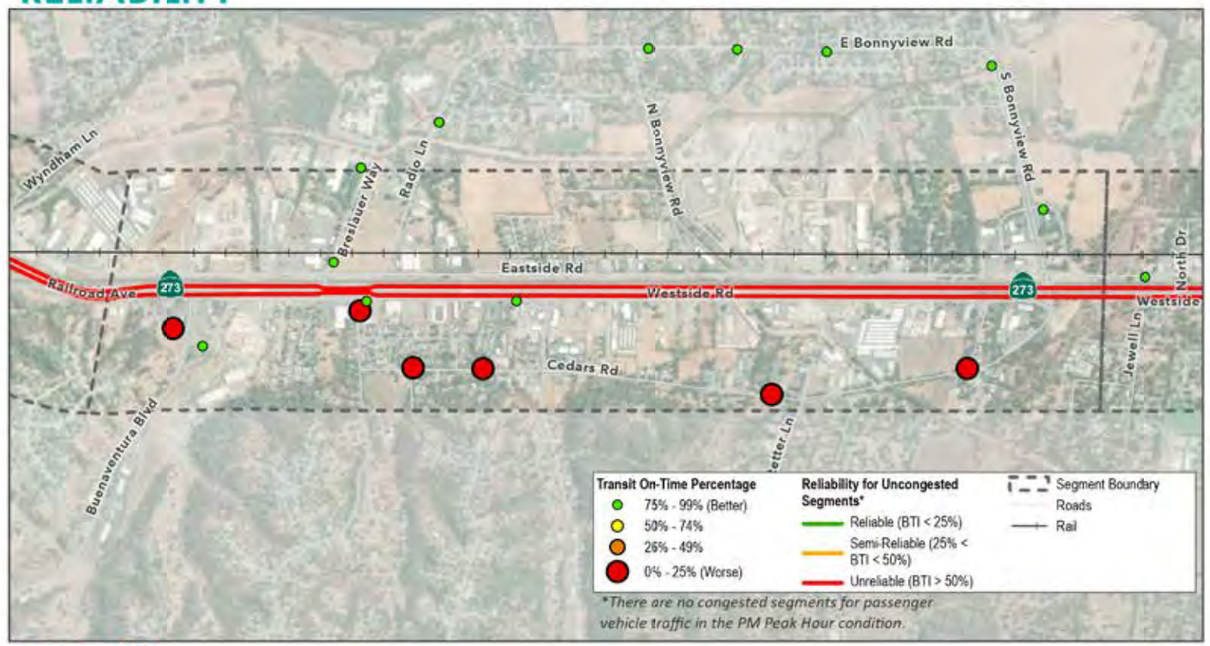
***North of Buenaventura Blvd to south of S Bonnyview Rd***

***EXISTING CONDITIONS PERFORMANCE RESULTS***

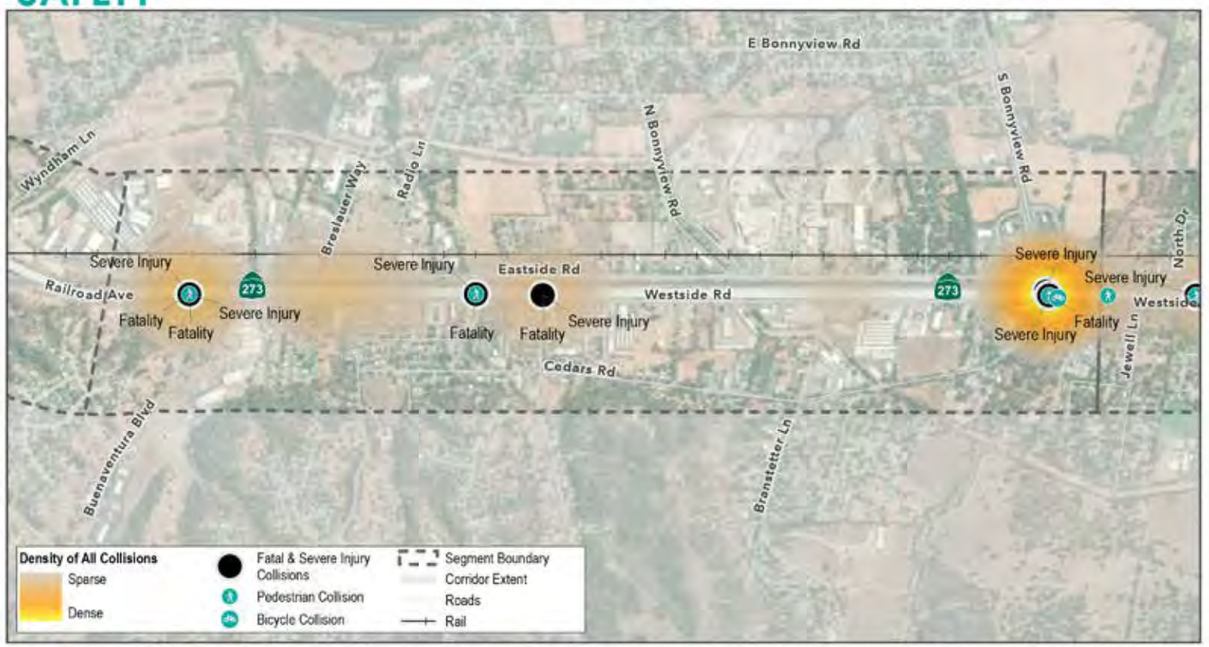
## MOBILITY



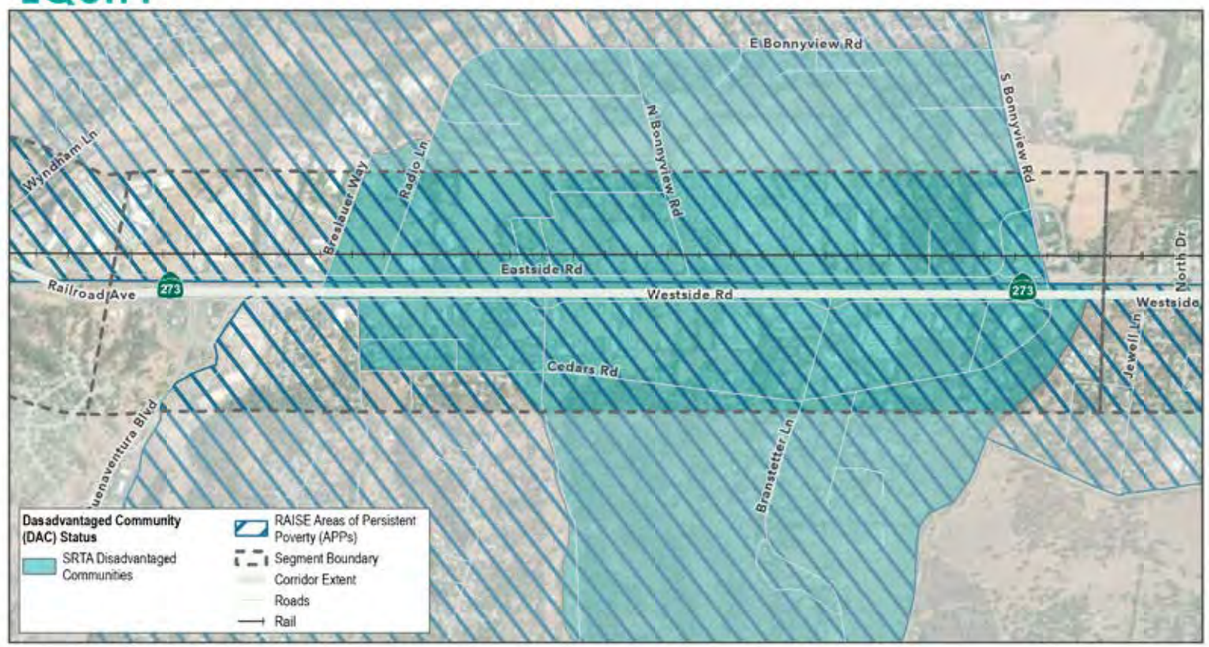

## RELIABILITY




## SAFETY




## EQUITY




Data source: Aerial Imagery (Firefly): Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2016-2022; DAC: SRTA/RTP-SCS, 2018; POI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2019

Created by: sperl

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Print date: 04 Oct 2023 - 20:47

N

0 500 1,000 1,500

US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 5

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Poor | 4 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Typically no bench/shelter | 4 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | No stops on SR 273 | 4 |
| **Sidewalk Coverage** | Minimal to None | 4 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 1 (0%) | |
| Education Destinations | 6 (4%) | |
| Community Services and Shopping Destinations | 9 (1%) | |
| Health Care Destinations | 1 (0%) | |
| Food Access | 0 (7%) | |
| Transit Service Destinations (includes Bike Share locations) | 17 (0%) | |
| Civic Service Destinations | 0 (0%) | |
| Parks/Open Space & Recreation Destinations | 0 (0%) | |
| **Overall Mobility Score** | **Poor** | **4** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 59 | - |
| Total Fatal Crashes | 5 | 4 |
| Total Severe Crashes | 1 | 4 |
| **Total Crashes Involving a Pedestrian** | 5 | 4 |
| Total Pedestrian Fatalities | 4 | 4 |
| **Total Crashes Involving a Bicyclist** | 1 | 4 |
| Total Bicyclists Fatalities | - | 0 |
| % Occurred at Night (Non-Daylight Crashes) | 34% | - |
| **Primary Crash Types** | Rear End | - |
| **Primary Crash Cause** | Unsafe Speed | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **1.04** | 4 |
| Statewide Crash Rate | 0.94 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | **3** |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | Majority | 4 |
| RAISE Areas of Persistent Poverty Criteria | Majority | 4 |
| Climate & Economic Justice Criteria | No | 1 |
| SB 535 CalEPA Criteria | No | 1 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **4** |
| **SAFETY** | Poor | **3** |
| **RELIABILITY** | Poor | **4** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **4** |

## SEGMENT ISSUES

- High speeds and a lack of low-stress crossing opportunities along the SR 273 corridor result in a high stress barrier to connectivity between destinations to the east and west.
- SR 273 at Buenaventura Blvd, Breslauer Way and Kenyon Dr are collision hotspots. Ten percent of collisions resulted in a fatal or severe injury, and ten percent of all collisions involved a bicyclist or pedestrian. Additionally, with the crash rate along the segment exceeding the statewide average, safety is a concern.
- Transit service reliability is an issue, with many of the stops within the segment area arriving on-time between 0 and 25 percent of the time. Updated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is also a concern with most areas within the segment meeting the DAC criteria for two of the four measures of disadvantage.

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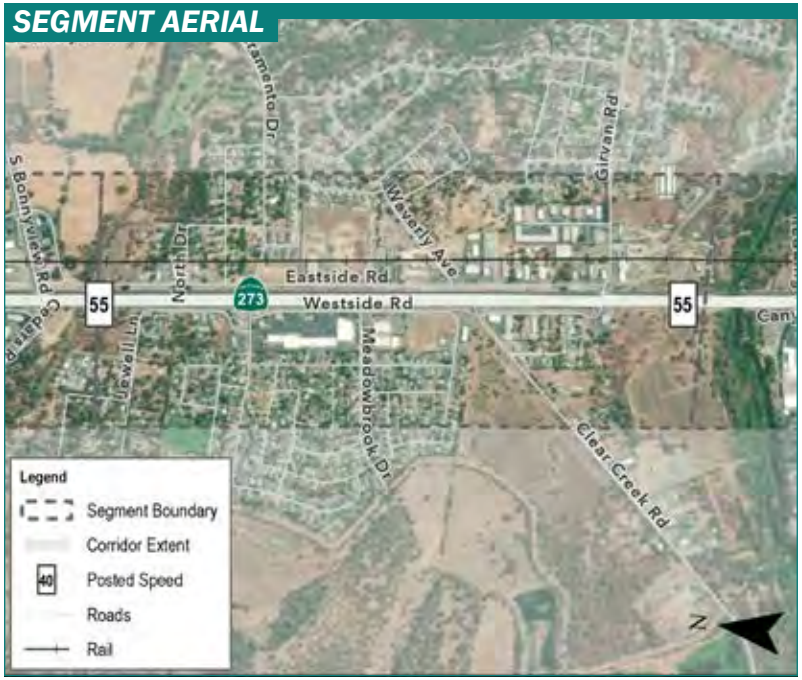
# STATE ROUTE (SR) 273 SEGMENT 6

***South of S Bonnyview Rd to south of Girvan Rd***

***EXISTING CONDITIONS SEGMENT OVERVIEW***

## KEY MAP

## SEGMENT AERIAL




- **Adjacent Land Use:**
  Neighborhood commercial with access to single-family and undeveloped multi-family residential
- **Place Type:**
  Suburban Community/Transitional Corridor
- **Key Destinations:**
  Clear Creek Grocery and Market; Westwood Village shopping center featuring Rite-Aid and SAV-MOR Foods; Northstate Recycling; Shasta Head Start and Sycamore Elementary School to the west of segment area
- **Key Features:**
  Highway 273 Bikeway at the north of study area and proximity to S Bonneyview shared-use path; potential for place-based activities, frontage opportunities, and proximity to regional amenities

- **Segment Length:**
  1.2 miles
- **Roadway Classification:**
  Freeway/Expressway
- **Jurisdiction of Adjacent Land Use:**
  City of Redding; unincorporated Shasta County
- **Posted Speed(s):**
  45 mph
- **Cross-Section:**
  mostly 4 to 5-lane divided with separate right and left turn pockets at intersections
- **Daily Traffic Volume:**
  ~ 18,600 vehicles per day

## TYPICAL SECTION

EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 6

## *South of S Bonnyview Rd to south of Girvan Rd*

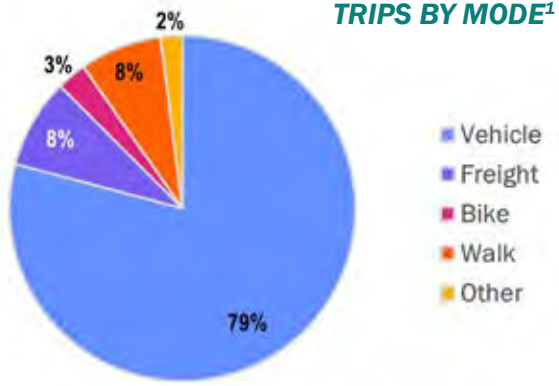
## *EXISTING CONDITIONS MOBILITY TRENDS*

### *EXISTING MULTIMODAL FACILITIES*

- The most common trip mode is motor vehicles, with 79 percent of trips made by a private automobile and 8 percent by a freight vehicle, followed by 8 percent by walking.
- Among all modes, private auto and freight vehicles show similar average trip lengths, at 9.7 and 9.6 miles, respectively. Average bike trip lengths are some of the longest across the corridor's study segments at 5.6 miles.
- Most people traveling within the segment have access to a car, with 95% of trips made by individuals living in households with access to at least one vehicle.

### *PRIVATE AUTO OWNERSHIP*

### *TRIPS BY MODE[1]*

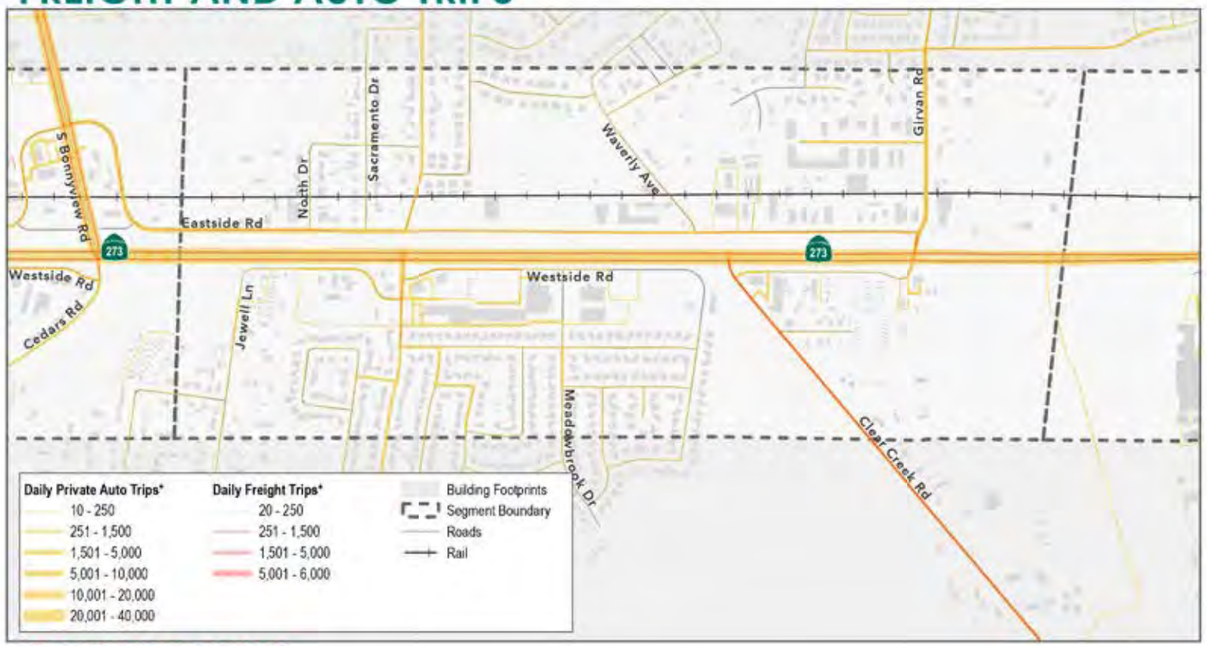



### *AVERAGE TRIP DISTANCE BY MODE[1]*

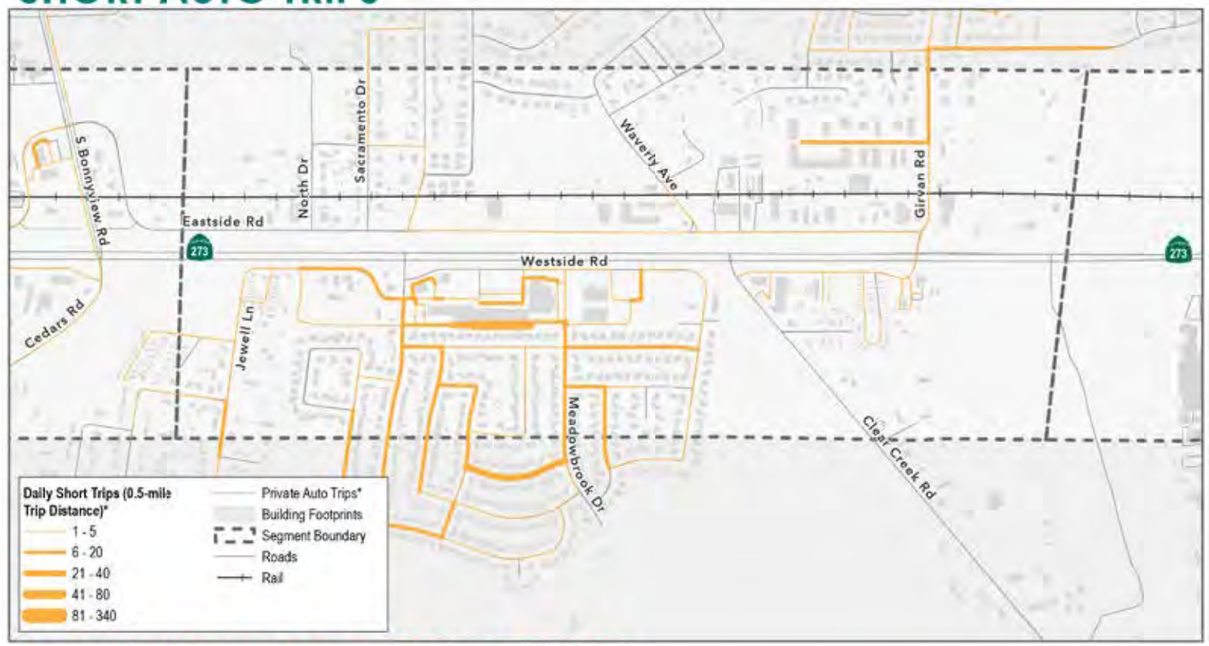
- Five percent of trips are made by people without access to a car, and people who do not have access to car are 67 times more likely to bike and 3 times more likely to walk than those who do have access to a car
- Bicycle trips traveling along the segment are most concentrated along Eastside and Westside Roads, as well as SR 273 south of Girvan Rd.
- Pedestrian trips, transit trips, as well as short vehicle trips are concentrated along Westside Rd and SR 273 near commercial and residential destinations.
- Freight and private automobile trips are concentrated along SR 273 and Girvan Rd.
- Clear Creek Rd shows more freight than vehicle trips.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

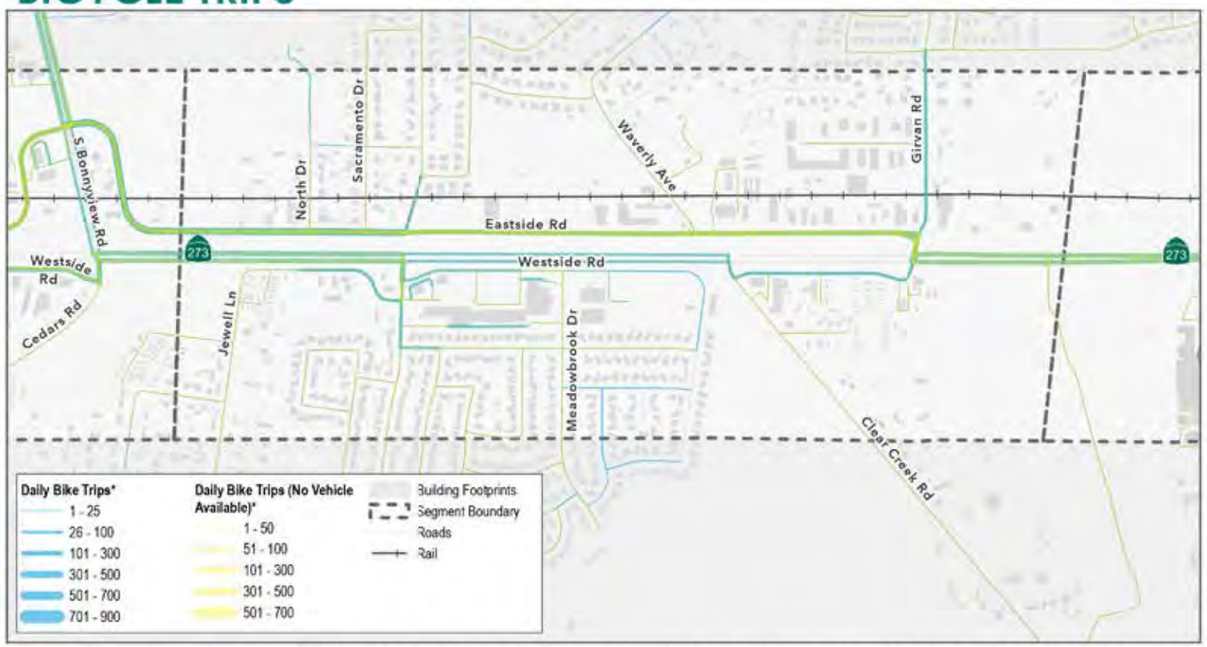
## FREIGHT AND AUTO TRIPS



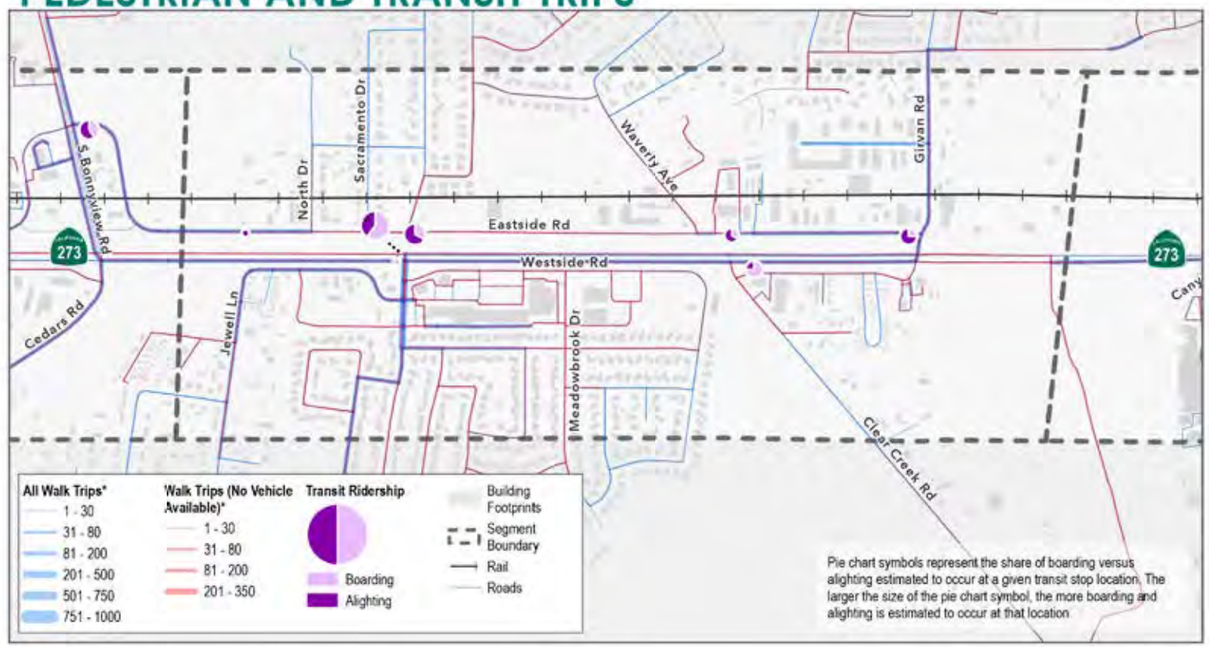

## SHORT AUTO TRIPS




## BICYCLE TRIPS




## PEDESTRIAN AND TRANSIT TRIPS




Data source: Human Geography Base: Esri Community Maps Contributors, City of Redding GIS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Trip data: Replica Typical Weekday in Fall 2022, Building Footprints: City of Redding, Shasta County, 2023, Transit Ridership: RABA, City of Redding, SHD, 2023, Roads: Shasta County, 2023, Rail: CA Data Hub, 2023
Created by: cpeel
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Print date: 04 Oct 2023 - 20:40

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

N

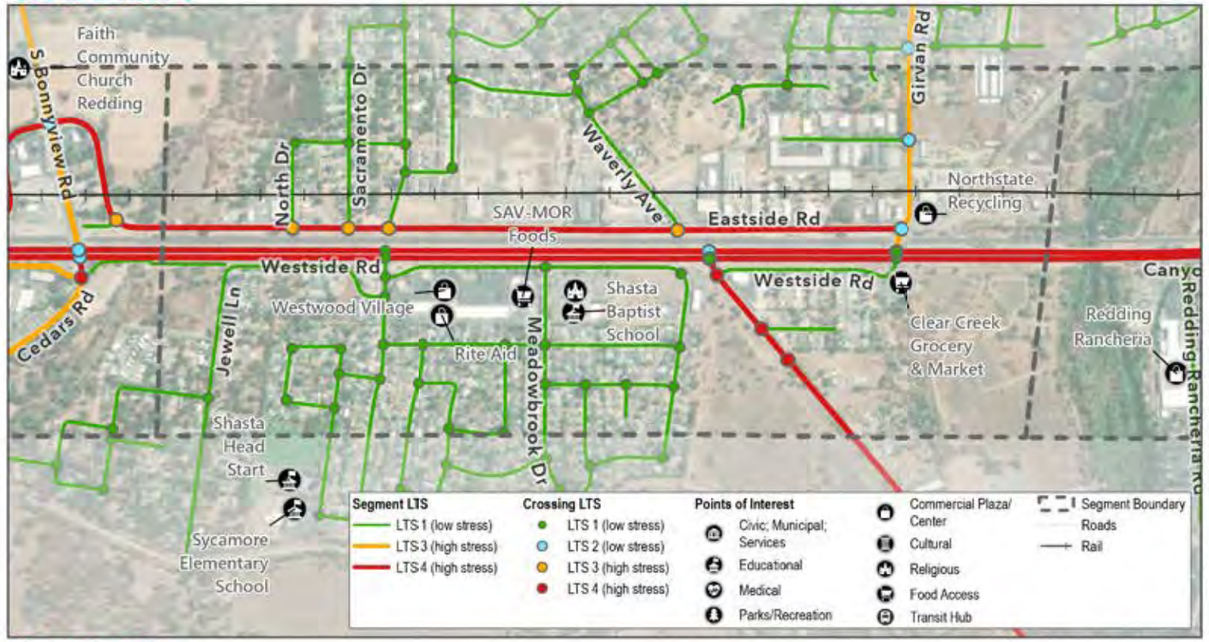
0 500 1,000 1,500
US Feet

# STATE ROUTE (SR) 273 SEGMENT 6

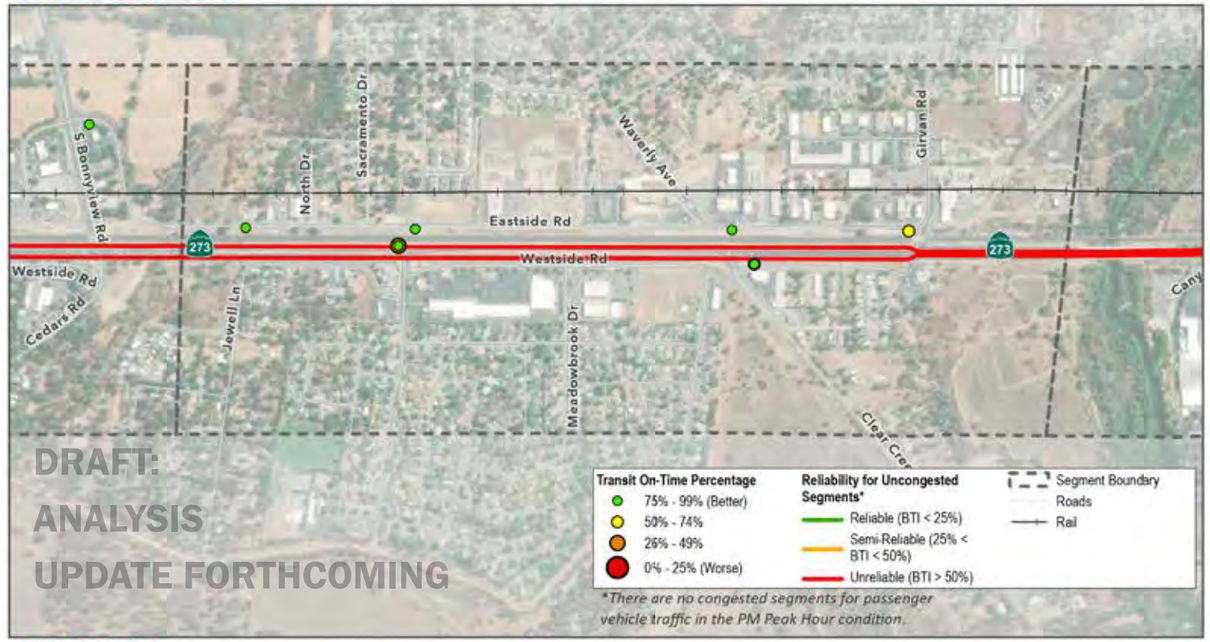
***South of S Bonnyview Rd to south of Girvan Rd***

***EXISTING CONDITIONS PERFORMANCE RESULTS***

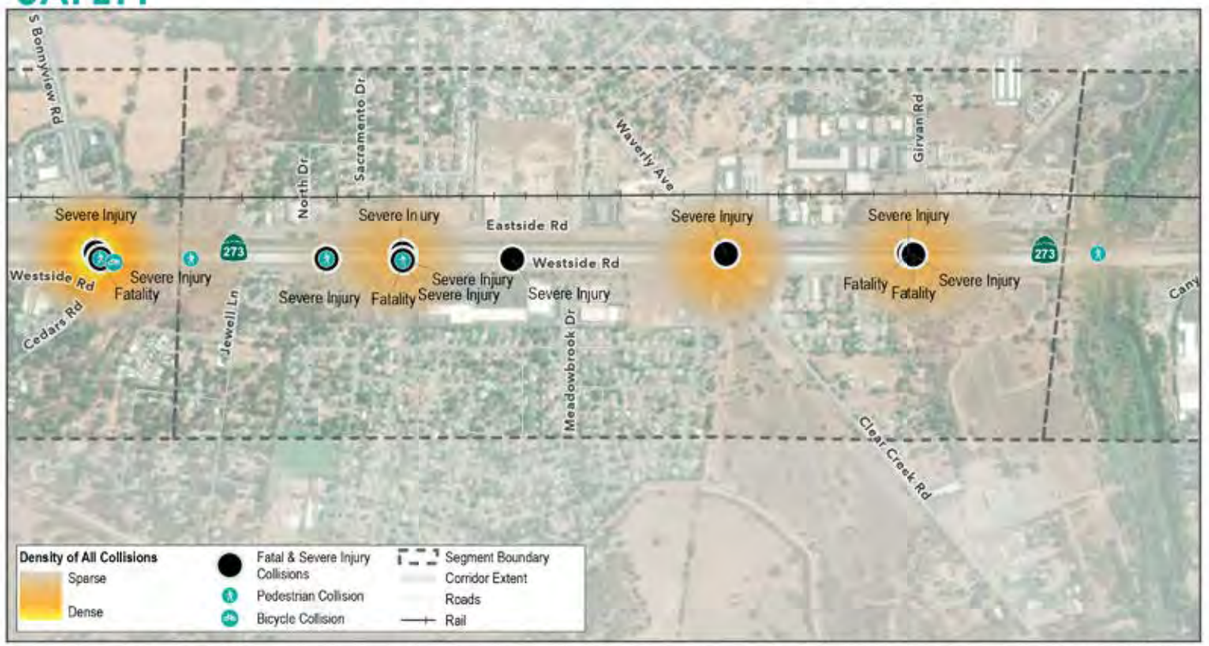
## MOBILITY



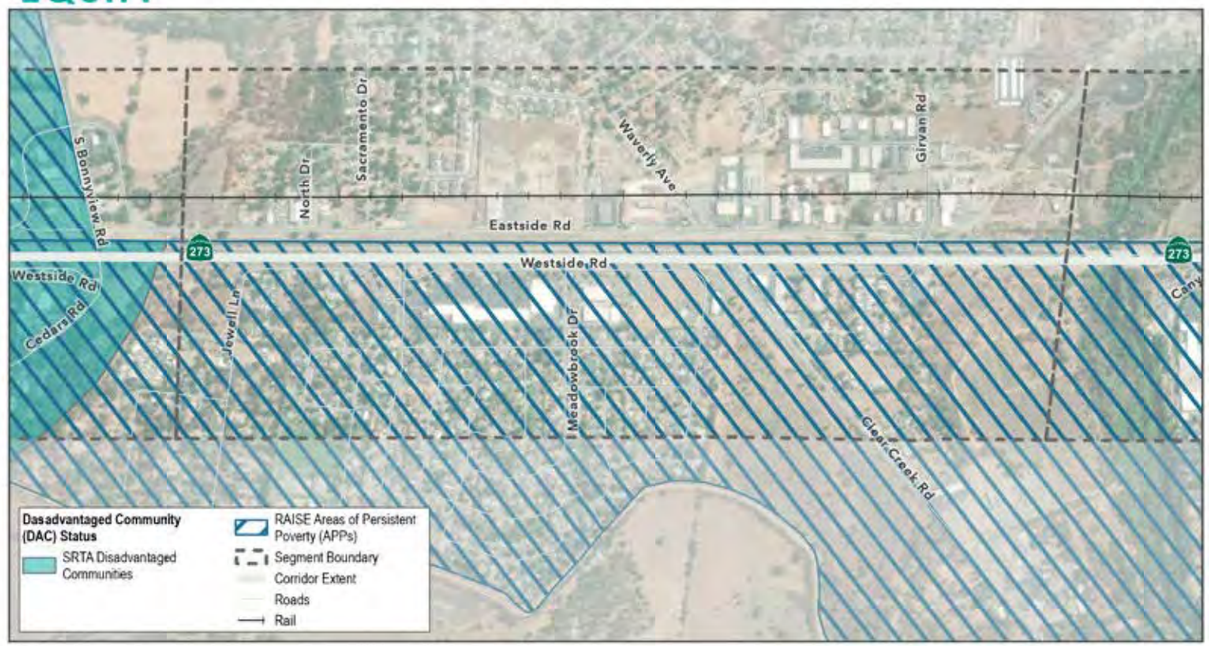

## RELIABILITY




## SAFETY




## EQUITY




Data source: Aerial Imagery (Firefly) Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2018-2022; DAC: SRTARTP-SCS, 2018; POI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2019
Created by: jgard
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Print date: 04 Oct 2023 - 20:49

N

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US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 6

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Fair | 0 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Some with bench/shelter | 3 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | Yes, sidewalk at SR 273 stops | 3 |
| **Sidewalk Coverage** | Minimal to None | 4 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 0 (0%) | |
| Education Destinations | 3 (46%) | |
| Community Services and Shopping Destinations | 4 (17%) | |
| Health Care Destinations | 0 (NA) | |
| Food Access | 2 (26%) | |
| Transit Service Destinations (includes Bike Share locations) | 9 (0%) | |
| Civic Service Destinations | 0 (0%) | |
| Parks/Open Space & Recreation Destinations | 2 (74%) | |
| **Overall Mobility Score** | **Poor** | **4** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 55 | - |
| Total Fatal Crashes | 3 | 4 |
| Total Severe Crashes | 5 | 4 |
| **Total Crashes Involving a Pedestrian** | 2 | 4 |
| Total Pedestrian Fatalities | 1 | 4 |
| **Total Crashes Involving a Bicyclist** | - | 0 |
| Total Bicyclists Fatalities | - | 0 |
| % Occurred at Night (Non-Daylight Crashes) | 47% | - |
| **Primary Crash Types** | Rear End | - |
| **Primary Crash Cause** | Unsafe Speed | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **1.35** | 4 |
| Statewide Crash Rate | 0.94 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | **3** |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | No | 1 |
| RAISE Areas of Persistent Poverty Criteria | Majority | 4 |
| Climate & Economic Justice Criteria | No | 1 |
| SB 535 CalEPA Criteria | Partially | 3 |
| **Overall DAC Status** | **Moderate DAC** | **2** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **4** |
| **SAFETY** | Poor | **3** |
| **RELIABILITY** | Poor | **4** |
| **EQUITY (DAC Status)** | Moderate DAC | **2** |
| **Overall Performance** | | **3** |

## SEGMENT ISSUES

- High speeds, minimal bicycle and pedestrian facilities and a lack of low-stress crossing opportunities along SR 273 results in a high stress barrier to connectivity between the low-stress residential streets to the east and west.
- Collision hotspots are seen at Westwood Ave, Clear Creek Rd and Girvan Rd. With 15 percent of collisions resulting in fatality and a crash rate significantly above the statewide average, safety is a concern.
- Transit service is mostly reliable with many of the routes serving stops in the segment arriving on-time between 75 and 99 percent of the time. Updated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is a concern, mostly in the areas to the west of the state highway, with a majority of the area designated as a Area of Persistent Poverty, per RAISE grant criteria definitions.

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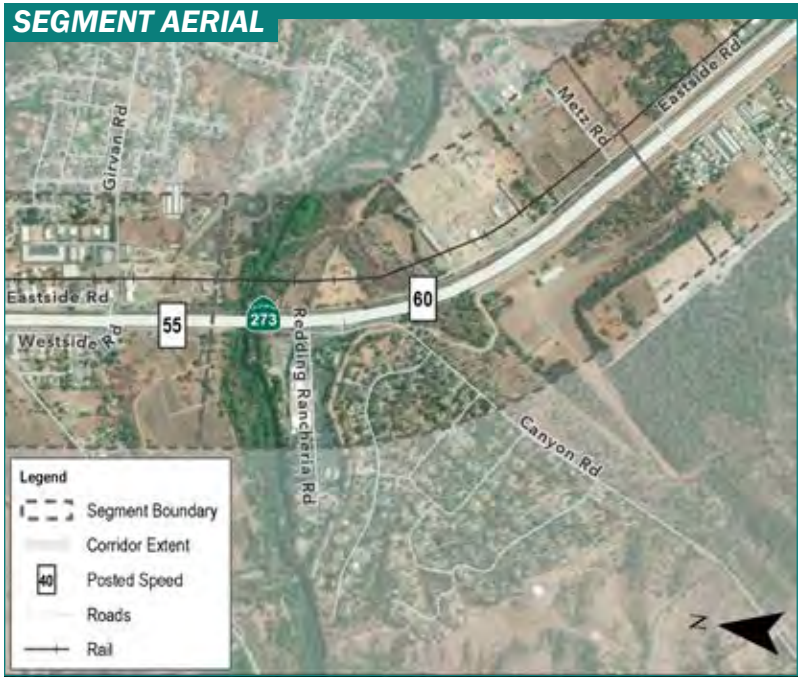
# STATE ROUTE (SR) 273 SEGMENT 7

***South of Girvan Rd to north of Happy Valley Rd***

***EXISTING CONDITIONS SEGMENT OVERVIEW***

## KEY MAP

## SEGMENT AERIAL

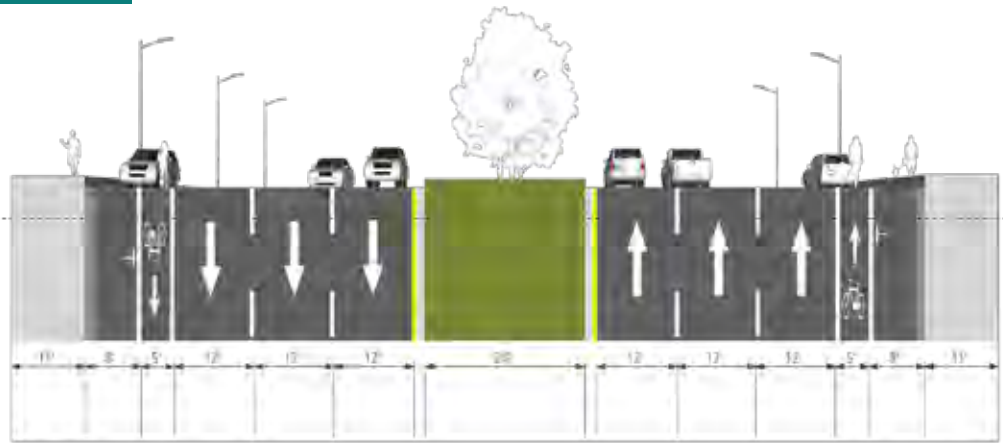



- **Adjacent Land Use:**
  Commercial and residential tribal lands, industrial, single-family residential
- **Place Type:**
  Transitional Corridor/Undeveloped Corridor (Rural)
- **Key Destinations:**
  Redding Rancheria, Win-River Resort & Casino

**Key Features:**
Transitional and rural corridor connecting to the Rancheria and unincorporated Shasta County to the south

- **Segment Length:**
  0.9 miles
- **Roadway Classification:**
  Freeway/Expressway
- **Jurisdiction of Adjacent Land Use:**
  City of Redding
- **Posted Speed(s):**
  60 mph
- **Cross-Section:**
  4-lane undivided with left turn pockets at intersections
- **Daily Traffic Volume:**
  ~ 10,700 vehicles per day

## TYPICAL SECTION



EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 7

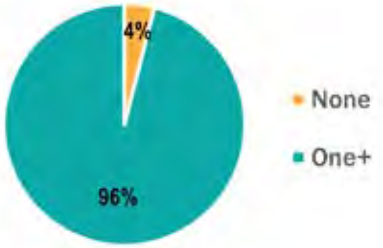
## *South of Girvan Rd to north of Happy Valley Rd*

## *EXISTING CONDITIONS MOBILITY TRENDS*

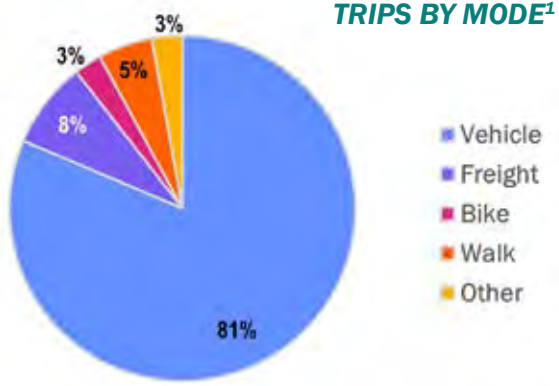
### *EXISTING MULTIMODAL FACILITIES*

- The most common trip mode is motor vehicles, with 81 percent of trips made by a private automobile and 9 percent by a freight vehicles.
- Among all modes, freight vehicles have the highest average trip distance at 10.4 miles, followed by private vehicles.
- Bike trip lengths are relatively high at 7.2 miles.
- Most people traveling within the segment have access to a car, with 96 percent of trips made by individuals living in households with access to at least one vehicle.
- Four percent of trips are made by people without access to a car, and people who do not have access to car are 49 times more likely to bike than those who do have access to a car.

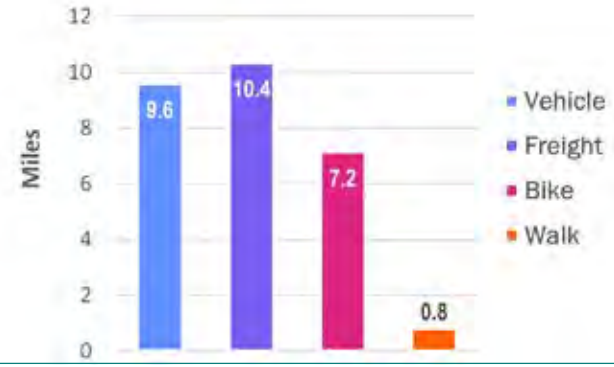
### *PRIVATE AUTO OWNERSHIP*




### *TRIPS BY MODE[1]*



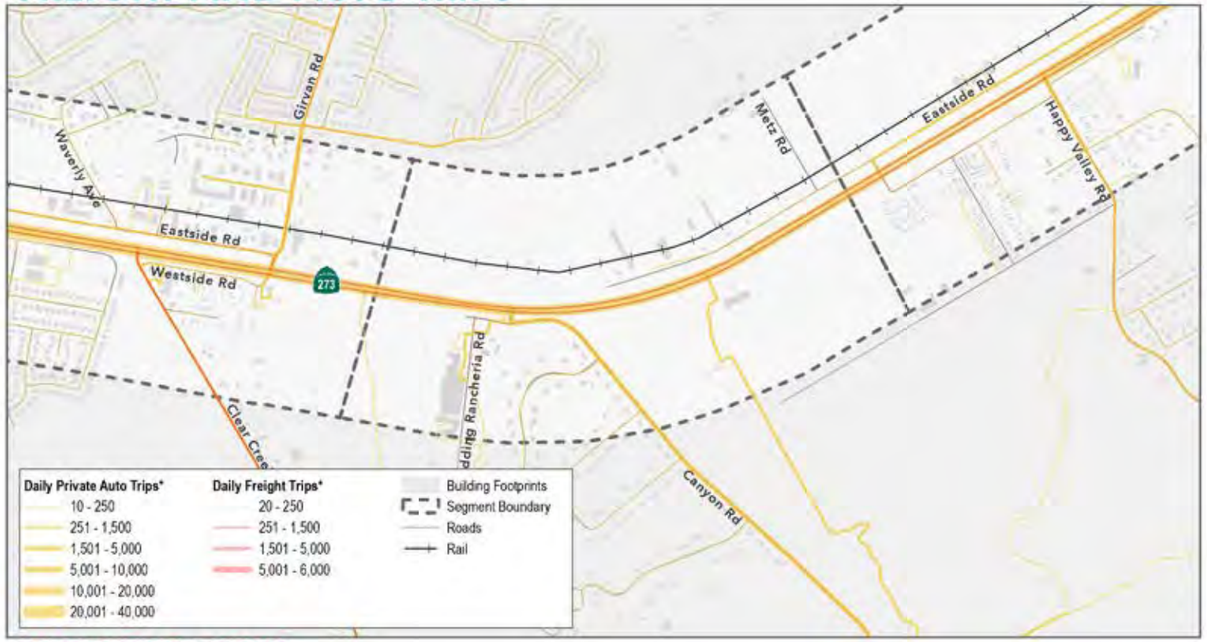

### *AVERAGE TRIP DISTANCE BY MODE[1]*




- Bicycle trips traveling along the segment are most concentrated along SR 273 and along Canyon Rd.
- Pedestrian activity is low within this segment, although some activity can be seen along SR 273, Canyon Rd, and unpaved roads south of Canyon Rd.
- Short vehicle trips are virtually non-existent due to proximity to minimal place-based activities
- The only location with transit stops is at Redding Rancheria Rd.
- Most freight and private auto trips are concentrated along SR 273, with some activity on the unpaved road south of Canyon Rd.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

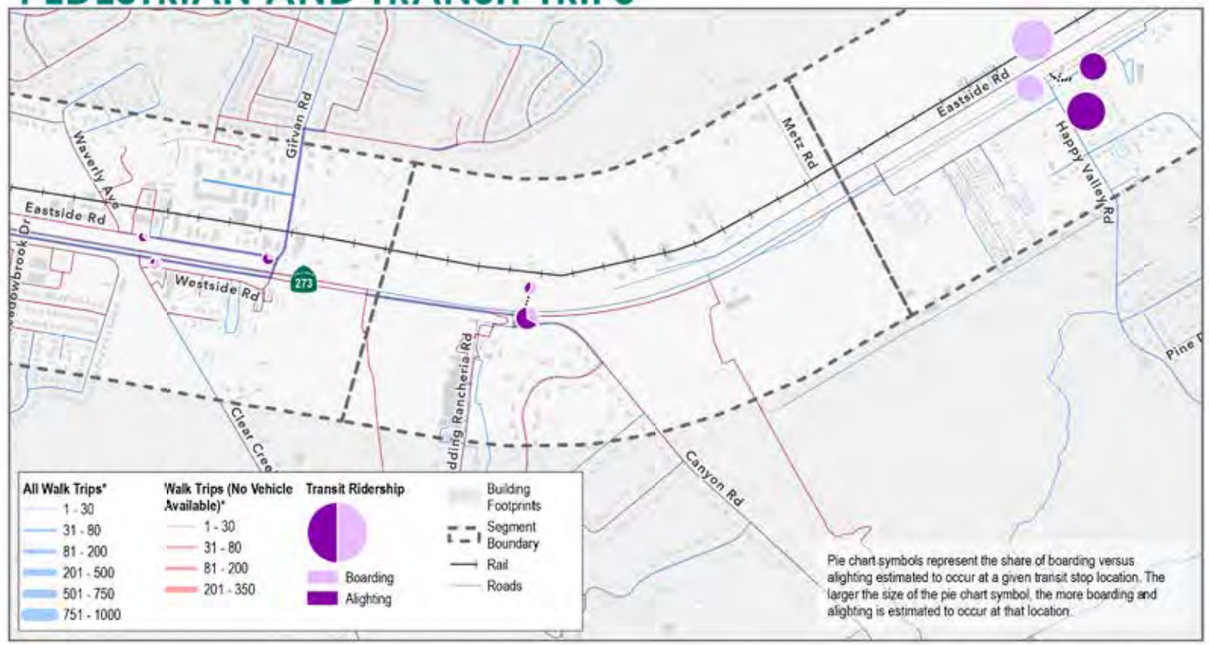
## FREIGHT AND AUTO TRIPS




## SHORT AUTO TRIPS

## BICYCLE TRIPS

## PEDESTRIAN AND TRANSIT TRIPS




Data source: Human Geography Base: Esri Community Maps Contributors, City of Redding GIS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Trip data: Replica Typical Weekday in Fall 2022, Building Footprints: City of Redding, Shasta County, 2023, Transit Ridership: RABA, City of Redding, GHD, 2023, Roads: Shasta County, 2023, Rail: DA Data Hub, 2023
Created by: cowell
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Print date: 04 Oct 2023 - 20:40

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

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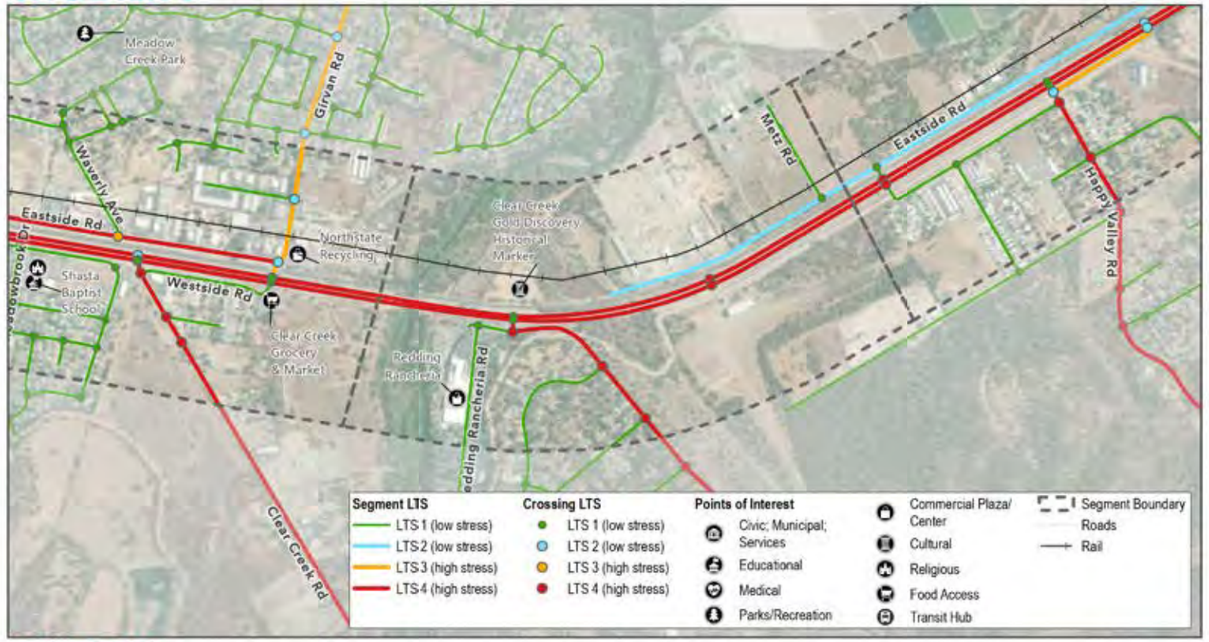
US Feet

# STATE ROUTE (SR) 273 SEGMENT 7

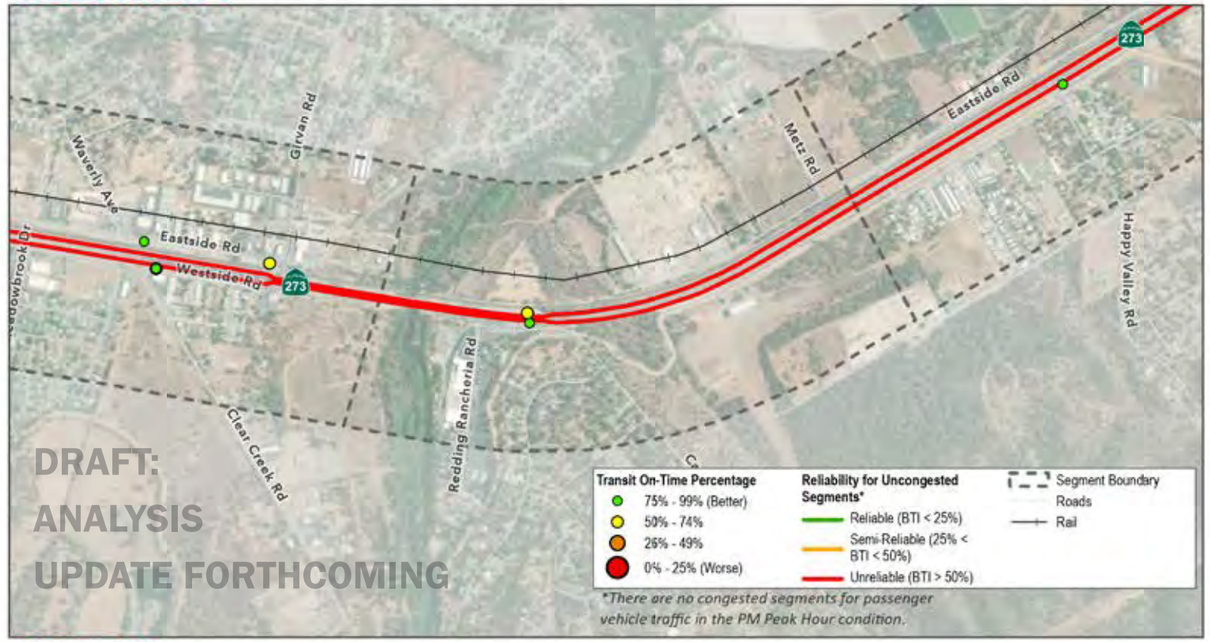
***South of Girvan Rd to north of Happy Valley Rd***

***EXISTING CONDITIONS PERFORMANCE RESULTS***

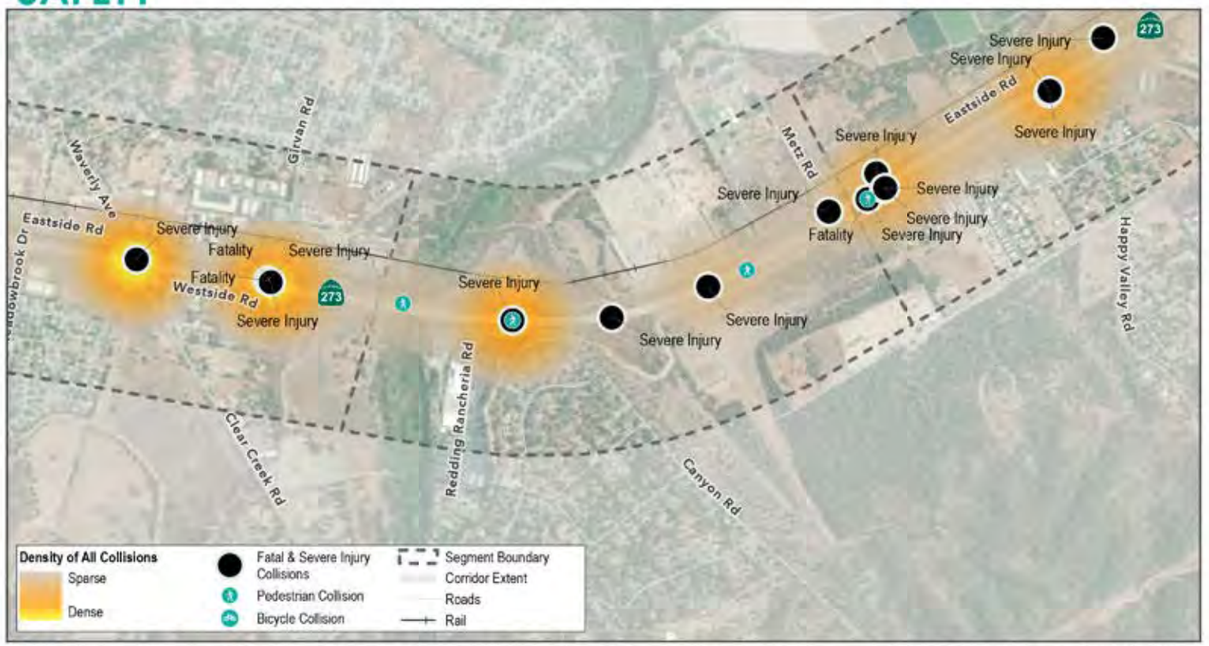
## MOBILITY



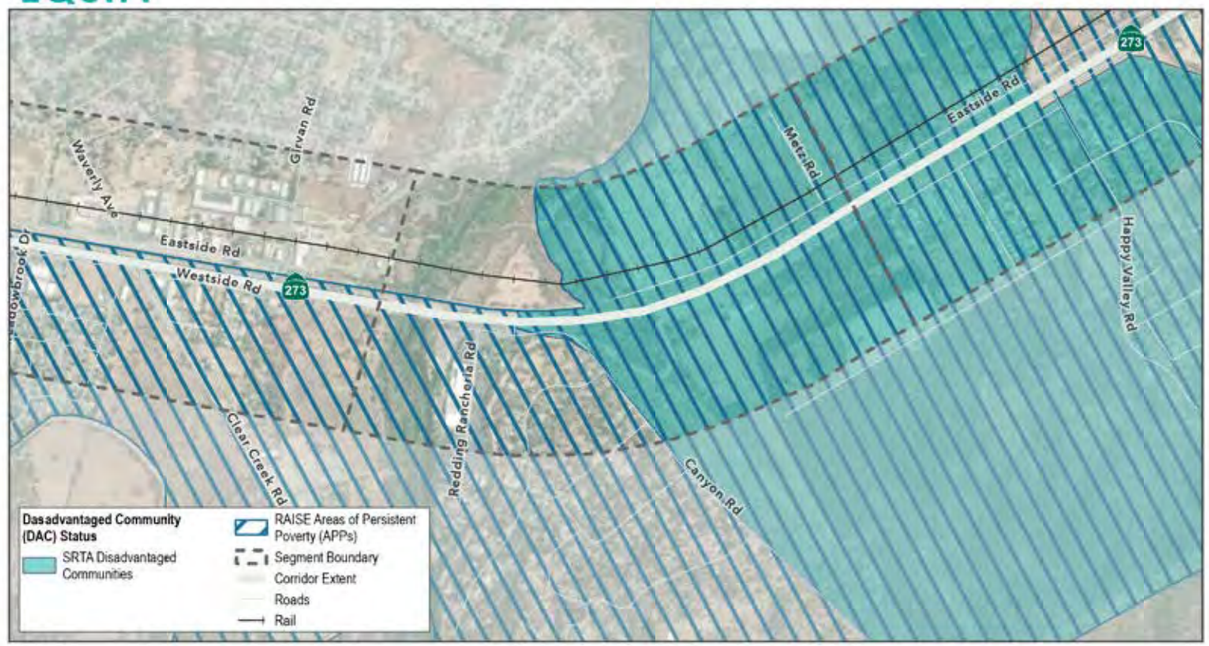

## RELIABILITY




## SAFETY




## EQUITY




Data source: World Imagery (Firefly) Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2018-2022; DAC: SRTA/RTP-SCS, 2018; POI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2019

Created by: jgeil

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Print date: 04 Oct 2023 - 20:47

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0 500 1,000 1,500

US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 7

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Fair | 0 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Some with bench/shelter | 3 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | Some sidewalk at SR 273 stops | 3 |
| **Sidewalk Coverage** | Minimal to None | 3 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 1 (6%) | |
| Education Destinations | 0 (0%) | |
| Community Services and Shopping Destinations | 1 (3%) | |
| Health Care Destinations | 0 (NA) | |
| Food Access | 0 (0%) | |
| Transit Service Destinations (includes Bike Share locations) | 3 (0%) | |
| Civic Service Destinations | 1 (0%) | |
| Parks/Open Space & Recreation Destinations | 0 (0%) | |
| **Overall Mobility Score** | **Poor** | **4** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 24 | - |
| Total Fatal Crashes | - | 0 |
| Total Severe Crashes | 4 | 4 |
| **Total Crashes Involving a Pedestrian** | 3 | 4 |
| Total Pedestrian Fatalities | - | 0 |
| **Total Crashes Involving a Bicyclist** | - | 0 |
| Total Bicyclists Fatalities | - | 0 |
| % Occurred at Night (Non-Daylight Crashes) | 46% | - |
| **Primary Crash Types** | Rear End & Broadside | - |
| **Primary Crash Cause** | Vehicle Driver Error & Unsafe Speed | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **1.37** | 4 |
| Statewide Crash Rate | 0.94 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | 3 |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | Majority | 4 |
| RAISE Areas of Persistent Poverty Criteria | Majority | 4 |
| Climate & Economic Justice Criteria | Partially | 3 |
| SB 535 CalEPA Criteria | Partially | 3 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **4** |
| **SAFETY** | Poor | **3** |
| **RELIABILITY** | Poor | **4** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **4** |

## SEGMENT ISSUES

- High speeds and minimal bicycle and pedestrian infrastructure along SR 273 results in a high stress barrier to connectivity between destinations to the east and west.
- The intersection of Redding Rancheria Rd and SR 273 is a collision hotspot. With 17 percent of collisions resulting in serious injury, and a crash rate well above the statewide average, safety is a concern.
- Transit service is mostly reliable with many of the routes serving stops in the segment arriving on-time between 75 and 99 percent of the time. Updated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is a concern with block groups to the east and west of the corridor meeting the DAC criteria measures of disadvantage.

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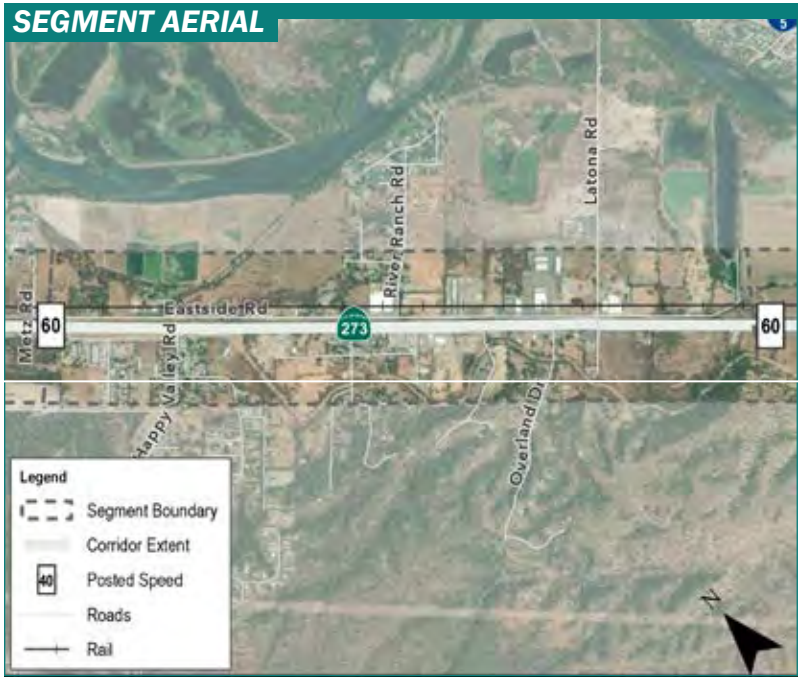
# STATE ROUTE (SR) 273 SEGMENT 8

***North of Happy Valley Rd to south of Latona Rd***

***EXISTING CONDITIONS SEGMENT OVERVIEW***

## KEY MAP

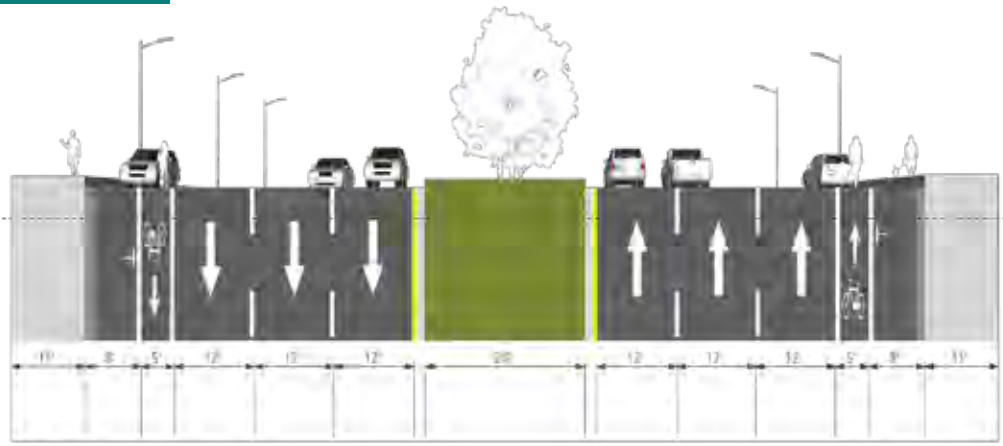
## SEGMENT AERIAL




- **Adjacent Land Use:**
  Single-family residential, small-scale commercial, industrial, agriculture
- **Place Type:**
  Rural Community/Undeveloped Corridor (Rural)
- **Key Destinations:**
  Jolly Green Giant Flea Market and Recycling Center
- **Key Features:**
  Rural community with limited destinations and minimal bicycle and pedestrian facilities

- **Segment Length:**
  2.3 miles
- **Roadway Classification:**
  Freeway/Expressway
- **Jurisdiction of Adjacent Land Use:**
  Unincorporated Shasta County
- **Posted Speed(s):**
  60 mph
- **Cross-Section:**
  4-lane divided with left turn pockets at some intersections
- **Daily Traffic Volume:**
  ~ 10,700 vehicles per day

## TYPICAL SECTION



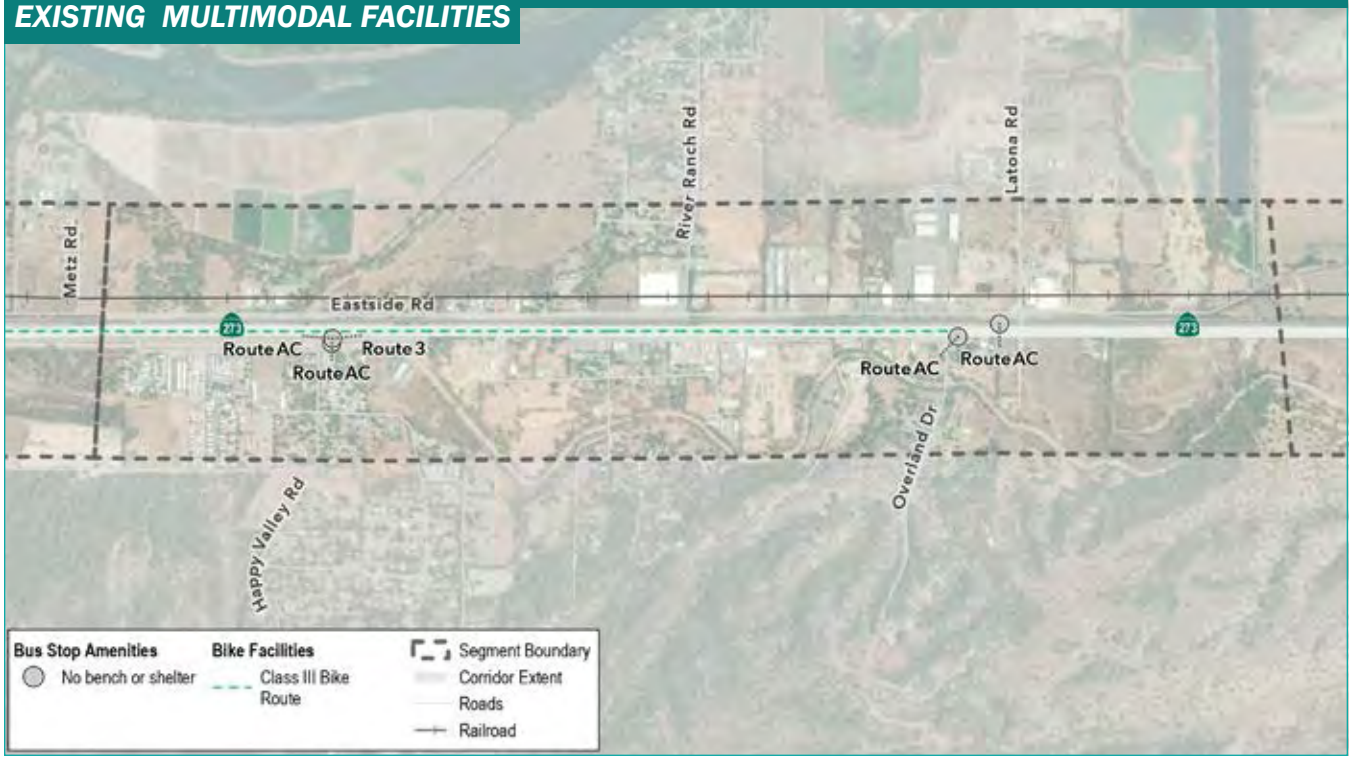
EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 8

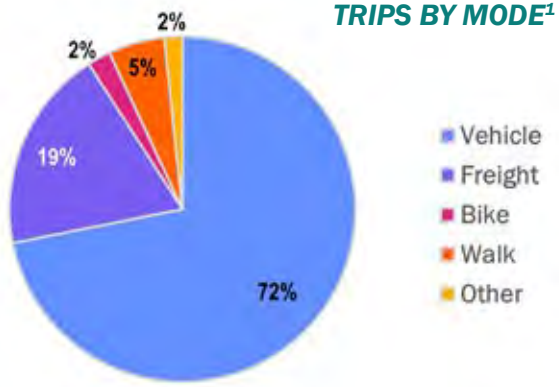
## *North of Happy Valley Rd to south of Latona Rd*

## *EXISTING CONDITIONS MOBILITY TRENDS*

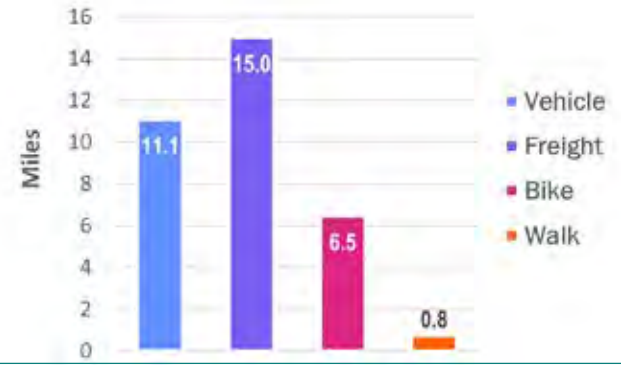
### *EXISTING MULTIMODAL FACILITIES*




### *TRIPS BY MODE[1]*

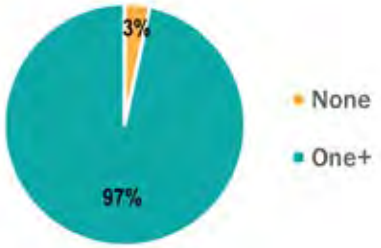



### *AVERAGE TRIP DISTANCE BY MODE[1]*




- The most common trip mode is motor vehicles, with 72 percent of trips made by a private automobile and 19 percent by a freight vehicle.
- Among all modes, freight vehicles have the highest average trip distance at 15 miles, followed by private vehicles at 11.1 miles and bike trips at 6.5 miles.
- Most people traveling within the segment have access to a car, with 97 percent of trips made by individuals living in households with access to at least one vehicle.

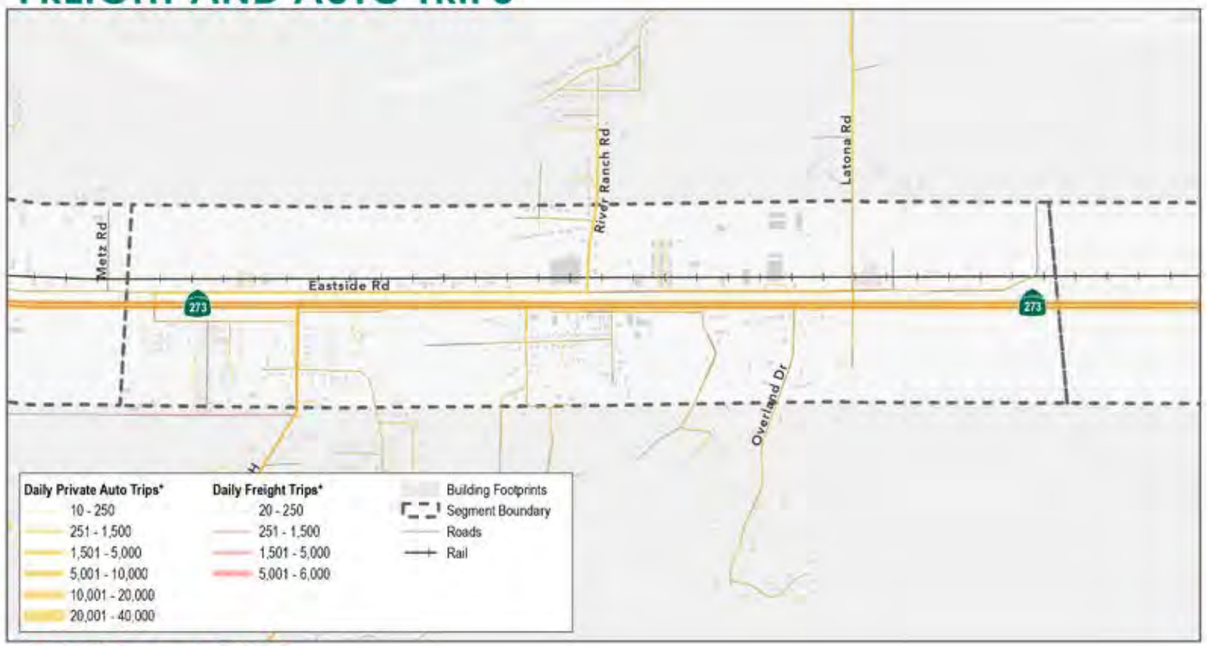
### *PRIVATE AUTO OWNERSHIP*



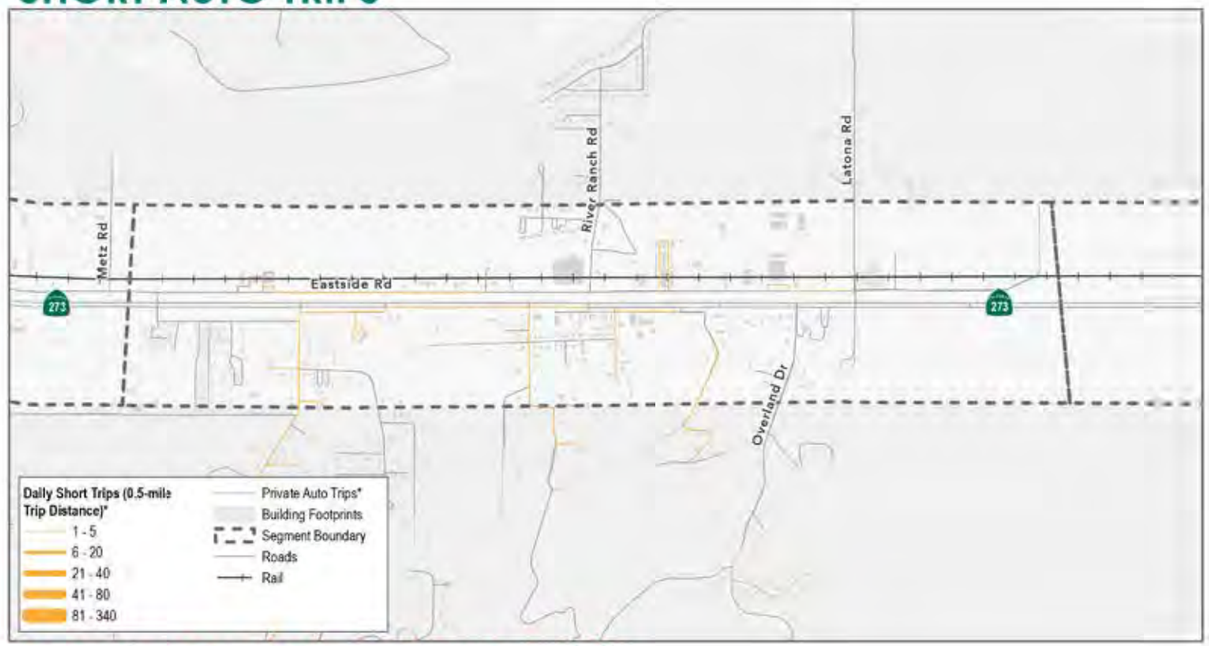

- Three percent of trips are made by people without access to a car, and people who do not have access to car are 92 times more likely to bike and twice as likely to walk than those who do have access to a car.
- Bicycle trips traveling along the segment are most concentrated on Eastside Rd and SR 273 south of Latona Rd.
- Pedestrian and short vehicle trips are minimal, with some trips along Eastside and Westside Roads and other side streets perpendicular to SR 273.
- Transit activity is focused at the stops near SR 273 and Happy Valley Rd
- Freight and private automobile trips are concentrated along SR 273 and Happy Valley Rd.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

## FREIGHT AND AUTO TRIPS

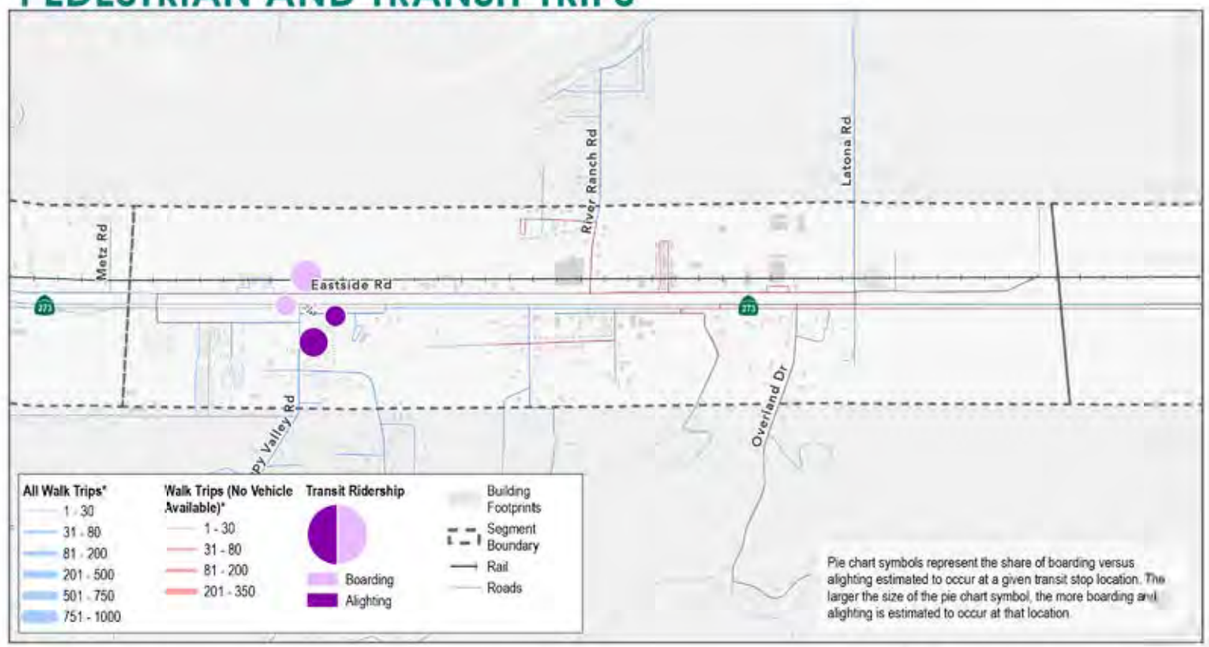



## SHORT AUTO TRIPS




## BICYCLE TRIPS

## PEDESTRIAN AND TRANSIT TRIPS




Data source: Human Geography Base: City of Redding GIS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA; Trip data: Replica Typical Weekday in Fall 2022; Building Footprints: City of Redding, Shasta County, 2023; Transit Ridership: RABA; City of Redding, QHD, 2023 Ridership; Shasta County, 2023; Rail: CA Data Hub, 2022
Created by: cpeet
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Print date: 04 Oct 2023 - 20:41

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty or reliability, and actual trip counts may vary from the numbers reported here.

N

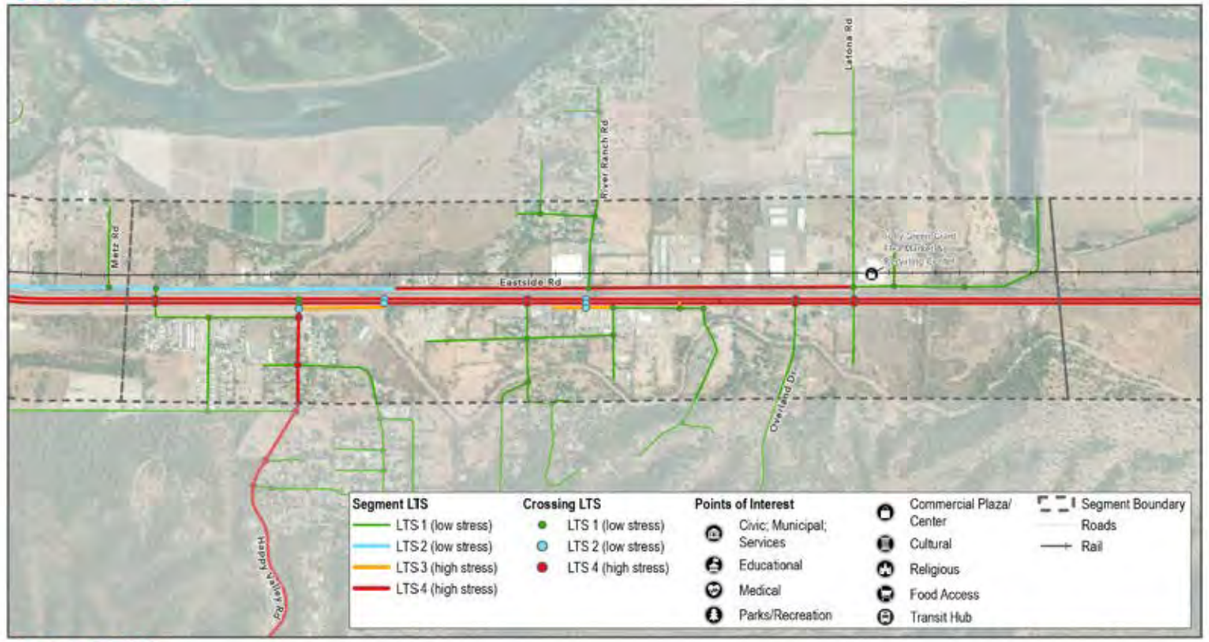
0 500 1,000 1,500
US Feet

# STATE ROUTE (SR) 273 SEGMENT 8

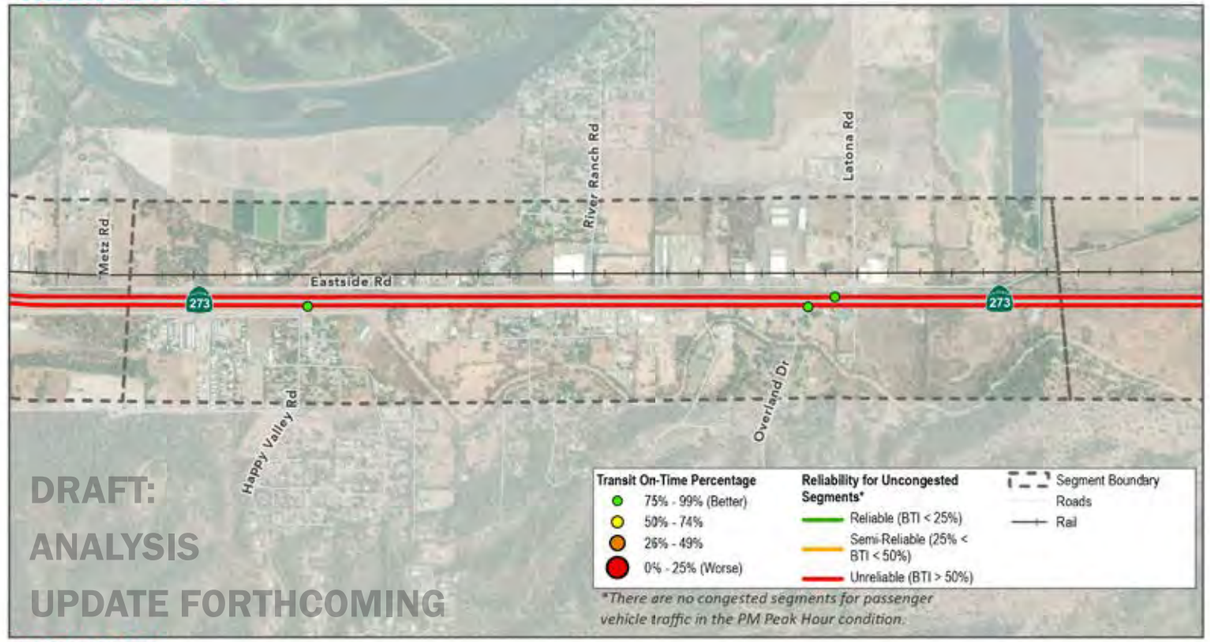
*North of Happy Valley Rd to south of Latona Rd*

***EXISTING CONDITIONS PERFORMANCE RESULTS***

## MOBILITY



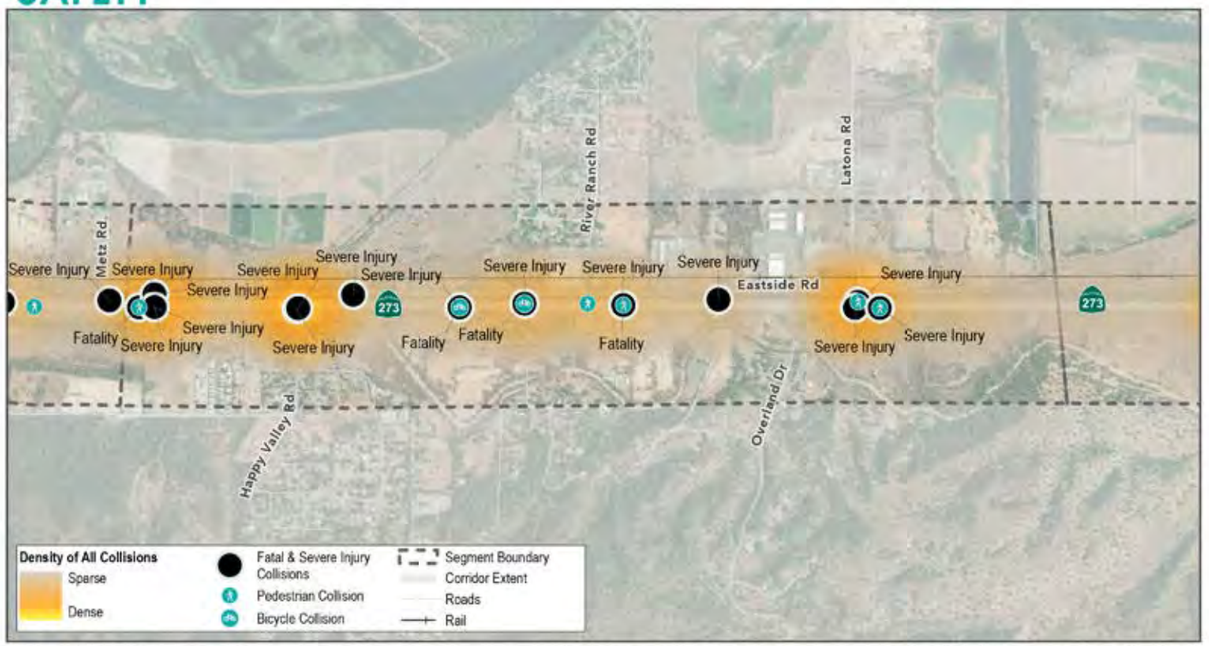

## RELIABILITY



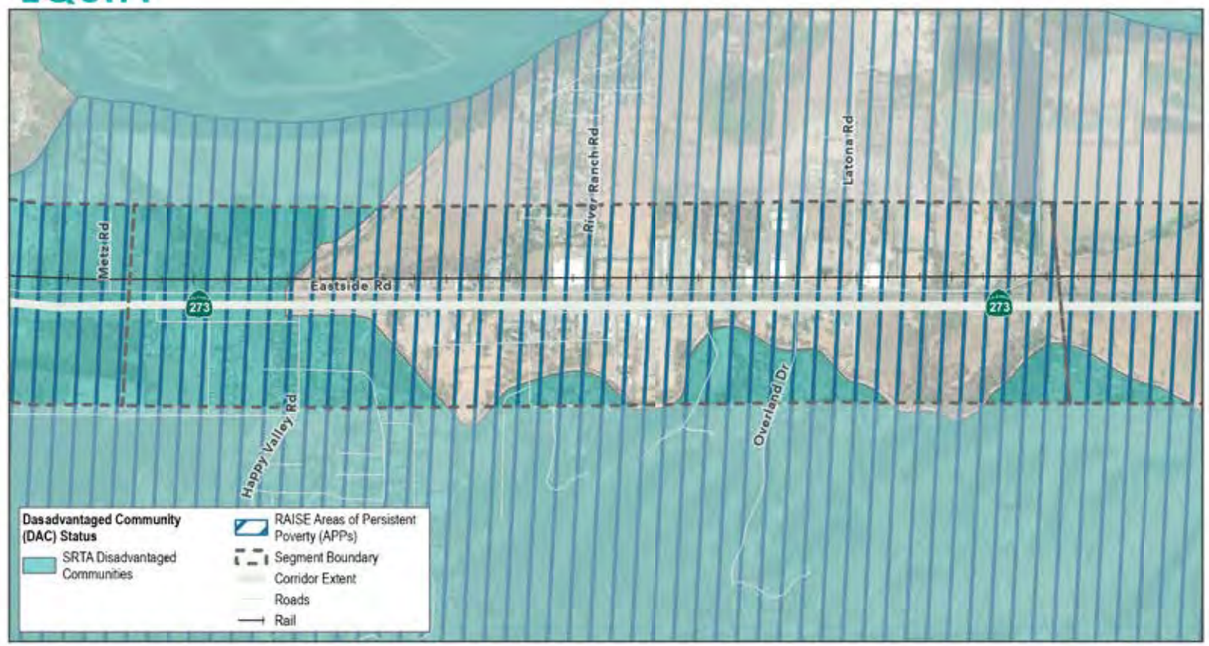

**DRAFT: ANALYSIS UPDATE FORTHCOMING**

**There are no congested segments for passenger vehicle traffic in the PM Peak Hour condition.*

## SAFETY




## EQUITY




Data source: Web Images (Firefly); Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2019-2022; DAC: SRTARTP-SCS, 2019; POI: GHD, 2023; Congestion & TTR: NMPRDS, GHD, 2019
Created by: dpeel
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Print date: 04 Oct 2023 - 20:47

N

0 500 1,000 1,500
US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 8

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Poor | 4 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | No bench/shelter | 4 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | No stops on SR 273 | 4 |
| **Sidewalk Coverage** | None | 4 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) 1,2 | 4 |
| Employment Destinations | 0 (0%) | |
| Education Destinations | 0 (0%) | |
| Community Services and Shopping Destinations | 2 (0%) | |
| Health Care Destinations | 0 (NA) | |
| Food Access | 0 (0%) | |
| Transit Service Destinations (includes Bike Share locations) | 9 (0%) | |
| Civic Service Destinations | 0 (0%) | |
| Parks/Open Space & Recreation Destinations | 0 (NA) | |
| **Overall Mobility Score** | **Poor** | **4** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 61 | - |
| Total Fatal Crashes | 4 | 4 |
| Total Severe Crashes | 10 | 4 |
| **Total Crashes Involving a Pedestrian** | 5 | 4 |
| Total Pedestrian Fatalities | 2 | 4 |
| **Total Crashes Involving a Bicyclist** | 2 | 4 |
| Total Bicyclists Fatalities | 2 | 4 |
| % Occurred at Night (Non-Daylight Crashes) | 43% | - |
| **Primary Crash Types** | Broadside | - |
| **Primary Crash Cause** | Vehicle Driver Error & Unsafe Speed | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **1.41** | 4 |
| Statewide Crash Rate | 0.18 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | **3** |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | Majority | 4 |
| RAISE Areas of Persistent Poverty Criteria | Fully | 4 |
| Climate & Economic Justice Criteria | Fully | 4 |
| SB 535 CalEPA Criteria | No | 1 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **4** |
| **SAFETY** | Poor | **3** |
| **RELIABILITY** | Poor | **4** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **4** |

## SEGMENT ISSUES

- High speeds and minimal bicycle and pedestrian infrastructure along SR 273 results in a high stress barrier to connectivity across the highway.
- Collision hotspots are seen at almost every intersection along the corridor, with more pronounced hotspots at and north of Happy Valley Rd and at Latona Rd. Twenty-three percent of collisions resulted in a fatality or serious injury, including four fatal injuries involving a bicyclist or pedestrian. The crash rate is significantly above the statewide average making safety a major concern along this segment.
- Transit service is mostly reliable with many of the routes serving stops in the segment arriving on-time between 75 and 99 percent of the time. Up dated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is a concern with block groups to the north and south of the corridor meeting the DAC criteria for three of the four measures of disadvantage.

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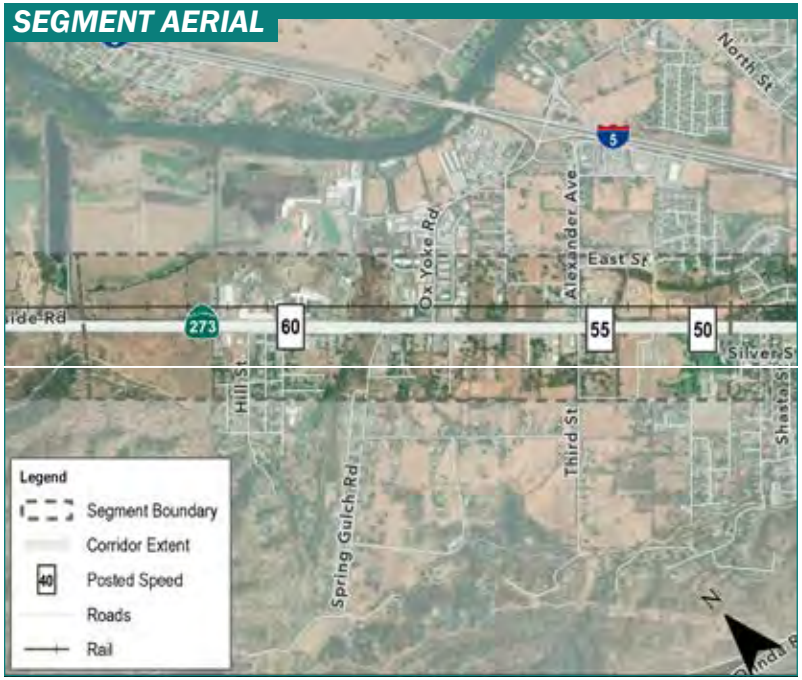
# STATE ROUTE (SR) 273 SEGMENT 9

***South of Latona Rd to north of Briggs St***

***EXISTING CONDITIONS SEGMENT OVERVIEW***

## KEY MAP

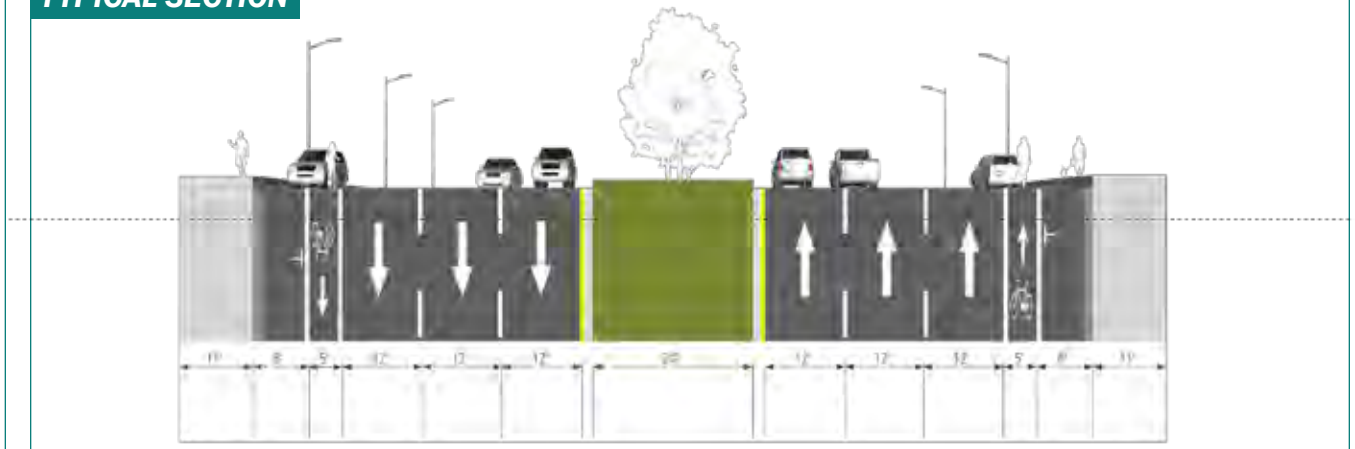
## SEGMENT AERIAL




- **Adjacent Land Use:**
  Small-scale commercial, single-family residential, industrial
- **Place Type:**
  Rural Community
- **Key Destinations:**
  Shasta District Fair & Event Center, Verde Vale Elementary School, proximity to City of Anderson
- **Key Features:**
  Rural community with limited destinations and almost no bicycle and pedestrian infrastructure

- **Segment Length:**
  2.2 miles
- **Roadway Classification:**
  Freeway/Expressway
- **Jurisdiction of Adjacent Land Use:**
  Unincorporated Shasta County; City of Anderson
- **Posted Speed(s):**
  50 to 60 mph
- **Cross-Section:**
  Mostly 2-lane divided with dirt median and left turn lanes at intersections
- **Daily Traffic Volume:**
  ~ 9,900 vehicles per day

## TYPICAL SECTION



EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 9

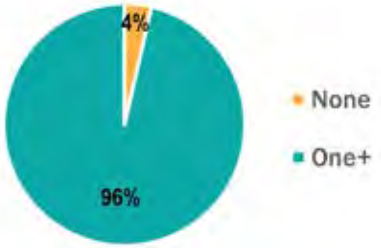
## *South of Latona Rd to north of Briggs St*

## *EXISTING CONDITIONS MOBILITY TRENDS*

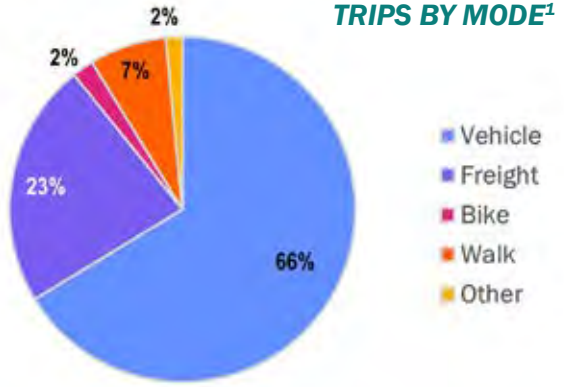
### *EXISTING MULTIMODAL FACILITIES*

- The most common trip mode is motor vehicles, with 66 percent of trips made by a private automobile and 23 percent by a freight vehicle.
- Among all modes, freight vehicles have the highest average trip distance at 28 miles, the longest across the study area
- Most people traveling within the segment have access to a car, with 96 percent of trips made by individuals living in households with access to at least one vehicle.
- Four percent of trips are made by people without access to a car, and people who do not have access to car are 98 times more likely to bike and 4 times more likely to walk than those who do have access to a car.

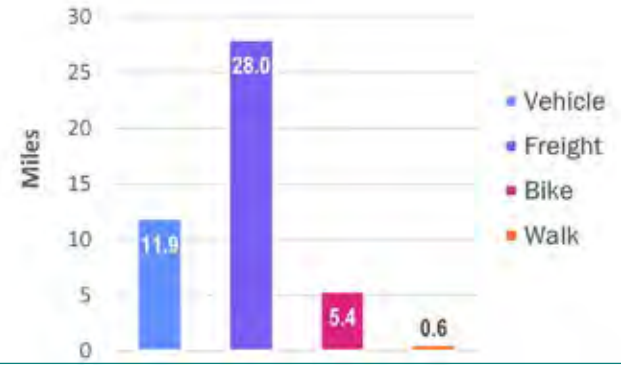
### *PRIVATE AUTO OWNERSHIP*




### *TRIPS BY MODE[1]*



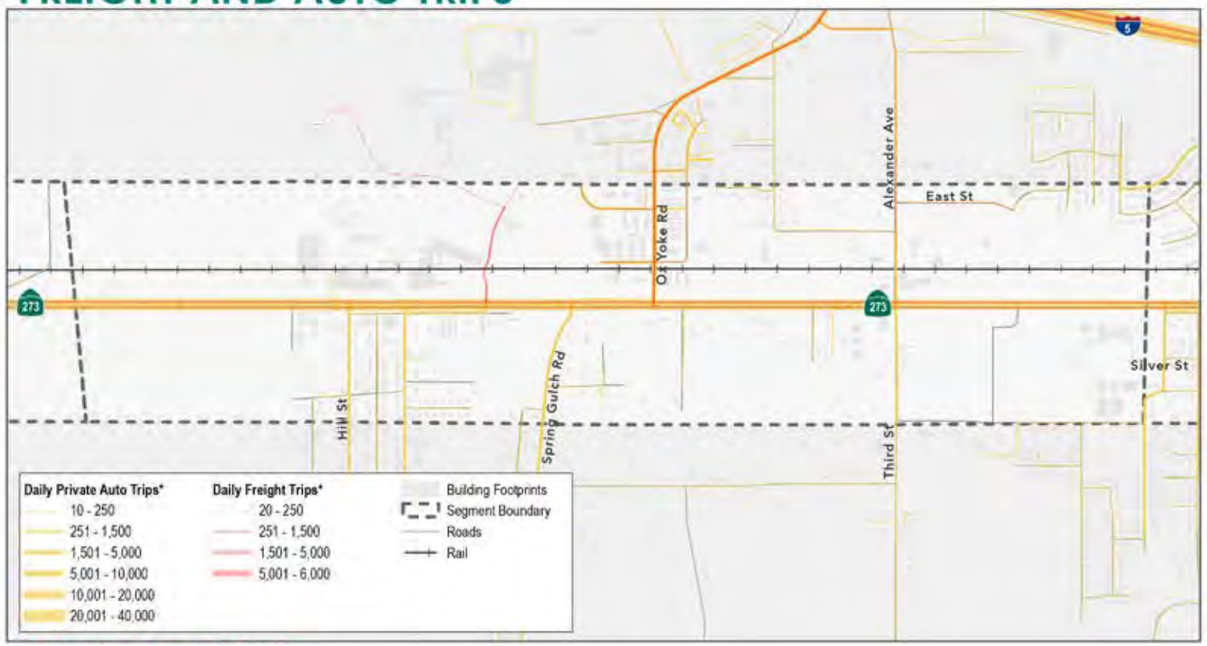

### *AVERAGE TRIP DISTANCE BY MODE[1]*



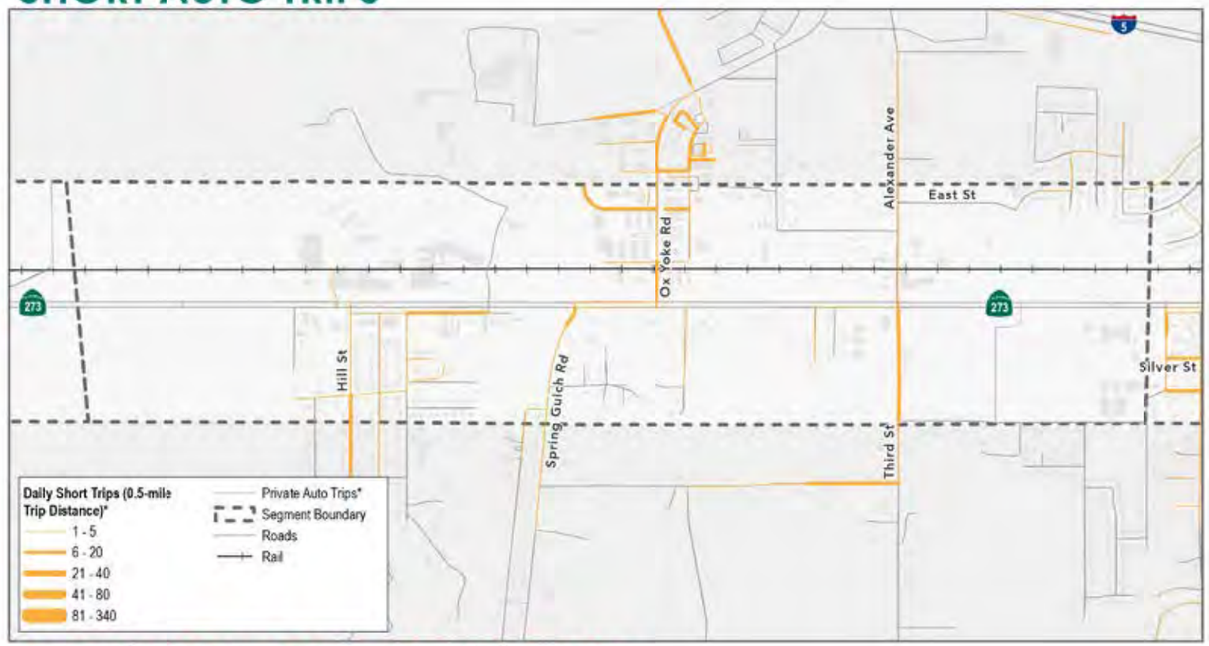

- Bicycle trips traveling along the segment are most concentrated along SR 273 and Ox Yoke Rd
- Pedestrian trips, and especially walking trips made by those who do not own a car, are also concentrated along Lake Blvd, as well as Twin View Blvd, and Hilltop Dr.
- Transit activity is also highest concentrated near Lake Blvd, with transit boarding and disembarking highest in this location due to the presence of the Masonic Transfer Center.
- Short vehicle trips are concentrated along Lake Blvd near local commercial destinations.
- Freight and private automobile trips are concentrated along I-5 and major roadways intersecting the corridor segment. Of all vehicle trips, 87% are made by private automobiles and 13% by freight vehicles.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

## FREIGHT AND AUTO TRIPS

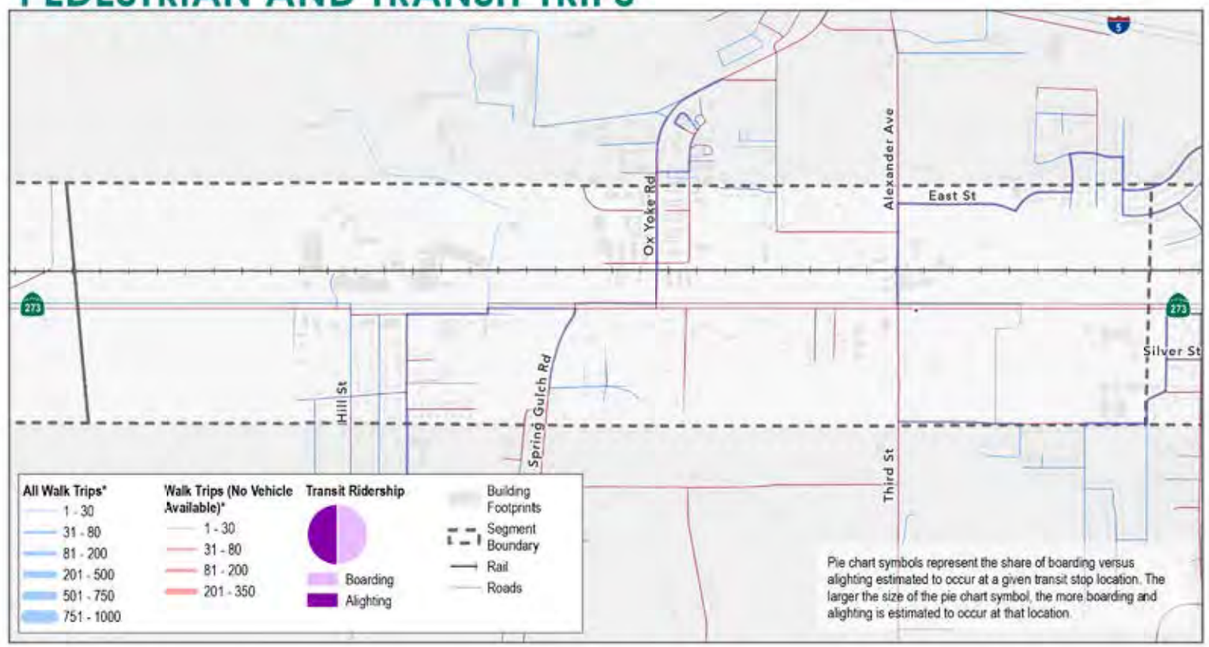



## SHORT AUTO TRIPS




## BICYCLE TRIPS

## PEDESTRIAN AND TRANSIT TRIPS




Data source: Human Geography Basic (California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Trip data: Replica, Typical Weekday in Fall 2022; Building Footprints: City of Redding, Shasta County, 2023; Transit Ridership: RABA, City of Redding, GHD, 2023; Roads: Shasta County, 2023; Rail: CA Data Hub, 2023
Created by: cpowell
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Print date: 04 Oct 2023 - 20:42

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

N

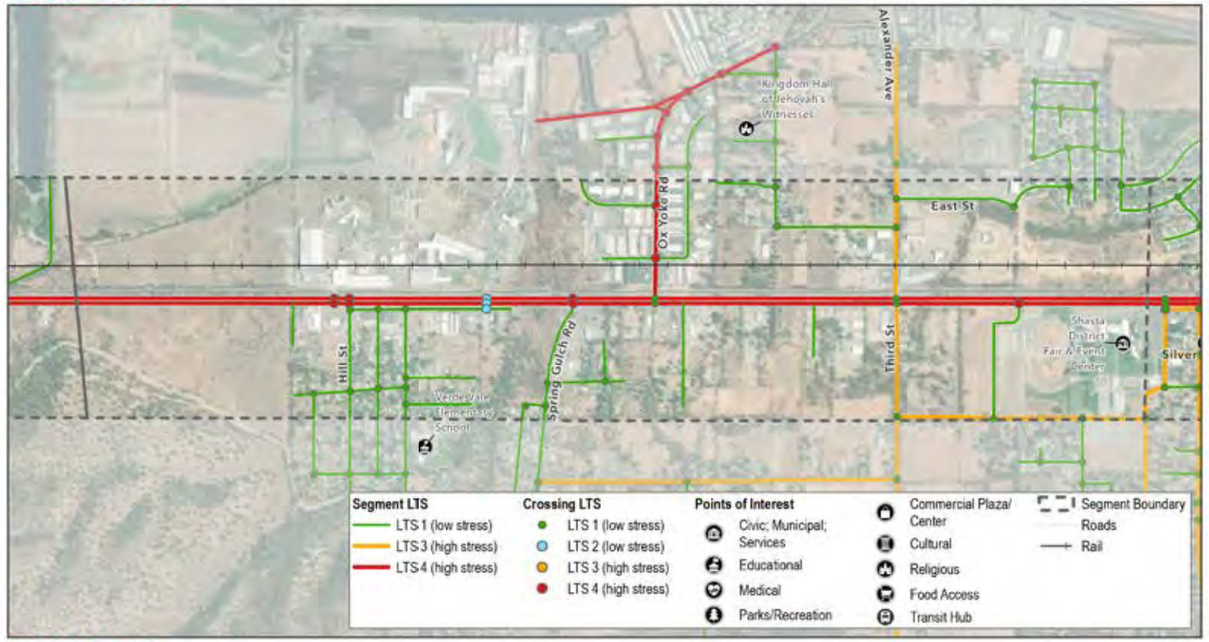
0 500 1,000 1,500
US Feet

# STATE ROUTE (SR) 273 SEGMENT 9

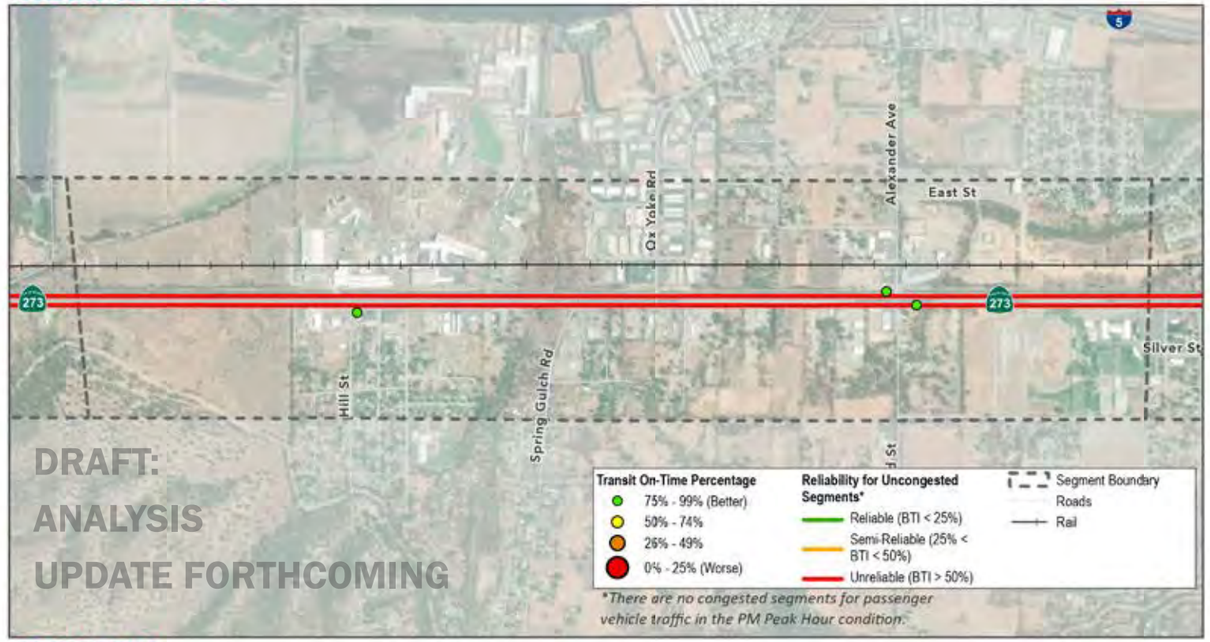
***South of Latona Rd to north of Briggs St***

***EXISTING CONDITIONS PERFORMANCE RESULTS***

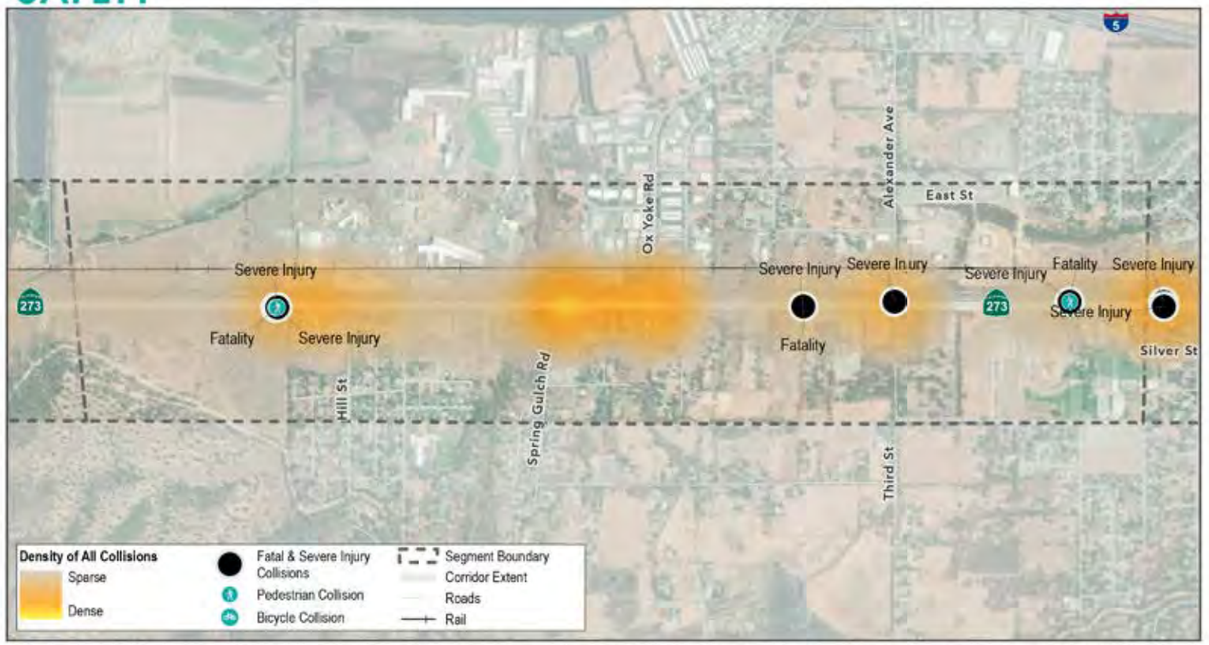
## MOBILITY




## RELIABILITY




## SAFETY




## EQUITY

Data source: Imagery: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2016-2022; EPC: SRTA/RTP-SCS, 2016; PCI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2019

Created by: sjeel

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Print date: 04 Oct 2023 - 20:50

0 500 1,000 1,500

US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 9

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Poor | 4 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Some with bench | 4 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | Some sidewalk at SR 273 stops | 4 |
| **Sidewalk Coverage** | None | 4 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 63 (0%) | |
| Education Destinations | 18 (0%) | |
| Community Services and Shopping Destinations | 232 (0%) | |
| Health Care Destinations | 39 (0%) | |
| Food Access | 34 (0%) | |
| Transit Service Destinations (includes Bike Share locations) | 20 (0%) | |
| Civic Service Destinations | 6 (0%) | |
| Parks/Open Space & Recreation Destinations | 11 (0%) | |
| **Overall Mobility Score** | **Poor** | **4** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 47 | - |
| Total Fatal Crashes | 3 | 4 |
| Total Severe Crashes | 2 | 4 |
| **Total Crashes Involving a Pedestrian** | 3 | 4 |
| Total Pedestrian Fatalities | 2 | 4 |
| **Total Crashes Involving a Bicyclist** | - | 0 |
| Total Bicyclists Fatalities | - | 0 |
| % Occurred at Night (Non-Daylight Crashes) | 30% | - |
| **Primary Crash Types** | Rear End & Hit Object | - |
| **Primary Crash Cause** | Vehicle Driver Error & Unsafe Speed | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **1.18** | 4 |
| Statewide Crash Rate | 0.94 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | **3** |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | No | 1 |
| RAISE Areas of Persistent Poverty Criteria | Majority | 4 |
| Climate & Economic Justice Criteria | Fully | 4 |
| SB 535 CalEPA Criteria | No | 1 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **4** |
| **SAFETY** | Poor | **3** |
| **RELIABILITY** | Poor | **4** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **4** |

## SEGMENT ISSUES

- High speeds and minimal bicycle and pedestrian infrastructure along SR 273 results in a high stress barrier to connectivity between destinations on either side of the highway.
- Collision hotspots are seen along SR 273 near Rona Ln, Spring Gulch Rd and Alexander Ave/Third St. With 11 percent of collisions resulting in fatality, two of which involved a pedestrian, and a crash rate that is significantly above the statewide average, safety is a major concern in this area.
- Transit service is mostly reliable with many of the routes serving stops in the segment arriving on-time between 75 and 99 percent of the time. Up dated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is a concern with block groups to the east and west of the corridor meeting the DAC criteria for two of the four measures of disadvantage.

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# STATE ROUTE (SR) 273 SEGMENT 10

## *North of Briggs St to I-5 Ramps*

## *EXISTING CONDITIONS SEGMENT OVERVIEW*

### *KEY MAP*

### *SEGMENT AERIAL*

- **Adjacent Land Use:**
  Commercial core, small-scale commercial, single- and multi-family residential
- **Place Type:**
  Urban Community/Suburban Community/ Transitional Corridor
- **Key Destinations:**
  Library, VFW, City Hall, Community Center, Teen Center, Health and Human Services office, Frontier Senior Center, community and faith-based aide centers, Grocery Outlet, Shasta Gateway Outlet Mall, Walmart Supercenter
- **Key Features:**
  Critical residential connection to Anderson, minimal bicycle and pedestrian infrastructure along SR 273 through Anderson core, but Class I bikeways on the southbound side of SR 273 south of Bruce Rd.

- **Segment Length:**
  2.2 miles
- **Roadway Classification:**
  Freeway/Expressway
- **Jurisdiction of Adjacent Land Use:**
  City of Redding
- **Posted Speed(s):**
  45 to 50 mph
- **Cross-Section:**
  4-lane divided with left turn pockets at intersections and landscaped median in some areas
- **Daily Traffic Volume:**
  ~ 9,200 vehicles per day

### *TYPICAL SECTION*

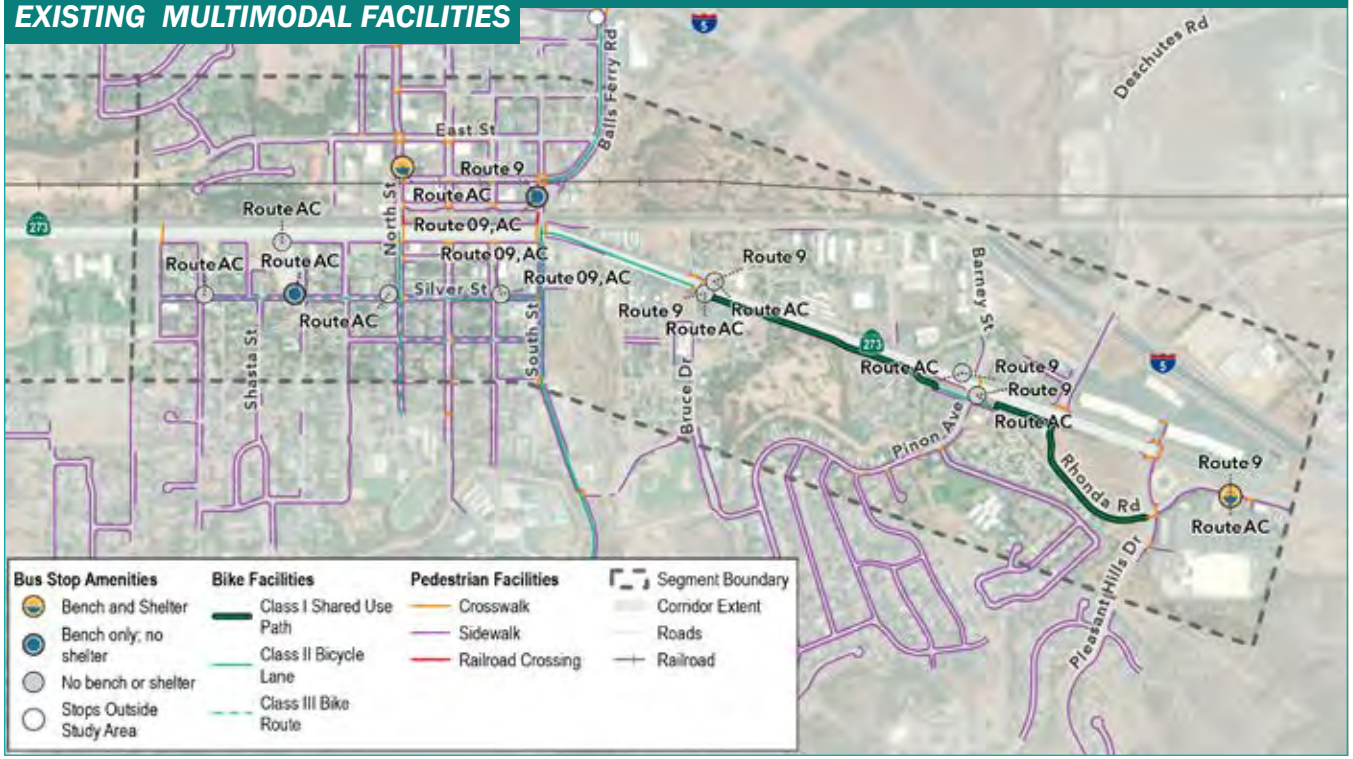
EXAMPLE IMAGE ONLY CROSS-SECTIONS FORTHCOMING

# STATE ROUTE (SR) 273 SEGMENT 10

## *North of Briggs St to I-5 Ramps*

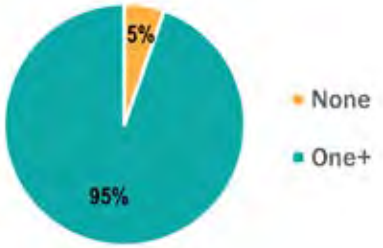
## *EXISTING CONDITIONS MOBILITY TRENDS*

### *EXISTING MULTIMODAL FACILITIES*

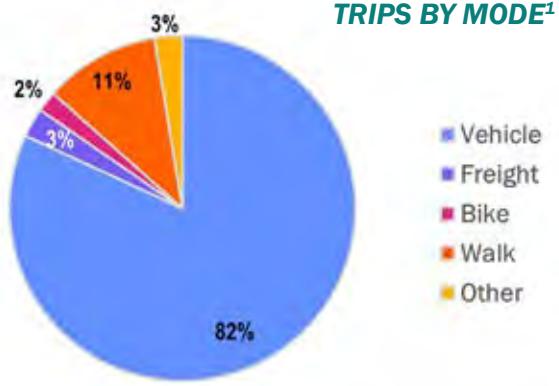



- The most common trip mode is private vehicles with 82 percent of trips made by a private automobiles, followed by 11 percent made by walking.
- Among all modes, freight vehicles have the highest average trip distance, at 19.8 miles, followed by private vehicles at 10.7 miles and bike trips at 5.7 miles.
- Most people traveling within the segment have access to a car, with 95 percent of trips made by individuals living in households with access to at least one vehicle.
- Five percent of trips are made by people without access to a car, and people who do not have access to car are 28 times more likely to bike and 4 times more likely to walk than those who do have access to a car.

### *PRIVATE AUTO OWNERSHIP*




### *TRIPS BY MODE[1]*

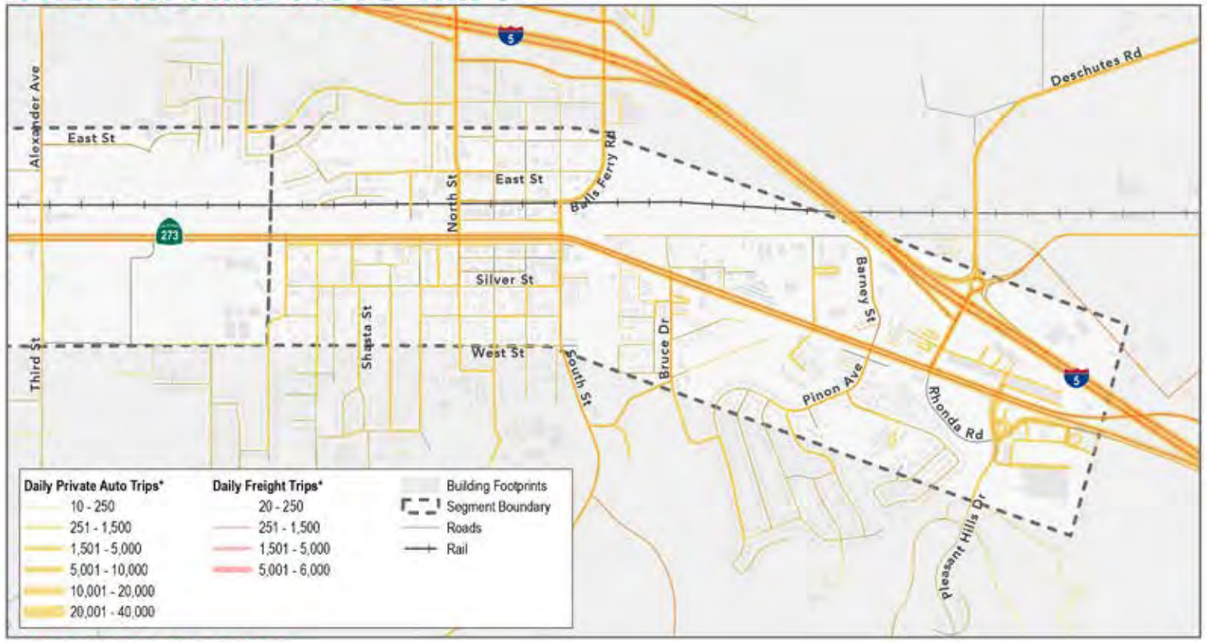



### *AVERAGE TRIP DISTANCE BY MODE[1]*

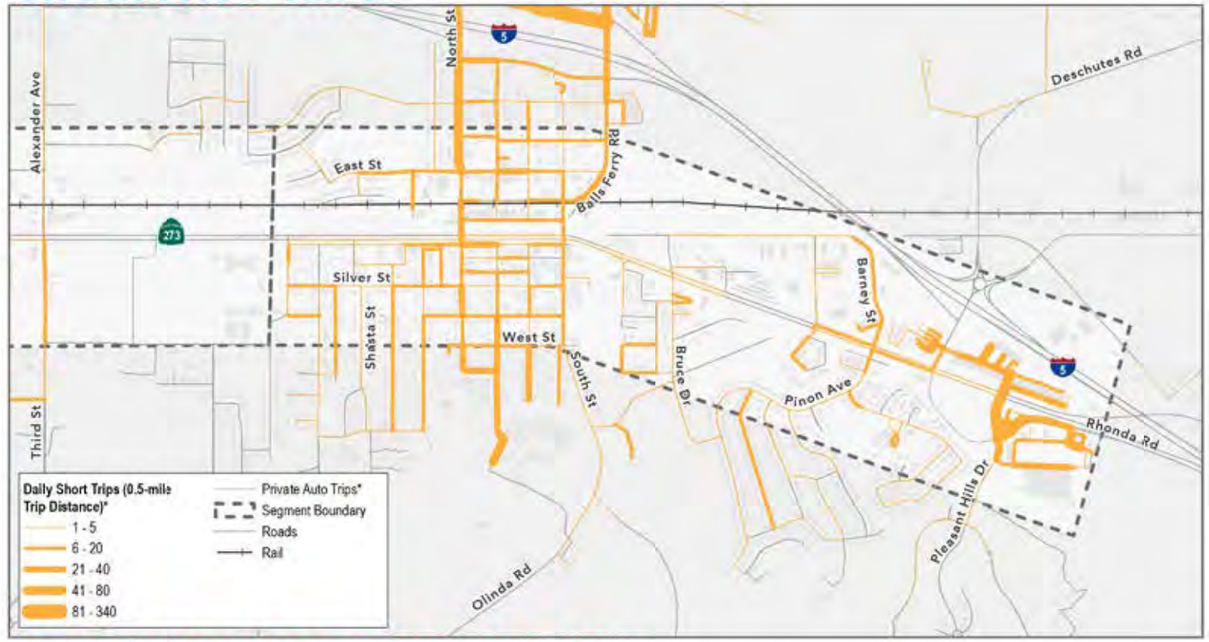
- Bicycle trips traveling along the segment are most concentrated along SR 273 south of South St, then they transition to the Class I bikeways south of Bruce Dr.
- Pedestrian trips are also concentrated similarly, however Barbey St to Marx is used as an alternative route to SR 273 by more pedestrians than bikes.
- Transit activity is concentrated near Rhonda Rd, near the Walmart shopping center,
- Short vehicle trips are also concentrated near the Walmart shopping center, as well as in the residential areas to the east and west of SR 273 through Anderson's core.
- Freight and private automobile trips are more concentrated along I-5, but a concentration of trips can be seen along SR 273 as well.

*[1] Replica, Fall 2022 Typical Thursday. Data estimates shown in the charts/graphs on this page represent trips originating in the segment. Trip estimates do not include transit data. Other includes trips made by taxi, TNCs, and other non-identified trips. Trip data shown in the maps on the page to the right include all trips to show the overall distribution of trips. These trips include trips that begin, end, or pass through a link within the segment area.*

## FREIGHT AND AUTO TRIPS

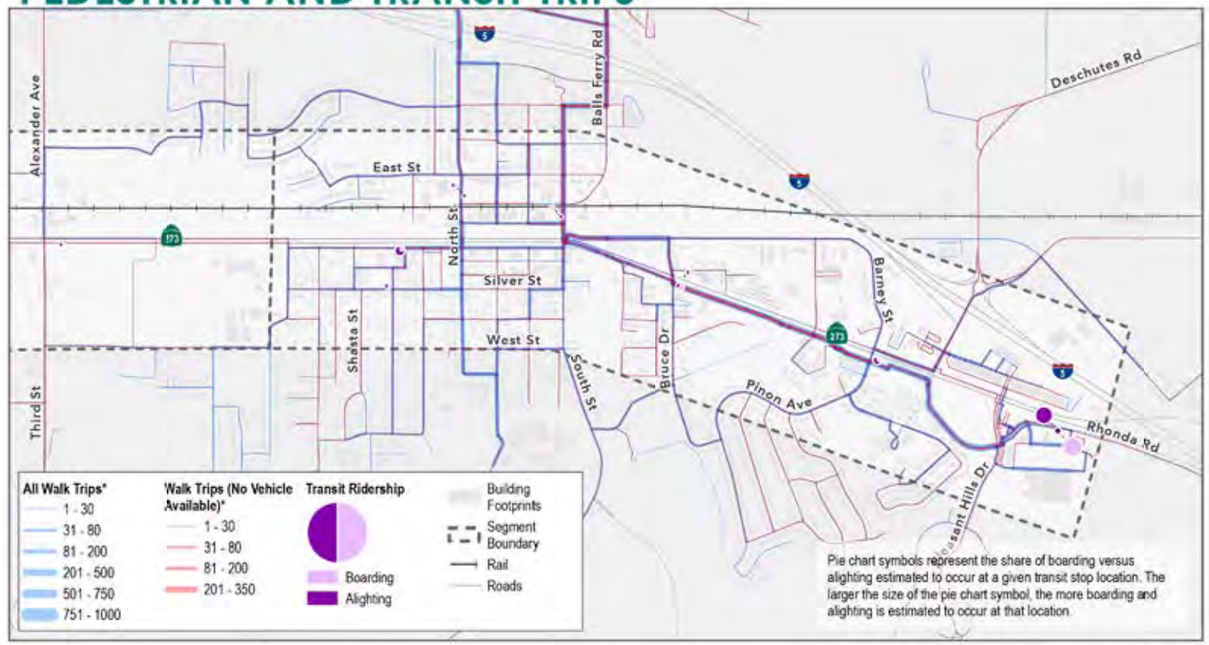



## SHORT AUTO TRIPS




## BICYCLE TRIPS

## PEDESTRIAN AND TRANSIT TRIPS




Data source: Hungarian Geography Base; California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS; Bureau of Land Management, EPA, NPS, US Census Bureau, USDA; Trip data: Replica, Typical Weekday in Fall 2022; Building Footprints: City of Redding, Shasta County, 2023; Transit Ridership: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Rail: CA Data Hub, 2023

Drawn by: jcreel

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Print date: 04 Oct 2023 - 20:43

*Data Disclaimer: Daily trips represent an estimate of a typical weekday in 2022. Volumes are an estimate only with medium certainty of reliability, and actual trip counts may vary from the numbers reported here.

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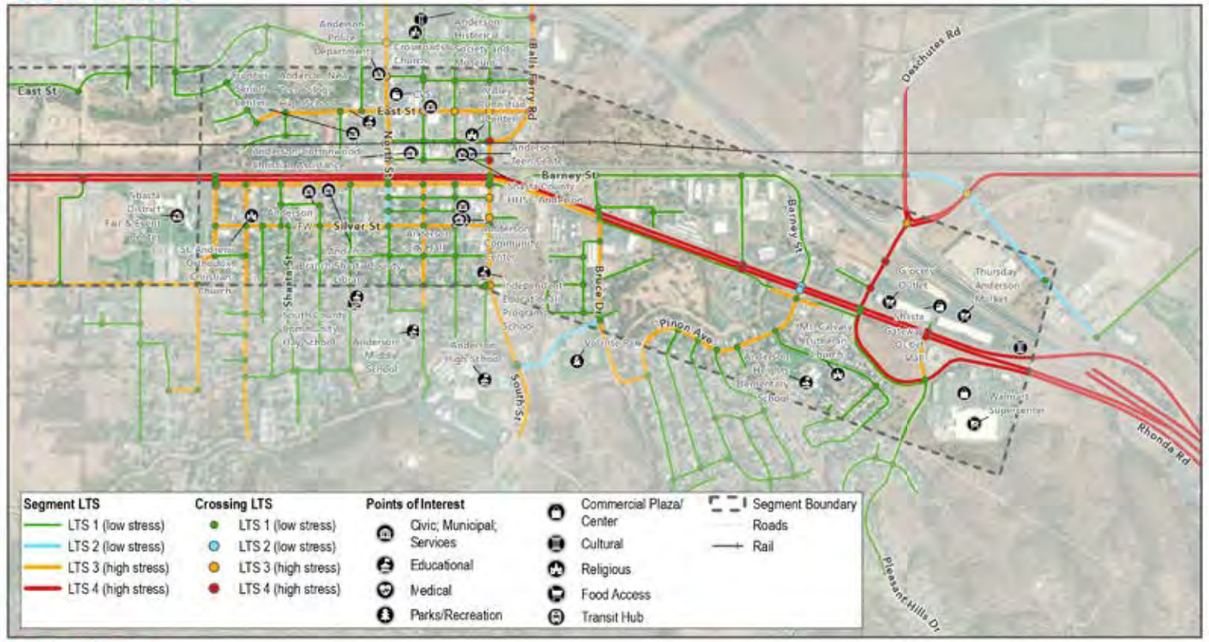
0 500 1,000 1,500
US Feet

# STATE ROUTE (SR) 273 SEGMENT 10

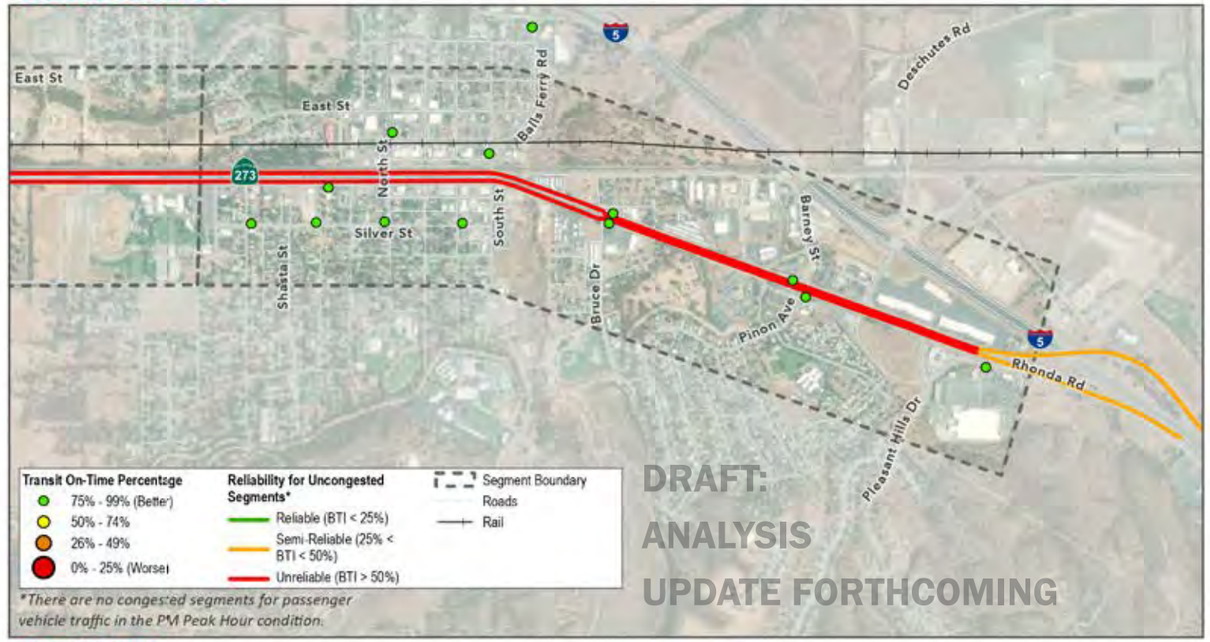
***North of Briggs St to I-5 Ramps***

***EXISTING CONDITIONS PERFORMANCE RESULTS***

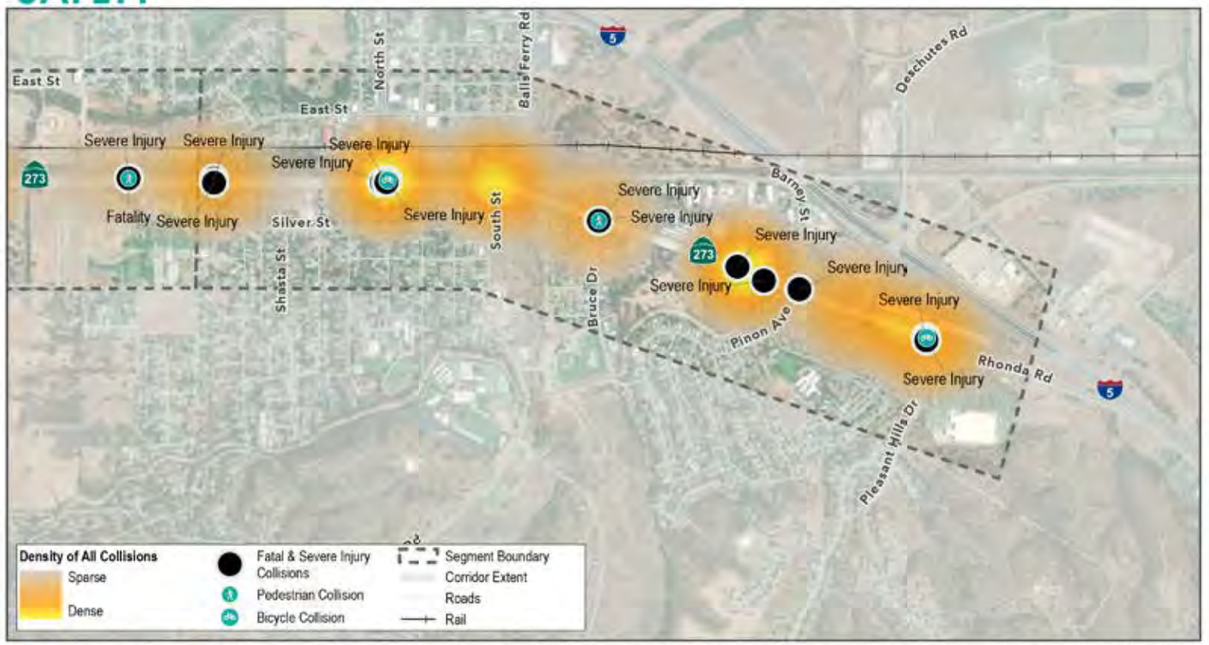
## MOBILITY



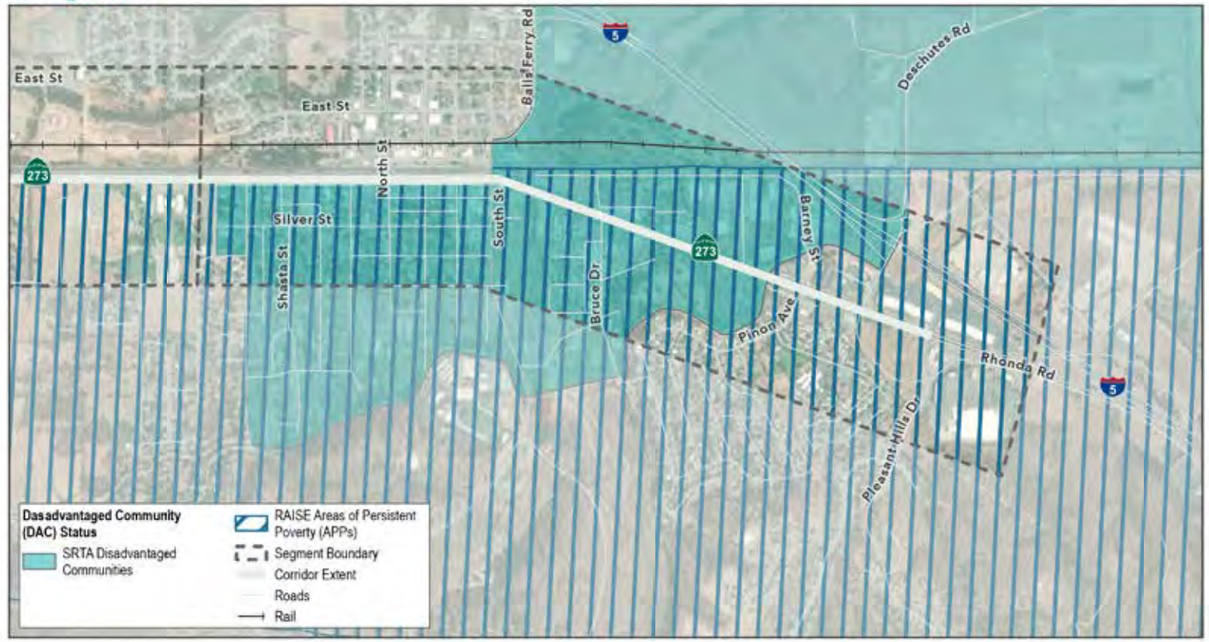

## RELIABILITY




## SAFETY




## EQUITY




Data source: Base Imagery (Firefly) Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; Transit Stops & Frequency: RABA; City of Redding, GHD, 2023; Roads: Shasta County, 2023; Highways: TIGER, 2022; Bikeways: SRTA, 2023; Pedestrian Facilities: City of Redding, 2023; Collisions: SWITRS, 2016-2022; DAC: SRTA/RTP-SCS, 2018; POI: GHD, 2023; Congestion & TTR: NPMRDS, GHD, 2019

Created by: dpeel

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Print date: 04 Oct 2023 - 20:51

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0 500 1,000 1,500

US Feet

# EXISTING CONDITIONS PERFORMANCE RESULTS SEGMENT 10

| MOBILITY & CONNECTIVITY | Result | Score |
|---|---|---|
| **Transit Stop Conditions** | Fair | 0 |
| Presence of Amenities (Shelter or Bench) at Transit Stop? | Some with bench/shelter | 2 |
| Sidewalk Connection to Transit Stop? (On SR 273, only) | Some sidewalk at SR 273 stops | 2 |
| **Sidewalk Coverage** | Medium to High | 2 |
| **Bicycle Level of Traffic Stress (LTS)** | High Stress | 4 |
| **Bicycle Connectivity to Destination Types:** | # Destinations (% Connected) [1,2] | 4 |
| Employment Destinations | 3 (27%) | |
| Education Destinations | 7 (13%) | |
| Community Services and Shopping Destinations | 10 (7%) | |
| Health Care Destinations | 2 (7%) | |
| Food Access | 3 (4%) | |
| Transit Service Destinations (includes Bike Share locations) | 27 (0%) | |
| Civic Service Destinations | 11 (5%) | |
| Parks/Open Space & Recreation Destinations | 1 (0%) | |
| **Overall Mobility Score** | **Poor** | **3** |

*[1] The # of destinations reported here are the # of destinations only within the segment. However, low stress connectivity is assessed for connections within and outside of the segment, so long as the location is reachable within a 1.5-mile biking distance.*
*[2]. Value of "NA" for the percent connected indicates that there are no connections for that node type in the full stress network within a 1.5-mile biking distance from the residential origins in that segment to compare low-stress connections against.*

| SAFETY | Result | Score |
|---|---|---|
| **Total Crashes** | 71 | - |
| Total Fatal Crashes | - | 0 |
| Total Severe Crashes | 12 | 4 |
| **Total Crashes Involving a Pedestrian** | 2 | 4 |
| Total Pedestrian Fatalities | - | 0 |
| **Total Crashes Involving a Bicyclist** | 2 | 4 |
| Total Bicyclists Fatalities | - | 0 |
| % Occurred at Night (Non-Daylight Crashes) | 44% | - |
| **Primary Crash Types** | Broadside & Rear End | - |
| **Primary Crash Cause** | Vehicle Driver Error & Unsafe Speed | - |
| **Crash Rate (Bold = Exceeds Statewide average)** | **1.92** | 4 |
| Statewide Crash Rate | 0.94 | - |
| **Overall Safety Score** | **Poor** | **4** |

| OPERATIONS & RELIABILITY | Result | Score |
|---|---|---|
| **Transit Stop Reliability** | Results provided by route | 3 |
| **Travel Time Reliability (TTR)** | Needs internal review | - |
| Vehicle - AM Peak Hour | - | |
| Vehicle - PM Peak Hour (shown on map) | - | |
| Truck - AM Peak Hour | - | |
| Truck - PM Peak Hour | - | |
| **Intersection Level of Service (LOS)** | Forthcoming | |
| **Overall Reliability Score** | **Poor** | **3** |

| EQUITY (DAC Status) | Result | Score |
|---|---|---|
| SRTA Regional Transportation Plan (RTP) Criteria | Majority | 4 |
| RAISE Areas of Persistent Poverty Criteria | Majority | 4 |
| Climate & Economic Justice Criteria | Fully | 4 |
| SB 535 CalEPA Criteria | No | 1 |
| **Overall DAC Status** | **High DAC** | **3** |

| PERFORMANCE SUMMARY | Result | Score |
|---|---|---|
| **MOBILITY** | Poor | **3** |
| **SAFETY** | Poor | **3** |
| **RELIABILITY** | Poor | **4** |
| **EQUITY (DAC Status)** | High DAC | **3** |
| **Overall Performance** | | **3** |

## SEGMENT ISSUES

- High speeds and minimal bicycle and pedestrian infrastructure along SR 273 results in a high stress barrier to connectivity between destinations to the north and south.
- Collision hotspots are seen at most of the major intersections along the corridor in this segment area. Seventeen percent of collisions resulted in severe injury and the crash rate is significantly above the statewide average, making safety a major concern.
- Transit service is mostly reliable with many of the routes serving stops in the segment arriving on-time between 75 and 99 percent of the time. Updated travel time reliability analysis is forthcoming. Results shown are a placeholder.
- Equity is a concern with block groups to the north and south of the corridor meeting the DAC criteria for three of the four measures of disadvantage.

# Appendix D.

## Public Outreach Summary

# Visioning Event Summary

# Envision 273

## Comprehensive Multimodal Corridor Plan

## INTRODUCTION

In August 2024, a Blue Zones active transportation team collaborated with neighborhood, community, governmental staff, and other leaders to create a future for State Route (SR) 273 that prioritizes multimodal transportation. This effort promotes a built environment focused on safety, health, and the well-being and livability of residents, and honors the unique character of the Cities of Redding and Anderson and the Shasta region.

The Shasta Regional Transportation Agency (SRTA) and California Department of Transportation (Caltrans) engaged Blue Zones consultants Dan Burden and Michael Williams to assess issues related to travel, traffic management, walkability, active transportation, and improved comfort and transportation for the 16.23-mile SR 273 corridor.
SR 273 serves as a business loop of Interstate 5 that travels directly through the downtown districts of Anderson and Redding in Shasta County. SR 273 was part of former U.S. Route 99. It's role as a bypass should not be for regional speed (expressway business route) but as a community-serving access route focused on safety-first. This approach will set a tone and operation to achieve successful business, multimodal, social and healthy living connections.

Dan Burden serves as an inspirational facilitator on building multimodal, equity, Safe Systems Approach, and Walkable Communities corridors. In this process, Dan and Michael used consensus-building activities with SRTA and Caltrans staff, local experts, property owners, and

the broader community to create a roadmap for how to design and operate the SR 273 corridor and other streets, to create and update operations procedures, and improve communications and outreach with the objective of improving safety, access, and comfort for all. Four area walking audits (Downtown Anderson, Miracle Mile, Downtown Redding, and Cypress Avenue) were featured in the discovery, and enhanced through two evening informed consent workshops where ideas, community preferences, and priorities were set.

# STUDY TEAM

Dan Burden is widely recognized as a thought-leader and implementation-focused practitioner in urban design, walkability, active transportation, traffic calming, safe routes to school, placemaking, and street design. He brings diverse teams together, integrating transportation planning with land use and health programming to build inclusive and vibrant communities. His expertise is in helping communities envision and implement streets that promote walking, bicycling, and social engagement.

Michael Williams is a transportation consultant specializing in active transportation and the rural environment. With more than ten years of experience as a licensed general contractor on public works projects from roads and bridges to schools, allows him to see the entire picture – from planning to construction. His experience in the active transportation field has taught him how to work with the public and government agencies to reach consensus, obtain grants and bring projects to fruition.

# FORMAT

In advance of the on-site work carried out in August 2024, the study team reviewed past materials, including previous plans and studies, surveys, traffic crash reports, and communications. The team met with Envision 273 SRTA and Caltrans leads and the GHD consultant to get needed background.

Walking audits and workshops: Over 100 people were engaged/providing feedback through 4 walking audits (Downtown Anderson, Miracle Mile, Downtown Redding, and Cypress Avenue), a nighttime walking audit, and 2 afternoon focused workshops. The team also received communications through surveys and emails.

This document provides a summary of common themes and observations on transportation and livability issues for Envision 273. From these observations and comments, we developed recommendations for enhancing and supporting the positive aspects of SR 273, as well as tools to address problem areas. Recommendations are based on national and California specific best practices (research and proven experiences from elsewhere), focused on what is most relevant to the Shasta region context.

# KEY FINDINGS

Overall, we heard "Less is More." This applies to the number of lanes, street width, and uncontrolled commercial driveways. The overriding message we heard from the community (including staff, property owners, and the public) is that people love and want to protect and restore Redding and Shasta County's rural character and lifestyle, with added walkability and livability. Additional findings:

- There is appreciation for place-restoring, maintaining and supporting multimodal planning, and active transportation features for people of all ages and abilities.

- There is general recognition that overly-wide road sections, unnecessary travel lanes, and nonessential or long auxiliary right or left turn lanes are increasing vehicle speeds. These high speeds deny access to vulnerable road users, and they further erode quality of life by contributing to high levels of noise, and creating unsafe conditions. This over-emphasis on speed and excess vehicular capacity at the cost of community reduces the multi-function and livability qualities desired in this corridor. A multimodal system is desired. "Pedestrian and bicyclist safety and convenience should also be considered when adding turn lanes at an intersection. Specifically, offset left- and right-turn lanes will lengthen crossing distances for pedestrians." FHWA. In addition, turn lanes often require adjusted signal timing to provide green time specifically for the turning movements, which increases the delay for pedestrians and bicyclists waiting to cross the road. WSDOT

- There is no engineering or capacity basis for having so many lanes on SR 273. Much of the roadway infrastructure throughout the corridor has been built (or overbuilt) to carry vastly more traffic than it does. According to the FHWA, "Typically, a Road Diet is implemented on a roadway with a current and future average daily traffic of 25,000 or less." Even by today's engineering standards, there is no reason this roadway needs so many lanes, and certainly no excuse to further widen them.

- The biggest impacts negatively affecting people's sense of community, safety, access, and comfort come from motor vehicles:
    - Many more motor vehicle trips in general, and vehicles being used in ways that are not acceptable
    - Parks, commercial districts, and schools are hard to reach
    - Getting across the street by foot or bicycle is difficult and unsafe
    - Extremes in weather/climate warrant significant new approaches to greening and shade
    - Night lighting of key streets and crossings needs a higher focus

- Despite significant recent work, the transit system is not living up to its potential. A further study is recommended.

- There are ways in which the street network and design are not functioning optimally:
    - Some of the one-way streets make travel unnecessarily inconvenient and induce unsafe speeds.
    - Posted speed limits through downtown and commercial other areas are too high. Safe and reasonable target speeds of 20-25 mph are appropriate.
    - In addition to excessive motor vehicle traffic generally, some important locations are particularly impacted, such as:

        - Downtown Anderson
        - Downtown Redding
        - Miracle Mile

- There is a desire for more central community spaces where people can gather.

# KEY RECOMMENDATIONS

Please see the two Power Point reports for illustrated recommendations

- Slow traffic speeds through design and operations to safer, more compatible levels
    - Apply default lane widths of 10 to 11 feet, and storage lanes of 10 feet
    - Eliminate unwarranted turn lanes
    - Provide urban street trees to provide scale, enclosure and traffic calming

- Apply safer, more compact intersections:
    - Consider roundabouts for all intersections. Prioritize the urban areas, such as Redding, Anderson, and Miracle Mile.
    - Intersections
        - Use curb extensions to maintain sight lines, and to reduce crossing exposure and turning speeds. Aprons can help with larger vehicles.
        - Ensure that there are no sight obstructions/restrict all vehicles being stopped/parked within 25’ of each intersection.
        - Use median noses and short medians in future rebuilds of intersections
        - For each major intersection, consider creative ideas for ensuring that people slow down/operate carefully
        - Provide crosswalks on all legs of intersections

- Provide shade and green the corridor with trees, ground cover, and boulevards. Place the highest emphasis on Anderson, Miracle Mile and Redding. Consider policies to incentivize or require business to provide canopies or vegetative cover at their storefronts.

- Celebrate streets as public spaces through an ongoing community-engagement effort.

# RECOMMENDATIONS FOR IMMEDIATE/SHORT-TERM ACTION

## OVERALL THEMES

The overriding message we heard is that people love and want to protect and restore Redding and Shasta County's rural character and lifestyle, with added walkability and livability. Overall themes included the following:

1. Route 273 provides a poor welcome, unsafe speeds, and unpleasant conditions. It is difficult to identify the entrance to any commercial area i.e. Anderson, the Miracle Mile, or downtown Redding. Gateway entries are needed.

2. A 20-25 mph target speed should be considered to bring out the social and commercial life of these areas, along with crossing islands, trees, sidewalks, protected bike lanes, parking, and book-end gateway features on each approach, such as roundabouts or chicanes.

3. Lighting. There are many areas throughout the corridor that are poorly lit and need better lighting. There are many ways of doing this that are compatible with "dark skies" goals, e.g., pedestrian-scale lighting, downlighting. Lighting improvements should be prioritized, as it is a safety issue for all road users. **Streetlights help keep pedestrians and cyclists safe —** Even when cyclists wear reflective gear and cross at marked crosswalks, they can be hard to see in the dark. If there's no nearby streetlight to illuminate them, the risk of an accident increases even further. These dangers are heightened even more for pedestrians, as they have a smaller visual profile than cyclists and can be harder to see if they're wearing dark clothing. When the streetlights go on, motorists can more easily spot vulnerable road users like pedestrians and cyclists.

4. Maintenance. Support for regular road and path maintenance, especially to avoid trip hazards.

5. Consider a high frequency bus service on the SR 273 corridor. This would reduce the vehicular volumes on SR 273 and provide additional connectivity for all, but especially for lower income populations.

# APPENDIX

## Notes on Envision 273 Nighttime Tour

Attendees:
Michael Kuker (SRTA), Todd Tregenza (GHD), Dan Burden (Blue Zones), Michael Williams (Blue Zones).

### Observations & Received Comments:

- The group toured the SR 273 corridor at night.
- We spoke to a homeless man that was walking from the park on Cypress Avenue to a friend's home south of the Goodwill store where he was going to spend the night. He was articulate and talked about his experience while homeless. He told us that he just received a ticket for loitering in a Redding park.
- We stopped at the section near the Goodwill store and observed a dark clothes pedestrian that was nearly invisible.
- At that section there was a crosswalk on only one side of the SR 273 intersection.
- We noted poor lighting levels and the presence of a streetlight directly over the crosswalk.
- Streetlights should be located away from the crosswalk to produce angled light which highlights pedestrians better.
- Generally, there were no lights along SR 273 except at the intersections and few on the frontage roads.
- Few lights for the railroad crossings.
- There were no lights on the shared use path on the west of SR 273 near the southern end.
- There were lights on the shared use path near the Rancheria.
- There was discussion as to whether a woman that was seen walking in the median earlier in the day about how she could be seen at night with the low lighting levels.

- We stopped at a market along SR 273 and asked the proprietor how many pedestrians and cyclists he saw. His response was that he saw 10 to 15 pedestrians and cyclists per day using his store. His count was a bit suspect since there was almost no visibility from the store counter to the front of the store. It wasn't clear how he could see whether someone had arrived by car, by foot, or by bike. It was noted that the driveway leading from the store to SR 273 had some access issues.

## Deficits:

- Poor lighting along SR 273 and the frontage roads
- Lack of sidewalks makes walking along SR 273 and frontage roads at night an intimidating task

## Resources (Strengths and Opportunities):

- Sidewalks do exist along some sections of SR 273
- There is some lighting along SR 273 and it appears to be concentrated at intersections where much of the pedestrian and bicycle crossing activity would occur

# Notes on Envision 273 Cypress Avenue Walk Audit

Attendees:
Michael Kuker (SRTA), Sean Tiedgen (SRTA), Todd Tregenza (GHD), a representative from Senator Dahle's office, a large group of government staff from Caltrans, the City of Redding, and Shasta County, GHD staff, Dan Burden (Blue Zones), Michael Williams (Blue Zones), and residents and business owners.

## Observations & Received Comments:

- The group toured the section of SR 273 from the intersection with Cypress Avenue to California Street.
- We discussed the South City Park and the difficulties accessing the park for nearby residents. Alternatives for creating access between the park and the neighborhood to the north/west, such as a flyover bridge or switchbacks down to a grade crossing, were discussed.
- Description of the difference between attached and detached sidewalk.

- At the Cypress Avenue intersection we noted that the signals had borders on them making them more visible. The grade of the crosswalk caused by the super elevation of the corner presented problems to people with mobility challenges and those using personal mobility devices. We talked about the difference between requiring pedestrians to always push the button (i.e., the big button versus automatic recall). We looked at the number of crossings to go south to north at Cypress Avenue and the incentive to cross against a red light or to cross at a location without a crosswalk. We talked about the lack of eyes on the park because of the way it was surrounded by streets and no homes. Michael Kuker talked about the history of SRs 44 and 99 meeting there and the layout of the intersection reflecting what had existed in order to make car travel comfortable. Caltrans informed us that leading pedestrian intervals are used at some of the signals along the SR 273 corridor.
- At the intersection of Parkview Avenue and Market Street, we saw an interruption of bike facilities. We were told that Parkview Avenue was the site of the first four lane to three lane road diet in Redding.
- At the Hermanos Restaurant north of California Avenue, there was a large undeveloped lot next to Parkview Avenue that may be developed into multi-use with residential above.
- At the beginning of our tour, we noticed two parents with strollers. There was a discussion of threat prioritization by pedestrians where tripping and near-term hazards tended to be more important to pedestrians than watching out for cars.
- Some residents talked about the unhoused folks traveling between the park and the neighborhood to the north/west. This use was stopped by installing fencing.
- At the termination of our walk at the intersection of California Street, we talked about the high percentage of fatalities that occur at intersections. The use of media noses at intersections can be a large help reducing those fatalities and slowing motorists. The intersection looked to be a good location for a gateway treatment

During the end-of-audit debrief, we heard:

- The high number of lanes at the intersections, how important it is to walk a street when looking at possible solutions, seeing the interactions in real life, how unpleasant it is to walk in this area, lack of crash data doesn't always indicate problem areas, The two things people hate - the way things are and change, development opportunities in this area, the diversity of perspectives available from different road users, including elderly and children, the lack of crashes on SWITRS for this area not showing the hostility of the corridor to pedestrians, the interest in roundabouts that is growing in the city.

# Notes on Envision 273 Downtown Anderson Walk Audit

Attendees:
Michael Kuker (SRTA), Sean Tiedgen (SRTA), Todd Tregenza (GHD), a large group of government staff from Caltrans and the City of Anderson, GHD staff, Dan Burden (Blue Zones), Michael Williams (Blue Zones), and residents.

## Observations & Received Comments:

The group toured SR 273 and the downtown area of the City of Anderson. The tour started at Anderson City Hall, then moved east across SR 273, north along East Center Street, west across SR 273, and south along West Center Street back to Anderson City Hall.

- SR 273 splits Anderson in two. Schools are located on one side but homes are located on the other side.
- The emphasis should be to focus on people and place. Reverse past mistakes that caused us to overemphasize automobility. Parking is overdone in this area.
- At the intersection of Howard and Douglas Streets, we looked at the street width and how it was far too wide for the uses that we saw.
- At the crossing of SR 273 on South Street, we noticed the use of leading pedestrian interval (LPI) at that signal. Shared use paths on both sides of SR 273 to the south of this intersection we're identified. The old 99 Trail is located on the east side of SR 273 to the south of this intersection. The crosswalk grade was pointed out as making it tough for people using personal Mobility devices. This intersection was identified as a good location for a gateway treatment. Discussion of the importance and benefit of gateway treatments was held.
- As we walked north on East Center Street, we noted the amenities added during the Reconstruction in 2014. There was seating available on the sidewalk. But still the street was too wide. We measured it at 68 ft in width. This width can provide room for diagonal or back in parking and other amenities such as bicycle lanes or wider sidewalks. We noted some trip hazards

in this corridor in the need to make them visible. When driveway into a business was overly wide - 14 ft is a good width for a single direction driveway. We talked about the three sidewalk zones, the importance of tight corner radii, high visibility crosswalk markings.

- At the Veterans Walk of Honor Plaza, we rested and enjoyed the place created there.
- At Club 49, we noticed the awning which provided shade. Dan talked about the five things necessary for a successful downtown: transparency, enclosure, complexity, imageability, and human scale. Discussion was had on how to incentivize these five factors for developers.
- At the intersection of North Street and West Center Street, we talked about Target Speed versus Design Speed, land use and how that influences the speeds of people drive at, median noses, lack of shade as a pedestrian barrier, and the fact that walkability is desired by many but provided only by a few cities. Reference to AARP surveys showing older people strongly desiring walkable neighborhoods. We talked about how the levels of noise are related to vehicle speed and speed limit setting procedures in the State of California.

During the end-of-audit debrief, we heard:

- The importance of shade, the fact that Howard Street is 60 ft wide and provides room for medians or bump outs Etc., the importance of connectivity to vulnerable road user networks, the trail to Walmart that exists but some people were not aware of, the need for more residents to get involved, the fact that pedestrian crossings of SR 273 are incomplete and the need for crosswalks on all legs of intersections, how motor vehicle speed drives noise in the corridor, the importance of place making, walkability and the need to design for what you want, public space being as good as and or complementary to private space, the importance of grade for personal mobility device users, the importance of field visits, and the importance of commercial buildings with windows fronting sidewalks.

# Notes on Envision 273 Miracle Mile Walk Audit

Attendees:
Michael Kuker (SRTA), Todd Tregenza (GHD), a large group of government staff from Caltrans, the City of Redding, and Shasta County, GHD staff, Dan Burden (Blue Zones), Michael Williams (Blue Zones), and residents.

## Observations & Received Comments:

- The group toured a portion of SR 273 known as Miracle Mile. We began at Caldwell Park, traveled north along SR 273, crossed 273 at Arboretum Drive, traveled south along 273 back to Caldwell Park. Prior to the walk, we drove through the well-established, single-family neighborhood to the west of SR 273. It featured large mature trees. The street was well canopied. The homes were smaller and likely built in the post-World War II period. Sidewalks were intermittent and the neighborhood had experience problems with cut through traffic between Quartz Hill Road and Benton Drive. These streets are too wide for their use.
- Near the park, we measured Quartz Hill Road as 73 ft in width from curb to curb and featuring a 17 ft wide two-way left-turn lane (TWLTL). We had discussion about attached versus detached sidewalks.
- At the intersection of Quartz Hill Road and Market Street, we discussed the concept of conflict points and how roundabouts reduce those. We talked about the possibility of a gateway at that location. We noted a right turn lane that was 15 ft wide and discussion was had about the necessity of that width. The width of Market Street at the southern leg of that intersection was 92 ft. We learned that a mountain bike park was being built nearby. Regular crashes were said to occur on the south side of the bridge where Market Street takes a left turn. Driver's heading south failed to navigate the turn and crash into the building there.
- While walking north along Market Street, we stop near the advanced power store and discovered there was 50 ft of width provided for the northbound lanes alone.
- Next to the SJ Denham auto dealership, we saw an older woman jogging in the bike lane. We were told that the intersection with Arboretum Drive can experience backed up traffic due to pick up and drop off at the Turtle Bay School located to the east along Arboretum Drive.
- At the northernmost crosswalk of SR 273 at the intersection with Arboretum Drive, we measured the street as being 120 ft wide. At this location, we saw a person with a stroller crossing at mid-

back without a crosswalk and a couple of other pedestrians safely crossing mid-block without a crosswalk.

During the end-of-audit debrief, we heard:

- Unnecessary road width, what amenities could be provided with that road width, the noise levels we had experience during the walk audit, and the benefits provided by countdown timers.

# Notes on Envision 273 Downtown Redding Walk Audit

Attendees:
Michael Kuker (SRTA), Todd Tregenza (GHD), a large group of government staff from Caltrans, the City of Redding, and Shasta County, GHD staff, Dan Burden (Blue Zones), Michael Williams (Blue Zones).

## Observations & Received Comments:

- The group toured a portion of SR 273 in the downtown Redding area. The walk audit started at Theory Coffee Roasters at the intersection of California Street and Division Street. We walked north along California Street to SR 299, traveled east along SR 299 to Pine Street, traveled south along Pine Street to Tehama Street, traveled west along Tehama Street, north along Market Street, and return to Theory Coffee Roasters.
- At the beginning of our walk audit, we noticed the new two-way cycle track on Division Street. We saw some motorists driving in the cycle track for a very short distance. We measured the travel lanes on Division Street as 11 ft wide.
- At the intersection of Eureka Way and California Street, we estimated the corner radius at the southwest corner as 48 ft while the southeast corner had only a 15 ft corner radius. Discussion was had about the benefits of smaller Corner radii and the options available to street designers to accommodate larger vehicles while maintaining small corner radii for small vehicles.
- At the intersection of Eureka Way and Market Street, we noticed a missing crosswalk on the northern leg of that intersection. Discussion was had about the number of conflicts created by omission of crosswalks on legs of intersections.
- At the intersection of Eureka Way and Pine Street, we observed a planter placed between the sidewalk in the parking lot and the mature sycamore trees in Red Oak in that area. Discussion was had about the importance of shade, separation of the sidewalk from parking lots and streets, and the atmosphere created by the presence of a mature canopy.
- At the intersection of Pine and Shasta Streets, we all noted the noise levels created by the traffic and the accelerating vehicles, we noted the presence of plentiful shade, we talked about the possibilities for traffic signal equipment control boxes being used for maps or public art, and we

discussed the advantages and disadvantages of the dual right turn lanes leading from Shasta Street to Pine Street for westbound drivers. Further discussion was had here about the issues of leading pedestrian intervals and the importance of synchronized signals to motorist mobility. This provoked discussion of a clash of values, notably those of providing mobility to motorists versus those of creating a pleasant and walkable downtown.

- At the intersection of Pine and Tehama Streets, we noticed a long, continuous awning along Tehama Street. The clear benefit of the shade and the enclosure was discussed. The three sidewalk zones were described. The five factors that help create a vital downtown were discussed: being seen, enclosure, complexity, imageability, human scale.
- At the Tehama and Market Streets intersection, we observed the three left-hand turn lanes leading from Market Street to Tehama Street. Dan Norris of Caltrans stated that there were approximately 21,000 vehicles per day counted on Tehama Street. The number of vehicles turning and accelerating made for high noise levels. A notable contrast was seen along Market Street south of Tehama Street.
- At the intersection of Shasta Street and Market Street, we observed the presence of bulb outs, talked more about the importance of small corner radii, and the options of using aprons to create tight radii for most vehicles but allow for turning movements of larger vehicles.

During the end-of-audit debrief, we heard:

- Mentions of the importance of shade, the high levels of noise experienced, the importance of the five factors to create a great downtown, the amount of truck traffic and the size of those trucks, the fact that pedestrians need to be hyper aware in this setting, the incidence of speeding by motorists, the fact that people disappear from this downtown area after 5:00 p.m., the soon-to-be-built two-way cycle track on California Street, and the public backlash around that facility.

# Interactive Map Comments

| ID | Type | Comment | Primary Themes | Sub-themes | Sentiment |
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| 1 | Ideas and Suggestions | Why is this street blocked most of the way in this section? Ove never seen a blockade in the middle of a street...If we could move the blockade over at least a little I could get my mobility scooter through this street, make my commute to work and home not as long, and I wouldn't need to go out of my way to 273 instead. This is the difference between it taking me 45 to get to work to 25. Please help if you can. Doesn't seem fair that only walker can get through but big mobility scooters can't. | Multimodal Transportation | Access/Blocked Roads; Accessibility; Pedestrian Paths | NEGATIVE |
| 2 | Ideas and Suggestions | Unblocking this street would create a less high trafficked and safer 273. Everyone not looking for a fast highway can go all the way through this street instead of detouring to 273 just for this section of the street. This causes unnecessary traffic on 273 especially things too big to go through the blockade like mobility scooters that don't need to be there because it's actually out of the way and making their already long commute longer and is a less safe route. | Roadway | Access/Blocked Roads Accessibility; Congestion; Pedestrian | NEGATIVE |
| 3 | Ideas and Suggestions | Why is this section blocked off? | Roadway | Access/Blocked Roads | NEGATIVE |
| 4 | Ideas and Suggestions | Very busy intersection. We have used it daily for 33 years. It has pot holes and is very unattrMultimodal. Some trees or landscaping would be nice on the eastern edge of it. Also, transients cross this busy intersection to get to and from the Jack in the Box area and back over the railroad tracks, maybe a fence could block them as it's very dangerous. | Placemaking | Pedestrian; Placemaking | NEGATIVE |
| 5 | Ideas and Suggestions | Clear Creek Wastewater Treatment Plant could be a source for drought proof reclaimed water for landscaping and beautification of the corridor. | Placemaking | Placemaking | NEUTRAL |
| 6 | Ideas and Suggestions | Continuation of bike line on court street to MLK park and Mercy Medical Ctr | Multimodal Transportation | Bicycle Lanes/Paths | NEGATIVE |
| 7 | Ideas and Suggestions | Maybe an amphitheater/park area to hold bigger events and draw more people to the area! Like movies in the park and concerts! | Placemaking | Placemaking | NEGATIVE |
| 8 | Ideas and Suggestions | Eliminate outside 3rd lanes and convert to parking. Install Class IV bike lanes in current parking with hard median between bike lane and parking, whether landscaped, storm drain improvement, or both. | Multimodal Transportation | Bicycle Lanes/Paths | NEUTRAL |
| 9 | Ideas and Suggestions | Widen bridge to add Class I, multiuse paths on both sides of bridge. Connect these with Sacramento River Trail. | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths; Recreation | POSITIVE |
| 10 | Ideas and Suggestions | Elevate railroad tracks over S. Bonnyview Road. | Freight | Freight | POSITIVE |
| 11 | Ideas and Suggestions | Very inconvenient to have this blocked. Why? It relieves traffic on 273 | Roadway | Access/Blocked Roads; Congestion | POSITIVE |
| 12 | Ideas and Suggestions | Agreed that this street being open relieves 273 traffic congestion | Roadway | Access/Blocked Roads; Congestion | NEUTRAL |
| 13 | Ideas and Suggestions | Eliminate the jump for the railroad track and Widen the railroad crossing. | Freight | Freight; Roadway | NEGATIVE |
| 14 | Ideas and Suggestions | Eliminate the hump. | Freight | Freight; Roadway | POSITIVE |
| 15 | Ideas and Suggestions | Straighten curves and change northbound speed approaching the curve. | Roadway | Straighten Curves | NEUTRAL |
| 16 | Ideas and Suggestions | Pushing through a connection here to Sundial bridge would allow people working downtown to cross the 44 bridge via rivertrail without travelling on busy roads. | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths; Recreation | NEUTRAL |
| 17 | Ideas and Suggestions | upgrade all traffic lights in downtown to be sensitive to bicycle traffic. I'm tired of having to get up on curb to press pedestrian crossing button. | Multimodal Transportation | Bicycle Crossings; Traffic Control | NEUTRAL |
| 18 | Ideas and Suggestions | Could the two separate Eastside Roads link up to become one Eastside road that the bikeway could be placed on? | Multimodal Transportation | Bicycling Lanes/Paths | NEUTRAL |
| 19 | Ideas and Suggestions | Create elevated crossing for bikes and pedestrians so they can access Eastside and Westside roads while avoiding highway and railroad crossings. Incorporate vegetation for aesthetics, cooling, and shade OR create a solar panel roof over the walkway to power part of the 273 corridor while shading the walkway. | Multimodal Transportation | Bicycle Lanes/Paths; Landscaping; Pedestrian Paths; Shade/C | NEUTRAL |
| 20 | Ideas and Suggestions | Construct roundabout(s) to promote lower driving speeds on Eastside Road. This would disrupt the straight alignment of Eastside, which may reduce temptation for some drivers to use as a high speed frontage road. Traffic delays would be minimal if installed at relatively small intersections. | Traffic Calming | Roadway; Traffic Calming; Traffic Control | POSITIVE |
| 21 | Ideas and Suggestions | Between Highway 273 and Westside Road there is a strip of unpaved surface where a power line exists. Use this to make a bike & pedestrian pathway. Plant shade trees to make the corridor safer, more aesthetic, and significantly cooler on hot summer days. Install bike racks and benches under shaded areas. Include lighted crosswalks across intersections. | Multimodal Transportation | Bicycle Lanes/Paths; Landscaping; Pedestrian Paths; Shade/C | NEGATIVE |
| 22 | Ideas and Suggestions | Improve bus stop here. 1) Add secure bike racks so people can bike from nearby neighborhoods to bus stop and then continue commute to Redding on bus. 2) Designate this small parking lot as a Park & Ride for commuters between Anderson/Tehama County and Redding. 3) Improve shade structure to make it more appealing, safer in summertime. | Transit | Bicycling; Placemaking; Transit | MIXED |
| 23 | Ideas and Suggestions | Improve RABA bus stop here. Add secure bike racks so people can bike from nearby neighborhoods to bus stop and then continue commute to Redding/Anderson on bus. Improve shade structure to make it more appealing, safer in summertime. | Transit | Transit; Bicycling; Placemaking | NEUTRAL |
| 24 | Ideas and Suggestions | Improve sidewalk in Anderson between South Street and Walmart/Gateway Shopping Center to provide pedestrian access to stores, bus stops | Multimodal Transportation | Pedestrian Paths; Transit | NEUTRAL |
| 25 | Ideas and Suggestions | Convert part of Barney Road to a designated bike and pedestrian trail. This could link pedestrian access throughout Anderson, since Barney provides connectivity between South Street and the bike path that starts near Pinon Avenue. As part of this, add an illuminated crosswalk to the Pinon Avenue x 273 intersection. | Multimodal Transportation | Bicycling Lanes/Paths; Pedestrian Paths; Pedestrian Crossings | POSITIVE |
| 26 | Ideas and Suggestions | Grants might be available for this from CA Department of Water Resources https://water.ca.gov/work-with-us/grants-and-loans | Funding and Programs | Funding and Programs | NEGATIVE |
| 27 | Ideas and Suggestions | Grants could be available for this from CA Department of Water Resources https://water.ca.gov/work-with-us/grants-and-loans | Funding and Programs | Funding and Programs | NEGATIVE |
| 28 | Ideas and Suggestions | https://water.ca.gov/work-with-us/grants-and-loans | Funding and Programs | Funding and Programs | NEUTRAL |
| 29 | Ideas and Suggestions | https://water.ca.gov/work-with-us/grants-and-loans | Funding and Programs | Funding and Programs | NEUTRAL |
| 30 | Ideas and Suggestions | Add a separate pedestrian walkway on the north bound lanes just like the one installed on the south bound lanes. There are several homeless people going back and forth. | Multimodal Transportation | Pedestrian Paths | NEGATIVE |

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| 31 | Ideas and Suggestions | Not homeless. Bums and Junkies. Till crime is punishable in California we will waste working people tax dollars on serving and enabling bums and junkies. | Funding and Programs | Funding and Programs | NEUTRAL |
| 32 | Ideas and Suggestions | Not homeless. Bums and Junkies. Till crime is punishable in California we will waste working people tax dollars on serving and enabling bums and junkies. | Funding and Programs | Funding and Programs | NEGATIVE |
| 33 | Ideas and Suggestions | Bums and junkies make driving in this area very dangerous. Criminalize crime again in California and pit tide who steal, deal and use drugs, burglarize and Rob in prison. Get them off the streets. Stop wasting taxpayer dollars to enable bad behaviors. | Funding and Programs | Funding and Programs | NEUTRAL |
| 34 | Ideas and Suggestions | 100% agree! I moved to Anderson recently and it was odd to me that the bike path does not continue into the "downtown" part of Anderson. | Multimodal Transportation | Bicycle Lanes/Paths | NEGATIVE |
| 35 | Ideas and Suggestions | The idea of a park-and-ride isn't terrible, but I think it would only be useful if the RABA Anderson Commuter service was more like a bus rapid transit service with frequent service. | Transit | Transit | NEGATIVE |
| 36 | Ideas and Suggestions | Honestly, a protected, separated walk/bike way would be great because I always noticed not just homeless people but also people trying to walk to the bus stops on 273 that unfortunately have to walk on the shoulder of a very busy road. | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths; Transit | NEUTRAL |
| 37 | Ideas and Suggestions | 1000% agree with this comment. It would be great to help provide shade to this area for not just the summer months, but even spring and fall when it heats up pretty quickly as well. Native trees and plants would be even better to improve the biodiversity in our area. | Placemaking | Placemaking | NEUTRAL |
| 38 | Ideas and Suggestions | Totally concur with a connection to the river trail. I believe the river trail has great potential for an increase in use for leisure and commuter trips if it is better connected to other walking/bike infrastructure. | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths | POSITIVE |
| 39 | Ideas and Suggestions | I agree. Over the years, there were several semis that got stuck (high centered) on that hump. A collision between a train and a semi truck transporting a large Caterpillar tractor took place on 10/4/23. Breslauer Way is still closed almost a week later due to the extensive damage to the railroad arm control equipment. | Freight | Freight; Roadway | NEGATIVE |
| 40 | Ideas and Suggestions | Reopen the left turn from Branstetter Lane on to SR 273 northbound lane. The northbound auto traffic is now using Westside Rd from Branstetter to Kenyon to get on SR 273 | Roadway | Turn Lanes | NEUTRAL |
| 41 | Ideas and Suggestions | Create elevated crossing for bikes and pedestrians so they can access bus stops while avoiding highway and railroad crossings. Incorporate vegetation for aesthetics, cooling, and shade AND/OR create a solar panel roof over the walkway to power part of the 273 corridor while shading the walkway. | Multimodal Transportation | Bicycle Crossings; Landscaping; Pedestrian Crossings; Shade | MIXED |
| 42 | Ideas and Suggestions | Create a left turn lane here so people can go straight through without waiting for a signal to clear traffic. | Traffic Control | Turning | MIXED |
| 43 | Ideas and Suggestions | Need different access to freeway rather then Bonnieview or Riverside. This would take thousands of vehicles off bonnieview and 273 | Roadway | Access/Blocked Roads | NEUTRAL |
| 44 | Ideas and Suggestions | Need a access point over the tracks to 273 right here | Freight | Acccess; Freight; Roadway | NEUTRAL |
| 45 | Ideas and Suggestions | The whole stretch between downtown and the casino looks like 1950's industrial gone seedy. It needs a serious overhaul with landscaping, bike paths & walking paths as well as safety improvements. 273 does not have enough space for roundabouts, but Westside and Eastside have some intersections where small ones could be included.<br><br>Trains: Maybe some intersections ( I'm thinking about Girvan and S. Bonnyview) could have lowered tracks so cars don't have to stop for the train. | Placemaking | Bicycling; Freight; Pedestrian; Placemaking; Traffic Control | NEUTRAL |
| 46 | Ideas and Suggestions | One-way streets (especially 3 lane one-ways) in downtown urban areas provide a speedway for drivers to go too fast, making them unsafe for pedestrians and cyclists. They also unequally distribute economic activity (this is pretty clear when one looks at this part of Market St vs Pine St to the east. Make Market St and Pine St 2-way traffic. Easy, effective way to naturally calm traffic speeds. | Traffic Calming | Traffic Calming | NEUTRAL |
| 47 | Ideas and Suggestions | One-way streets (especially 3 lane one-ways) in downtown urban areas provide a speedway for drivers to go too fast, making them unsafe for pedestrians and cyclists. They also unequally distribute economic activity (this is pretty clear when one looks at this part of Market St vs Pine St to the east. Make Market St and Pine St 2-way traffic. Easy, effective way to naturally calm traffic speeds. | Traffic Calming | Traffic Calming | NEUTRAL |
| 48 | Ideas and Suggestions | Why do we have to have traffic lights at every intersection on Pine and Market? Smaller intersections like Pine and Yuba could just be stop signs. Traffic lights cost taxpayers tens of thousands of dollars to install and maintain! And they aren't necessary everywhere. Save money, be smarter. | Traffic Control | Traffic Signal | NEUTRAL |
| 49 | Ideas and Suggestions | The Fall River Brewery off of Eastside Rd has become a very popular spot (I love going there), but the crossing here is terrible. I ride my bike down Buenaventura and the bike lane here (which does not feel very safe with cars going 50+ past you). | Multimodal Transportation | Bicycle Crossings | NEUTRAL |
| 50 | Ideas and Suggestions | The "complete streets" program was evaluated by the City several years ago for Cypress which would reduce lanes here. Is this program being used in design planning for 273 and related high volume intersections/streets that feed 273? | Traffic Calming | Traffic Calming | NEUTRAL |
| 51 | Ideas and Suggestions | Move the bus stops off busy 273. Not safe to access them. | Transit | Transit | NEUTRAL |
| 52 | Ideas and Suggestions | Suggest a reimagined 273/Eastside road that utilizes Eastside road with pedestrian/cycle class 1 lane. This would provide a good separation from traffic on 273 (which is a state highway) and peds/bikes. This could run the entire length from the city to Girvan. There will need to be installation of ped/bike overpass locations (as we see in Davis and other cities) at critical intersections as ped/vehicle conflicts will not be resolved with lights/lanes here. | Multimodal Transportation | Bicycle Lanes/Paths; Bicycle Crossings; Pedestrian Paths; Ped | NEUTRAL |
| 53 | Ideas and Suggestions | With the volume of people on the Westside of 273, there should be two pedestrian/bike paths. One on westside road and one on Eastside road as it would be very difficult to channel people across 273 at multiple locations. Perhaps sending peds/bikes to common crossing points would utilize money better and provide for a more cohesive infrastructure that could be maintained more efficiently and would provide quicker learning by the motorists. | Multimodal Transportation | Bicycle Lanes/Paths; Bicycle Crossings; Pedestrian Paths; Ped | NEUTRAL |
| 54 | Ideas and Suggestions | RABA bus stops are on ongoing issue. While I understand they are on the public highway, they accept and dispense people along a very busy highway that requires them to cross the highway.<br>There needs to be some thought about removing or relocating the bus stops in this edition of 273. | Transit | Transit | NEUTRAL |

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| 55 | Ideas and Suggestions | How about relocating the RABA stops to the casino? This would reduce foot traffic crossings on 273 | Transit | Transit; Pedestrian | NEUTRAL |
| 56 | Ideas and Suggestions | Yes!! I have thought of this. We can do this envision 273! | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths; Pedestrian Crossings | NEUTRAL |
| 57 | Ideas and Suggestions | Probably not because the recycling center in in the way. But I think that Eastside could curve around and meet girvan in that field. Then it would be Eastside/ Girvan Rd until Eastside joins up again. | Roadway | Access/Blocked Roads | POSITIVE |
| 58 | Ideas and Suggestions | Why!? They just did a big project flattening the railroad tracks on girvan | Freight | Freight | NEGATIVE |
| 59 | Ideas and Suggestions | I agree with it having bad aesthetics But all you would have to do is weed The place regularly and clean up the trash from those who are walking across that area, better Yet bring those people who are walking around on our streets littering to clean up their own mess daily if they want to stay in our city. | Placemaking | Placemaking | NEGATIVE |
| 60 | Ideas and Suggestions | I travel this corridor and adjacent streets everyday aND many NIGHTs. Walkers and bikers are very careless no bright clothes, no helmets . Maybe simples solution is to put up white posts every 4 feet. mAJOR hwy way work is not necessary - taxes accomADATING unsafe behavior. | Multimodal Transportation | Bicyclist and Pedestrian Behavior | NEGATIVE |
| 61 | Ideas and Suggestions | Adjust the timing/coordination between lights for different trips from Eureka Way besides going through downtown. Right now it seems that Shasta and Tehama are timed to provide preference to people commuting from 44 to Mercy Hospital or the courts, which is still needed. Yet it would be good to see other movements included. Coming Eastbound on Eureka Way its faster to go Eureka Way, Market, Shasta, California, Gold, and Market to get to Cypress despite how windy and convoluted that route is. | Traffic Control | Traffic Signal | NEUTRAL |
| 62 | Ideas and Suggestions | Encourage trucks to use Buenaventura to access I-5 rather than through downtown with all it's tight turns and narrow streets. | Traffic Calming | Freight; Traffic Calming | NEGATIVE |
| 63 | Ideas and Suggestions | There was a study long ago about elevating this entire intersection above the RR tracks to alleviate waiting for trains. This would look very out of place here. Instead, it would be better to change the elevations of the tracks, or maybe change both the track and road elevation (split the difference) so the impact isn't as noticeable. | Freight | Freight | NEGATIVE |
| 64 | Ideas and Suggestions | Punch Happy Valley Rd across the river to Knighton Rd. This would allow more direct access for people in Happy Valley and would help alleviate traffic on Canyon Road and South Bonnyview Road. | Roadway | Access/Blocked Roads; Congestion | NEUTRAL |
| 65 | Ideas and Suggestions | Can we repave California St? It's so rough! | Roadway | Maintenance | NEGATIVE |
| 66 | Ideas and Suggestions | The city and Caltrans should have worked together to repave Eastside. The city did not pave bike lanes. They painted Bike Lane is what is unrideable on the South bound side. 273 is unsuitable for bikes from Cypress south. Too many businesses with traffic turning and entering. We use Eastside to Breslauer. Then Westside since there is less traffic. The bike path from Cedar to Westwood needs to be improved. There needs to be a clear path from Westside Rd Glengary across Clear Creek Rd. | Multimodal Transportation | Bicycle Lanes/Paths | NEGATIVE |
| 67 | Ideas and Suggestions | Traffic gets hectic here with the people turning right to get on 44. It'd be nice if there was a better route of some sort? | Roadway | Congestion; Turn Lanes | NEGATIVE |
| 68 | Ideas and Suggestions | We need a lot more street lights all along 273 from Buenaventura to Anderson. | Placemaking | Lighting | POSITIVE |
| 69 | Ideas and Suggestions | Better signage for trucks who are getting into the left lane to make the right turn onto Market Street. Drivers can not tell that the right lane goes into the center and right lanes after the turn until after they have committed to the left lane. | Traffic Control | Signage | MIXED |
| 70 | Ideas and Suggestions | Long straight empty roads encourages higher speeds for traffic often making them ignore speed limits, a simple solutions to this would be a install chicanes along the route (narrow road with slight curves back and forth). This would decrease drivers speed and encourage them to be more attentive, thus making the roadway safer for not only other drivers but cyclist and pedestrians too.<br><br>Picture is for example but would need to be scaled up for the faster speed limit of 273. | Traffic Calming | Traffic Calming | NEUTRAL |
| 71 | Make a Comment | Can't wait to check out how this will help people that bike scooter, walk, and wheel around in other ways. This is seriously lacking here. It's sad. Downtown and beyond is full of non existent sidewalks, sideways sidewalks that are impossible to wheel on, potholed sidewalks, and heavily cracked that also make it difficult. Having some smooth level sidewalks would make so many peoples commutes less long and less unsafe. wheel chairs etc are very hard to commute on without smooth level sidewalks. | Multimodal Transportation | Accessibility; Pedestrian Paths | POSITIVE |
| 72 | Make a Comment | Are you planning on moving the train tracks? It's difficult to imagine south 273 being anything more than industrial buildings and transient camps due to the fact that most customer centric businesses don't want to be near them. From the rescue mission to Branstetter is a very good example of this. What will be done to address this? | Freight | Freight | POSITIVE |
| 73 | Make a Comment | Way too many highways, intersections, highway congesting a small area in Downtown. | Roadway | Congestion | POSITIVE |
| 74 | Make a Comment | It would be spectacular to use some of this right of way for a protected (separate from the highway) path for use by cyclists, scooters, pedestrians, etc. What a lovely way to connect the downtown areas of Anderson and Redding to each other and to the areas in between. Emphasis, however, on separate and protected from the highway. We will always need the light industrial infrastructure in this area, and walking/cycling/wheelchairing near the heavy trucks is terrifying. Lets find a way to share! | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths | POSITIVE |
| 75 | Make a Comment | The proposal for a roundabout here is a great idea! | Traffic Control | Roundabout | NEUTRAL |
| 76 | Make a Comment | Southside Park could be a great starting point for a bike or walking path to Anderson. It could also provide bike or walking access to the several open spaces and parks along the way. Imagine being able to get around this area without needing a car! | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths; Recreation | NEGATIVE |
| 77 | Make a Comment | The 273-Buenaventura intersection would be a good location for a pedestrian overpass | Multimodal Transportation | Pedestrian Crossings | NEUTRAL |
| 78 | Make a Comment | Need to decrease the number of one-way streets and reduce the number of lanes. Pine Street is 3 lanes, 40 feet wide, and if all the lights are green it is essentially a speedway. The same can be said for numerous other stroads in the area. The bike lane on Pine is completely unsafe as a result. Can we make this two-way and devote more area to physically separated Multimodal transportation infrastructure please? | Multimodal Transportation | Bicycle Lanes/paths, Traffic Calming | NEGATIVE |
| 79 | Make a Comment | A roundabout would be perfect for this location. Please make sure it includes safe entry and exit points for pedestrians and bikes. | Traffic Control | Bicycle Crossings; Pedestrias Crossings; Roundabout | NEUTRAL |
| 80 | Make a Comment | Worried about wheelchair crossings at Breslauer. | Multimodal Transportation | Accessibility; Pedestrian Crossings | NEUTRAL |
| 81 | Make a Comment | Would like improved crossing at Latona Road. | Multimodal Transportation | Pedestrian Crossings | POSITIVE |

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| 82 | Make a Comment | Would like improved crossings at the Rancheria/Canyon Road. | Multimodal Transportation | Pedestrian Crossings | NEUTRAL |
| 83 | Make a Comment | Prefers perpendicular curb ramps to diagonals. | Multimodal Transportation | Accessibility; Pedestrian Crossings | NEUTRAL |
| 84 | Make a Comment | Bury the railroad in a tunnel, widen westside and eastside roads. Turn former 273 right of way into green space. | Freight | Freight; Placemaking; Roadway | NEGATIVE |
| 85 | Make a Comment | Dangerous sharp turns that cars speed through. | Traffic Calming | Roadway; Traffic Calming | NEGATIVE |
| 86 | Make a Comment | Please widen the intersection and add a signal. Number of cars using this intersection has outgrown the design and made it dangerous at all hours. | Traffic Control | Traffic Signal | POSITIVE |
| 87 | Make a Comment | Put a pedestrian Bridge here over the railroad track and 273 for safe passage to shopping for the neighborhood. | Multimodal Transportation | Pedestrian Crossings | NEUTRAL |
| 88 | Make a Comment | This undercrossing is extremely dangerous and improvement should be considered. Get railroad on board early to widen span so that a separate ped/bike lane can be accommodated. | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths | NEGATIVE |
| 89 | Make a Comment | Perhaps another idea would be to leave Pine Street as is, but close nearby streets to through-traffic, effectively making them bike/ped corridors. Concentrate the cars in one area and the bikes/peds in another. | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths; Traffic Calming | NEUTRAL |
| 90 | Make a Comment | Another access point from 273 to Eastside would be great for the thousands of homes in the Sacramento Dr neighborhoods | Roadway | Access/Blocked Roads | NEUTRAL |
| 91 | Make a Comment | Roundabouts are not a universal solution for all intersection. They are a nightmare for bikers and pedestrians | Traffic Control | Roundabout | POSITIVE |
| 92 | Make a Comment | I have seen almost three auto accidents due to this new "improvement" while merging into this underground bridge passing. Not a great idea, should have come up with something else. It seems this plan was a quick fix and should've been done after more planning and more funds were available. | Roadway | Collisions | MIXED |
| 93 | Make a Comment | three "almost" accidents during the initial days of a new traffic pattern isn't exactly novel. many people have died at this undercrossing over the years. give the new traffic pattern some time, people will get used to it. Plenty of occurrences of 2 lanes safely reducing to 1 throughout Redding and many other cities. | Roadway | Collisions | NEGATIVE |
| 94 | Make a Comment | New crosswalks and/or curb ramps should be installed at this corner now that the SB lane has been taken beneath the railroad crossing. Ideally it would be easy for bikes/peds to get to eastside and/or westside roads OR have a dedicated bike lane along shoulder of SB 273. | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Crossings | NEGATIVE |
| 95 | Make a Comment | Between Highway 273 and Westside Road there is a strip of unpaved surface where a power line exists. Use this to make a bike & pedestrian pathway. Plant shade trees to make the corridor safer, more aesthetic, and significantly cooler on hot summer days. Install bike racks and benches under shaded areas. | Multimodal Transportation | Bicycle Lanes/Paths; Bicycle Parking Landscaping; Pedestrian | MIXED |
| 96 | Make a Comment | Grants for recycling water for urban use could be available from CA Department of Water Resources, and I am sure there are other state/federal sources.<br>https://water.ca.gov/work-with-us/grants-and-loans | Funding and Programs | Funding and Programs | POSITIVE |
| 97 | Make a Comment | This stop sign leading to the traffic light causes back ups. Also, the limit line at the light feels very close to highway traffic | Traffic Control | Congestion; Traffic Signal | NEGATIVE |
| 98 | Make a Comment | I understand the concerns, but closing a whole lane to cars for pedestrians was a huge problem as 273 already become so congested during the week. I use this road daily and rarely see pedestrians on it, maybe 5 since this implementation. I hope this is a temporary fix until something better can be done. | Roadway | Congestion; Lane Closure; Pedestrians Paths | NEUTRAL |
| 99 | Make a Comment | Instead of taking away an entire lane for pedestrians, can't a pedestrian bridge be created on the Eastside of the road? | Multimodal Transportation | Pedestrian Crossings | NEUTRAL |
| 100 | Make a Comment | I commute daily on 273 between Kenyon Dr and Angelo Ave. Not once have I seen a pedestrian or a bicyclist using the newly designated bike lane under the railroad tracks. Blocking an entire lane of a major highway in Redding for a handful of potential users is a terrible idea. Widening the highway and redoing the undercrossing should be considered as the best solution for the needs of the bicyclists and pedestrians.<br>It also looks like tens of cars have ran over the white divider posts… | Roadway | Bicyclists; Lane Closure | NEGATIVE |
| 101 | Make a Comment | Several years ago the left turn from Branstetter unto 273 northbound was closed due to a couple of fatal accidents. Unfortunately, the drivers that want to go North are now taking Westside to Kenyon and then turn left on 273 northbound. Same risks of crossing the 273 southbound lanes as at Branstetter but Caltrans kicked the can up the road to the next intersection. Also, the diverted traffic due to the closure of the left turn Branstetter is causing the extra wear/tear of Westside, a city road. | Roadway | Collisions; Congestion | NEGATIVE |
| 102 | Make a Comment | Have there been any studies to see how many pedestrians and bicyclists are using the newly designated lane that was assigned to them? A traffic camera installed under the railroad bridge can easily help with that. Another camera near Wyndham could be used to count how many cars ran over the white plastic posts that separate the two lanes. | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths | NEGATIVE |
| 103 | Make a Comment | To add, maybe a green space that doubles as a part of a dedicated protected pedestrian/bike path separate from 273 that runs from Anderson to Redding. I think giving people the opportunity and option to travel between Redding and Anderson by bike or on foot would be a great addition to our location community. | Multimodal Transportation | Bicycle Lanes/Paths; Landscaping Pedestrian Paths; | NEGATIVE |
| 104 | Make a Comment | Love this! It would be amazing for there to be a mixed-use protected path for travel to and from Redding to Anderson. I strongly believe it would be used on a regular basis year-round because of the weather we have here! | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths | MIXED |
| 105 | Make a Comment | The railroad crossing at Breslauer Way and 273 has seen quite a few accidents where the trais hit semi-trucks high centered on the tracks. The last accident from 10/4/2023 closed the access to Breslauer Way for days due to the significant damage to the railroad crossing arm controls. Please fix the ramp off of SR 273 to Breslauer Way in order to prevent the semi-trucks from getting high centered on the tracks. | Freight | Freight | NEUTRAL |
| 106 | Make a Comment | Vehicles turning right (southbound) from Quartz on to Market St do not yield for cyclists who have green light/right of way who are turning left (southbound) from traveled Way. I cycle here every morning and its a 50/50 shot that a vehicle will cut me off | Multimodal Transportation | Bicycle Crossings | NEGATIVE |
| 107 | Make a Comment | Lots of pedestrian traffic from bus stop towards casino and homeless camp under the bridge. They often j-walk to save time making it very precarious for them and drivers who don't expect pedestrians outside of the intersections. Especially at night. | Multimodal Transportation | Bicyclist and Pedestrian Behavior | POSITIVE |

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| 108 | Make a Comment | Better street lights between Westwood & Happy Valley Road would be helpful so pedestrians are easier to spot at night. | Multimodal Transportation | Lighting | POSITIVE |
| 109 | Make a Comment | Better pedestrian trails or a paved path would help to keep pedestrians safe and away from fast moving traffic. | Multimodal Transportation | Pedestrian Paths | NEGATIVE |
| 110 | Make a Comment | Additional street parking to access shops. | Placemaking | Economy; Parking | NEGATIVE |
| 111 | Make a Comment | This bottle-neck is dangerous. An elementary school, two neighborhoods, an entire shopping hub, and a church use ONE access point. Peak hours cause backup onto 273. One uncontrolled fire in the surrounding vegetation, causing an emergent evacuation, would be chaos. There needs to be another access/exit point for Westwood. | Roadway | Congestion; Evacuation | MIXED |
| 112 | Make a Comment | Wouldn't just a paved pathway be sufficient? Like any sidewalk that crosses the tracks at an intersection. | Multimodal Transportation | Pedestrian Paths | NEGATIVE |
| 113 | Make a Comment | When traveling southbound it is really easy to run up on people turning onto Sacramento Dr because most people turn on Star drive. Suggestion is either widen the road and provide turn lane or make it so you can't turn left onto Sacramento from Eastside. | Traffic Control | Turning | NEGATIVE |
| 114 | Make a Comment | Why is it "No Turn on Red" here anyway? | Traffic Control | Traffic Signal; Turning | MIXED |
| 115 | Make a Comment | Clear Creek Road is ROUGH and needs to be repaved up past the all the asphalt and concrete businesses (for about three miles). | Roadway | Maintenance | NEGATIVE |
| 116 | Make a Comment | The entire 273 corridor should be more appealing and inviting to walkers and bikers. Landscaping, signage, lighting, wide sidewalks, consistent bike lanes, safe connections to trails for bikers and pedestrians. | Multimodal Transportation | Bicycle Lanes/Paths; Landscaping; Pedestrian Paths; Recreati | NEUTRAL |
| 117 | Make a Comment | The roundabout at costco is a mess. I avoid it constantly. Going anywhere else if i can or leaving and entering costco a different way if possible. Regular lights are MUCH safer in my opinion and several others I have talked to. I would not want more roundabouts in Redding. | Traffic Control | Roundabout; Traffic Signal | NEGATIVE |
| 118 | Make a Comment | I avoid roundabouts at all costs, they are a nightmare for many reasons!, | Traffic Control | Roundabout | NEGATIVE |
| 119 | Make a Comment | I drive this every day. I've only seen one pedestrian in the area - He was walking on the top of the K line wall in the middle of all lanes. NOT the new access lane provided for them.<br>This lane reduction was stupid and accomplished nothing. | Roadway | Lane Reduction; Pedestrian Paths | NEUTRAL |
| 120 | Make a Comment | I lived in Europe for a few years and have a preference for roundabouts. They are safer and more efficient; but have unfortunately been designed incorrectly in many areas in the US. The Costco roundabout is sadly an example of a poor roundabout. Signage and driver education is important thought too.. | Traffic Control | Funding and Programs; Signage; Roundabout | MIXED |
| 121 | Make a Comment | needs more lighting at night | Placemaking | Placemaking | NEUTRAL |
| 122 | Make a Comment | I get what the lane was taken away under the railroad. I feel like it is more dangerous going past the gas stations now. I have seen road rage of people trying to get ahead before the lane ends. I have seen accidents when people hit the car in front of them. I understand there needing a safe place for people walking but it still not safe. People walking in that lane still walk all the way over on the edge of the road. | Roadway | Bicycle Lanes/Paths; Collisions; Pedestrian/Paths | NEUTRAL |
| 123 | Make a Comment | There has to be a better answer for this area! I hate driving home every. I barely see anyone use this area and when I do they are on the side of the road and not in the lane provided.<br><br>This one lane area is stupid! There has to be a better way. Maybe open the area during high traffic times and have set hours it is used for a bike lane.<br><br>My understanding for the change had to do with the Multimodal bike community redding has that go to the town hall meeting advocating for this lane closure. | Roadway | Bicycle Lanes/Paths; Lane Reduction | NEGATIVE |
| 124 | Make a Comment | Intersection improvements. Anytime there is an event at the fairgrounds, or the fairgrounds is used as a command post by CalFire, there in increased traffic at this intersection, often resulting in back-ups and congestion. Maybe a dedicated turnlane for S/B traffic onto W/B Briggs. Now there is no right turn permitted on a red light because of intersection with frontage road that also ties into this intersection. | Traffic Control | Congestion; Turning | NEUTRAL |
| 125 | Make a Comment | I've been nearly struck by a vehicle so many times. Would love to see a traffic light or at least a flashing crosswalk here. | Traffic Control | Collisions; Traffic Signal; Pedestrian Crossings | NEUTRAL |
| 126 | Make a Comment | Left turn lane is a solution. Those of us that live on this end of Sacramento Dr don't want to go to Star. Pay attention and/or slow down. Reduce the speed on eastside might cut down on the the north bound traffic from 273 that is avoiding the lights on 273 and avoiding the right turn on S Bonneyview (all the morning UPS trucks as an example). People drive 50+ mph on wayside now. Stops signs or speed bumps would sort that out | Traffic Calming | Traffic Calming; Traffic Control | POSITIVE |
| 127 | Make a Comment | The comment below opining that traffic lights are safer than roundabouts is patently false. The Insurance Institute for Highway Safety (among a ton of broad traffic research) shows that roundabouts actually reduce traffic collisions. This would be a good spot for a roundabout. | Traffic Control | Roundabout | NEUTRAL |
| 128 | Make a Comment | Definitely need flashing yellow walk signs and/or mid-street sign reminding drivers it is the law to stop for pedestrians. | Multimodal Transportation | Pedestrian Crossings | NEUTRAL |
| 129 | Make a Comment | Closing cross streets seems like a cool idea on its face, but in the US it just doesn't work very well unless you have a lot of pedestrian activity already, which Redding does not. Calming traffic where it is too fast and unsafe should be the priority. | Traffic Calming | Pedestrian; Roadway; Traffic Calming | NEGATIVE |
| 130 | Make a Comment | I imagine this whole mess here will change during this process and whatever takes its place needs to have bike lanes. I cycle down Market St on my route to work and it feels pretty unsafe with cars whizzing by at 45 mph. It doesn't matter what the speed limit is if the road was designed to let drivers drive 45+. | Multimodal Transportation | Bicycle Lanes/Paths; Traffic Calming | NEGATIVE |
| 131 | Make a Comment | Some people DO actually use this lane for cycling, myself included, but I can tell you no one feels at all safe using it. It's not hard to understand why it doesn't get more use - the barriers are cheap plastic that provide only visual "protection" while cars zip by at 50+ mph, and there is no good bike infrastructure to the north or south of this lane. Calm traffic speeds and created physically separated cycling infrastructure from Eureka to Buenaventura? Branstetter? Bonnyview? | Multimodal Transportation | Bicycle Lanes/Paths; | NEGATIVE |

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| 132 | Make a Comment | This corridor was designed like a freeway. It is 125 feet across, one-way, and three lanes with devoted turn lanes…is it a mystery why there is no pedestrian activity and the economic activity that comes with it? It's not a place for people. This could (and should) literally be 2-way, 2-lane (1 lane each direction) street with center turn lane and on-street parking. You could make bike lanes with the removed lanes. Lets make this corridor economically viable and pleasant please. | Roadway | Bicycle Lanes/Paths; Economy; Traffic Calming | NEGATIVE |
| 133 | Make a Comment | Move the bus stops off of 273. It is unsafe to have people walking across the railroad track and highway to access bus stops. This area is too heavily traveled to have bus stops on a highway. | Transit | Pedestrian; Transit | MIXED |
| 134 | Make a Comment | I agree with the majority here that the conversion of one of the east bound lanes to a pedestrian lane has made it far more dangerous for vehicles traveling east. Road races occur as one approaches the merge point. In addition this will be a bottleneck nightmare during an evacuation for a major fire.Why not acrosswalk at the junction of 273 and Buenaventura with bike pedestrian path running parallel to 273 west that goes up over tracks and onward. With caution signs at tracks. 5 trainsvs100scars | Roadway | Evacuation; Pedestrian Paths; Traffic Calming; | NEGATIVE |
| 135 | Make a Comment | Allow turn on red using green arrow synchronized with other lights. There becomes a back up on red lights into 273 at times. | Traffic Control | Congestion; Turning | NEUTRAL |
| 136 | Make a Comment | Allow turn on red with green arrow to indicate safe time in coordination with other traffic. | Traffic Control | Turning | NEGATIVE |
| 137 | Make a Comment | 100%agree | Multimodal Transportation | Lighting | NEGATIVE |
| 138 | Make a Comment | I drive this home every day at 5pm and it is a cluster. I don't know how there is not more accidents. They merge the lane right at the signal where lots of people are turning left! Everyone is slamming on their brakes. I've just learned to stay way back from everyone, so I don't get in an accident. Someone did not think this out... | Roadway | Collisions | NEGATIVE |
| 139 | Make a Comment | This intersection always makes me feel like there could be a wreck here if someone was not easily paying attention. | Traffic Control | Collisions | NEUTRAL |
| 140 | Make a Comment | The bike lane that was put up on 273 just before the bridge that took our 2nd driving lane is continually empty. Give us bank or lane please. It's about 300 cars to an Occasional walker. | Multimodal Transportation | Bicycle Lanes/Paths | MIXED |
| 141 | Make a Comment | I drive through this intersection almost twice per day, and I've never felt unsafe. I don't understand why Caltrans wants to block this off. And the public meeting about it (2024may29) isn't posted on the envision273.org website, almost like they were trying to hide something. | Traffic Control | Access/Blocked Roads | NEUTRAL |
| 142 | Make a Comment | cant turn left - star blends ino scramento - first left goes north | Traffic Control | Turning | NEGATIVE |
| 143 | Make a Comment | Do not remove this intersection | Traffic Control | Access/Blocked Roads | NEUTRAL |
| 144 | Make a Comment | Do not remove this intersection | Traffic Control | Access/Blocked Roads | NEUTRAL |
| 145 | Make a Comment | I know it's not fully Caltrans, but time signals to encourage more traffic to use Court and Tehama rather than Placer and Pine to get to 44 would help alleviate traffic on Pine. This ideally would allow traffic counts to drop so a lane could be removed allowing for buffer space between parking and travel lanes, provide a wider bike lane, and provide dual right turns for northbound Pine onto Tehama/44. | Traffic Control | Bicycle Lanes/Paths; Traffic Signal | NEUTRAL |
| 146 | Make a Comment | Have a connection from Glengary Dr to Clear Creek Road to provide secondary access to the Westwood area. | Roadway | Access/Blocked Roads | NEGATIVE |
| 147 | Make a Comment | There is a "no turn on red" for Northbound 273 for two reasons. 1st is so cars don't try to cross when a train is coming and the gates are coming down. 2nd is to allow traffic waiting at the stop sign on Girvan a chance to get to the light. A stop sign for Eastbound traffic on Girvan can't be placed here as traffic would backup onto the RR crossing. Without some form of stop there is an unbroken stream of traffic from 273 continuing up Eastside road hindering Girvan road traffic from moving. | Traffic Control | Congestion; Turning | POSITIVE |
| 148 | Make a Comment | This bike lane here is awful. It slows down traffic all the way back to eat express as now generally people are hesitant to use the right lane. | Roadway | Bicycle Lanes/Paths; Congestion | NEGATIVE |
| 149 | Make a Comment | The more roundabouts the better. They're efficient, safer and less antiquated than traffic lights. I also LOVE the roundabout at Costco!!! | Traffic Control | Roundabout | NEGATIVE |
| 150 | Make a Comment | Please alow for better walking and bicycle path ect. But do it without more light pollution between Canyon road and.<br>Ox Yoke rd we don't need more light pollution and near Canyon rd and Happy Vally rd maybe put a walking bridge over it to end the pedestrian crossing accidents without adding a ton of lights and could add a couple at the street crossing areas on south from there | Multimodal Transportation | Bicycle Lanes/Paths; Lighting; Pedestrian Paths; Pedestrian C | MIXED |
| 151 | Make a Comment | The traffic light here is not responding to bikes. Modern bikes are mostly Carbon fiber and may not contain enough metal to trip the sensor. In both directions crossing 273 the pedestrian button in dangerous to get too from the stop line. We have had 4 bikes on the square and still can't get a light. | Multimodal Transportation | Bicycle Crossings; Traffic Control | NEGATIVE |
| 152 | Make a Comment | I'll second this. Traffic moves at 65mph. Many are distracted. Too much debris causing flats. There is no good alternative to get from Redding to Anderson. Churn Creek Bottom has no shoulder. Airport traffic is heavy and fast. Much of it with no shoulder. | Roadway | Congestion; Traffic Calming | NEGATIVE |
| 153 | Make a Comment | What will this cost and how much and who will fit the bill??? | Funding and Programs | Funding and Programs | NEGATIVE |
| 154 | Make a Comment | A bike lane and sidewalk should be added from Caterpillar Rd to Lake Blvd and from lake Blvd to Quartz Hill Rd, this would allow walking and biking access to those staying at any of the hotels on Caterpillar, to stores, restaurants and Waterworks on Lake Blvd and to Caldwell Park on Quartz Hill. | Multimodal Transportation | Access; Bicycle Lanes/Paths; Pedestrian Paths | NEUTRAL |
| 155 | Make a Comment | Lake Blvd should have better bike lanes and sidewalk for encouraging those who live in the surrounding neighborhood to walk and bike rather than drive to the nearby stores. | Multimodal Transportation | Bicycle Lanes/Paths; Access; Pedestrian Paths | NEUTRAL |
| 156 | Make a Comment | Ox Yoke/Riverside would benefit from having a bike lane and sidewalk installed especially over the highway as the bridge forces bikes and pedestrians into traffic. | Multimodal Transportation | Bicycle Lanes/Paths; Bicycle Crossings; Pedestrian Paths; Ped | NEGATIVE |
| 157 | Make a Comment | Making pedestrian crossing for neighborhoods along 273 would encourage more bike and walking usage along the route reducing the traffic. | Multimodal Transportation | Bicycle Crossings; Pedestrian Crossings | NEUTRAL |
| 158 | Make a Comment | At any crossing the road should narrow by adding Curb Extensions to reduce traffic speed before the crossing and include light posts for better Pedestrian visibility and a Pedestrian island. | Multimodal Transportation | Pedestrian Crossings; Traffic Calming | NEGATIVE |
| 159 | Make a Comment | This lane was made to accommodate vehicle traffic. To accommodate bicycle traffic on 273 add a short bypass connecting 273 to Railroad Ave. | Multimodal Transportation | Bicycle Lanes/Paths | NEUTRAL |

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| 160 | Something I Like | Best roundabout in the area by far. Large and easy to navigate. Any proposed roundabouts should be modeled after this one. City of Redding's roundabouts are too small which make them hard to navigate. | Traffic Control | Roundabout | NEUTRAL |
| 161 | Something I Like | The aesthetics of landscaping and water feature are nice here. Retain these and plant more trees along the Hwy 273 corridor. | Placemaking | Placemaking | NEUTRAL |
| 162 | Something I Like | Only if they are something other than palm trees. We don't need to look like southern CA....Hilltop Drive! | Placemaking | Placemaking | NEUTRAL |
| 163 | Something I Like | More trees and landscaping would be a great look and enhancement...maybe a park or two on the way into Redding or Anderson, additional street lighting along the corridor would be good for the seniors for safety at night. Smart Deco or attrMultimodal fencing along the highway would also keep more animals off the hit list. Cameras to monitor any out of the way activity for security and safety for citizens. | Placemaking | Placemaking | NEUTRAL |

# Ideas Wall Comments

| ID | Type | Comment | Up Votes | Down Votes | Primary Themes | Sub-themes | Sentiment |
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| 1 | Ideas and Suggestions | A bike lane the entire length of the corridor would be a plus to the City. I believe this was suggested a while back and the suggestion said there would be a protective barrier of some kind to protect bikers from traffic. | 11 | 1 | Multimodal Transportation | Bicycle Lanes/Paths | MIXED |
| 2 | Ideas and Suggestions | Long term, 273 would be a great mass transit corridor between Anderson and Redding. A Bus Rapid Transit (BRT) system with bus only lanes could be beneficial, whether in the median or on the shoulders. Currently, 273 does not likely have the density to support a BRT system, but as development continues, and density increases along the corridor, a BRT system may help mobility and commuters into the downtowns. | 6 | 1 | Transit | Transit | POSITIVE |
| 3 | Ideas and Suggestions | More landscaping, trees/shade, and general beautification of the corridor is desperately needed. Consider using reclaimed water from Clear Creek Wastewater Treatment Plant along 273 to provide greenery even during drought years. This reclaimed water system could potentially be utilized by nearby developments as well. | 13 | 2 | Placemaking | Environment; Landscaping | NEUTRAL |
| 4 | Ideas and Suggestions | Class I or Class IV bike lanes are needed along the length of 273. These generate the most ridership. Very few people, especially in Redding and Anderson, are comfortable in Class II or Class III bike lanes. This can also serve as a backbone for bike facilities to branch off from. | 9 | 2 | Multimodal Transportation | Bicycle Lanes/Paths | NEUTRAL |
| 5 | Ideas and Suggestions | Yes, yes, yes to the protected bicycle/walking/wheelchair path!<br><br>Also: a pedestrian overpass or SOME sort of safe way to cross the corridor for bikes, pedestrians or wheelchairs. | 8 | 2 | Multimodal Transportation | Accessibility; Bicycle Crossings; Pedestrian Crossings | NEUTRAL |
| 6 | Ideas and Suggestions | Maybe starpaths along 273 would encourage more people to use them! A Starpath is a spray-on coating that can be used on any solid surface and works by absorbing UV rays during the day and then expelling them at night. A lot of cities are doing this now and it's cost effective! (There are more pictures online but it can be painted straightforward as shown or more artistically) | 18 | 1 | Multimodal Transportation | Beautification; Bicycle Lanes/paths; Pedestrian Paths; Shade/Cooling; | POSITIVE |
| 7 | Ideas and Suggestions | Solar powered bike/scooter stations/depots would be nice! | 7 | 5 | Multimodal Transportation | Bicycle Amenities | NEUTRAL |
| 8 | Ideas and Suggestions | We need some more art installations in general but maybe we can get some artistic bike racks! | 4 | 6 | Placemaking | Placemaking | MIXED |
| 9 | Ideas and Suggestions | I think a major re-envisioning of the intersection at Cypress & 273 is a must. The vehicle turn going north from 273 directly on to Cypress is unnecessary. It encourages vehicles to go faster through that area and is a blind turn where it's unsafe for pedestrians to cross and get to the park. This intersection is not safe because it's confusing for people driving, which leads to people running lights and not paying attention to pedestrians and bicycles. | 3 | 1 | Roadway | Pedestrian; Traffic Calming; Traffic Control | NEGATIVE |
| 10 | Ideas and Suggestions | The sidewalk along 273 adjacent to South City Park is not wide enough for more than 1 person at a time. I have seen many people in wheelchairs needing to wait for other people coming the opposite direction to either step off of the sidewalk to let them pass or go into the little cut out section where you used to be able to walk down to the park. That passageway is gated now. | 3 | 1 | Multimodal Transportation | Accessibility; Pedestrian Paths | NEUTRAL |
| 11 | Ideas and Suggestions | Bulb outs are needed at every intersection in Downtown Redding. | 3 | 3 | Multimodal Transportation | Pedestrian Crossings; Traffic Calming | MIXED |
| 12 | Ideas and Suggestions | I would like to support the idea to continue pedestrian and bike lane from Court St. to 273 via Railroad Ave. I agree this route is used by many and is currently not safe. For those coming off the bottom of the Blue Gravel Mine Trail ; this would create a safe return route to Downtown. | 7 | 1 | Multimodal Transportation | Bicycling Lanes/Paths; Pedestrian Paths | NEGATIVE |
| 13 | Ideas and Suggestions | Happy Valley Road connects to 273 and has a high amount of bicycle traffic, but the road is rather narrow and has many blind turns. It may encourage use of the 273 corridor if Happy Valley Road was widened/straightened. | 2 | 2 | Roadway | Bicycling; Roadway | MIXED |
| 14 | Ideas and Suggestions | This is a stretch and would take a lot of cooperation, but what if the path went alongside the railway in places? If the rail could be diverted somewhat, the old railway could be used as a bikeway. Perhaps grant funding related to railway/infrastructure improvements could pay for doing this. | 4 | 4 | Freight | Bicycling; Freight; Fundging and Programs | POSITIVE |
| 15 | Ideas and Suggestions | Regarding transit, what about catenary transit system from Redding to Anderson. | 2 | 1 | Transit | Transit | NEUTRAL |
| 16 | Ideas and Suggestions | I walk Railroad Ave every day, it becomes 273. There are chock points and abandoned house and growth on the corners. These obstructions force me to walk out in the street | 3 | 2 | Multimodal Transportation | Pedestrian Paths | NEUTRAL |
| 17 | Ideas and Suggestions | More access points from the Westwood and Girvan neighborhoods to 273. Jewel Lane neighborhood residents should be able to get to Cedars Road without needing to go through the Westwood light and then the Bonnyview crossing. Star Drive neighborhood residents shouldn't have to go up to the Bonnyview crossing or down to the Girvan crossing just to get to the pharmacy, grocery store, and school right across the way. It creates traffic at Bonnyview and 273 and creates a bottleneck at Westwood. | 5 | 3 | Roadway | Access; Congestion | NEUTRAL |
| 18 | Ideas and Suggestions | 273 needs street lights. It gets very dark and you cannot see pedestrians until you are right up on them. Very dangerous and scary. | 3 | 0 | Placemaking | Placemaking; Safety | NEUTRAL |
| 19 | Ideas and Suggestions | Teach the homeless people to use the sidewalks and crosswalks. Keep them out of the road and you've solved the problem. | 2 | 3 | Multimodal Transportation | Bicyclist and Pedestrian Behavior | MIXED |
| 20 | Make a Comment | A couple of things jump right out at me. First, The language sustainability and resiliency and compatibility between land use and corridor design sound a lot like the language used in United Nations Agenda 21/2030 sustainable development goals. The second thing that makes me suspicious is the mention of being able to compete for federal and state grant funds. Who is funding the grants? Again, is it tied to UN agenda 21/2030? The public has a right to know this and it's implications. | 1 | 14 | Funding and Programs | Funding and Programs | NEGATIVE |
| 21 | Make a Comment | A SEPARATED BIKEWAY along the entire route is required.<br><br>The SRTA board should also reopen planning for the Salmon Runner Bus to Sacramento/Vacaville. The route should begin at the 273/I5 interchange, exactly where the "Envision 273" local route ends.<br><br>https://www.srta.ca.gov/DocumentCenter/View/4099/North-State-Intercity-Bus-System-Business-Plan-June-2018<br><br>Car-less travel all the way from Sacramento, to and from the station and throughout the region, using passenger owned and rental bikes. | 4 | 0 | Multimodal Transportation | Bicycle Lanes/Paths; Transit | MIXED |
| 22 | Make a Comment | A separated path from Redding to Anderson is desperately needed. I don't think it needs to be on 273, as the route is noisy and unattractive. Let's utilize side streets (and develop class IV facilities) or the ACID Canal as much as possible and fill in with separated paths where needed. I am an avid cyclist but nothing appeals to me about riding 273 in a separate bike path along the road way. | 7 | 2 | Multimodal Transportation | Bicycle Lane/Paths | MIXED |

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| 23 | Make a Comment | Would like to see signal lights replaced with roundabouts in many locations. This would slow down the corridor and prevent fatalities that have happened at many intersections (difficult to come to a stop at a red light when you are going 65 mph). More lighting along the corridor is needed. Beautify the corridor. | 13 | 4 | Traffic Control | Placemaking; Safety; Traffic Calming; Traffic Control; | NEGATIVE |
| 24 | Make a Comment | Please provide pedestrian/bicyclist counts in this plan. I have lived in downtown Redding for 12 years and can barely recall individuals who actually use their bike for transportation. The few bicyclists I do see in Redding do it for recreation up in the trails or in city parks. I am not entirely sure why there is such a large push for bike lanes/bike facilities around 273 when no one even bikes around there. There are many pedestrians around 273 though. | 7 | 6 | Multimodal Transportation | Bicycle Lanes/Paths; Bicyclist and Pedestrian Behavior | MIXED |
| 25 | Make a Comment | I regularly commute from China Gulch to Redding via 273. Traffic management on 273 is marginal. The speed limit is 55 mph to 60 mph. However, traffic along 273 is often in perpetual stop and go mode being stopped by lights for one or two cars on the side streets. How is that environmentally friendly? Can some traffic light synchronization be planned like downtown Redding has? | 10 | 1 | Traffic Control | Congestion; Environment; Traffic Control | MIXED |
| 26 | Make a Comment | Redding has been pushing ebikes through incentives and rebates. Planning around 273 should be in line with that effort including security for the rather expensive ebikes given the very real theft concerns. | 6 | 2 | Multimodal Transportation | Bicycle Amenities | POSITIVE |
| 27 | Make a Comment | To the person in the comments asking why the push for bike lanes. Having been a bicycle commuter myself for years I agree there aren't many folks using bikes along the route - or in Redding in general. The reason why is safety in many instances. It is extremely hazardous riding your bike along the corridor. Class 3 ebikes and above push about 30 mph. With $4 to $5 a gallon gas it is a viable option to the car. Our disabled son uses one. Safety is our primary concern. | 5 | 2 | Multimodal Transportation | Accessibility; Bicycle Lanes/Paths; Traffic Calming | MIXED |
| 28 | Make a Comment | Getting the railroad onboard early to deal with the undercrossing south of The Mission is critical to safe ped/bike movement through that part of the corridor. It seems that no matter the viability of routing people around this bottleneck, there will still be some that use it (often our community members experiencing homelessness and other underrepresented groups). Ideally, a separate bike/ped facility would be installed. This seemingly would necessitate a wider span railroad overcrossing. | 2 | 1 | Multimodal Transportation | Bicycle Lanes/Paths; Pedestrian Paths | NEGATIVE |
| 29 | Make a Comment | To the person who commented on "Why the push for more bicycle lanes and facilities in Redding"-many people, including me, limit bike riding in town because it's dangerous. Lack of bike lanes, rough and unrepaired roads, and drivers under the influence of drugs and alcohol make for dangerous riding. Bike lanes and routes help mitigate these threats. Want to improve and decrease traffic in town? Make walking and biking more accessible. | 8 | 5 | Multimodal Transportation | Bicycle Lanes/Paths | POSITIVE |
| 30 | Make a Comment | I'd like to see some measures to reduce vehicle traffic speed along 273 to the north and (especially) south of Cypress Ave. Vehicles go way too fast south of the 273 and Cypress Ave intersection. We also need a crosswalk at the corner of 273 and Lincoln St. It's a popular coffee shop and there's no safe way to cross 273 from Lincoln. | 8 | 6 | Traffic Calming | Pedestrian; Traffic Calming | NEUTRAL |
| 31 | Make a Comment | Make the path so that the rider feels comfortable, even on the hottest days. Shade. Cooling areas. Color of pavement. Something.<br><br>The Redding area is ripe for bicycling due to how few days of the year have rainy/icy/snowy conditions. The problem is that a good portion of those days might be considered to be unrideable due to the incredible heat for 2-3 months of the year. | 6 | 3 | Placemaking | Bicycling; Environment | MIXED |
| 32 | Make a Comment | Bike lanes in Redding seem to be underserved by street sweepers. Plenty of things are puncturing our tires. Some obstacles have not been swept up for months! If there is a 273 corridor, please allocate some budget to keep it clean from puncture-causing debris. | 8 | 5 | Multimodal Transportation | Maintenance | POSITIVE |
| 33 | Make a Comment | The idea of closing an entire South bound lane going under the train trusses is absurd...build a walk/bike bridge to go over the tracks if crossing the train tracks is the issue...I have two businesses south of that area off Girvan road and I have clients that complain about that all the time especially around 5pm...not sure who's bright idea that was but it certainly wasn't thought through...go back to the drawing board and build a walk bridge and open the lane back up...motorists pay way more | 6 | 8 | Roadway | Bicycling; Freight; Pedestrian; Roadway | NEGATIVE |
| 34 | Make a Comment | I live off the Girvan area, and the North State Recycling and Win-River make it such a high transit and dumping area. Regardless, homeless are going to be in these areas. It would be helpful to have benches with shade or something for them while they wait for recycling. It's such a high traffic area full of people walking and bike riding. But no lanes for bikers/walkers. | 8 | 2 | Placemaking | Placemaking | NEUTRAL |
| 35 | Make a Comment | Encountering pedestrians along the 273 at night is terrifying (speaking as a driver). Most of them are wearing black and they are very difficult to see until you're right beside them. Better lighting and a designated walking trail particularly in the higher speed areas would put both pedestrian and drivers minds at ease. Safer and well-lit pedestrian crossings would be wonderful too though high traffic speeds make tradition cross-walks difficult as cars will need to stop too quickly. | 6 | 1 | Multimodal Transportation | Bicyclist and Pedestrian Behavior; Lighting; Pedestrian Crossings; Pedestrian Paths; Traffic Calming | NEGATIVE |
| 36 | Make a Comment | Some beautiful landscaping along the 273 between Westwood and the Anderson Fair Grounds would help to elevate the overall feel of that stretch & make it more appealing for commuters and home owners who frequent that stretch. Some grants or incentives for business owners to improve on their store fronts and property appearances would be nice as well. Many structures along this stretch appear to be abandoned & it would be nice to see them demo'd so the land can be re-purposed with something new. | 4 | 2 | Placemaking | Beautification; Placemaking | NEGATIVE |
| 37 | Make a Comment | There needs to be more street lights between Redding Rancheria Rd where Win-River is and Spring Gulch. That whole stretch is so hard to see at night. I also saw someone comment that there should be crosswalks for pedestrians and I 100% agree. People will cross 273 nonchalantly which is super dangerous especially at night. Also there have been many wrecks and accidents by Spring Gulch Rd and people who run the light. I've almost been hit multiple times turning left onto Spring Gulch. | 2 | 0 | Roadway | Lighting; Pedestrian; Safety | NEUTRAL |
| 38 | Make a Comment | I have an ebike and love riding it for pleasure and would use it to commute to work if there was a safe route, but currently there is not a safe way. We live near downtown Redding and getting to the River Trail safely is challenging. We drove around and studied maps until we found a circuitous route through the downtown area that felt safe to take to get to the River Trail. I believe this is why we do not see many people using the bike lanes in the car heavy roadways, it doesn't feel safe. | 4 | 0 | Multimodal Transportation | Bicycle Lanes/Paths | NEGATIVE |
| 39 | Make a Comment | significant safety issue is pedestrian-auto accidents during night/poor weather periods. | 2 | 0 | Multimodal Transportation | Collisions | POSITIVE |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 40 | Make a Comment | Put in bike paths because it seems to be a popular idea. But please solve this homeless issue. They are the ones using bikes the most right now. And, either walking or riding they are the ones who I've had to break for as they walk right out into traffic to cross the road, just a few yards from a crosswalk. They are not in their right mind.<br>I'm afraid this effort is just a way to handle homless people rather than sincerely improving our community. By all means let's improve this corridor. | 1 | 0 | Multimodal Transportation | Bicycle Lanes/Paths; Bicyclist and Pedestrian Behavior | MIXED |
| 41 | Make a Comment | Drivers should be able to make a right turn on red from South Bonneyview onto 273. For many years we were allowed to do that. Traffic is backed up waiting for the green light causing congestion and increasing pollution. I call BS on Caltrans that is unsafe, have them show you the data. | 0 | 0 | Traffic Control | Traffic Control | NEGATIVE |
| 42 | Make a Comment | Please coordinate the timing of stoplights from South Bonneyview to Canyon Road; these lights are not coordinated and I have seen too many vehicles run red lights due to this lack of coordination. | 0 | 0 | Traffic Control | Traffic Control | NEGATIVE |
| 43 | Make a Comment | It would be beneficial to have an indicator sign for train delays on South Bonneyview prior to the intersection with Eastside Road so that drivers can make choices earlier on for alternate routes. | 2 | 0 | Traffic Control | Traffic Control | NEUTRAL |

Public Input Survey Responses

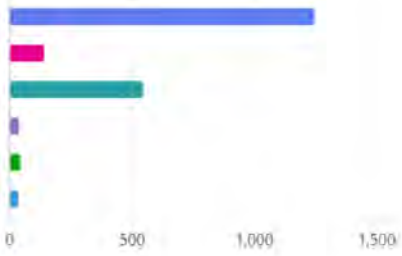
## Responses Overview

Closed

| Responses | Average Time | Duration |
|---|---|---|
| 1312 | 08:27 | 314 Days |

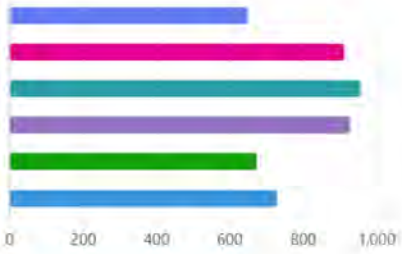
1. I am a _____ in Shasta County. *Select all that apply.*

| | |
|---|---|
| Resident | 1245 |
| Business Owner | 137 |
| Property Owner | 543 |
| Commerical Truck Driver | 35 |
| Student | 40 |
| Other | 31 |



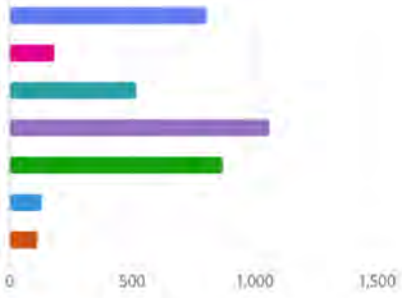

2. What portions of SR 273 do you use regularly. *Select all that apply.*

| | |
|---|---|
| Miracle Mile (North Market Street, north of Downtown Redding) | 647 |
| Downtown Redding (California Street, Pine Street) | 911 |
| South Market Street (Cypress to Buenaventura) | 955 |
| South Redding (Buenaventura to Rancheria) | 927 |
| County Segment (Rancheria to County Fairgrounds) | 672 |
| Anderson (County Fairgrounds to Outlet Malls/Walmart) | 727 |




3. What types of trips do you typically utilize SR 273 for? *Select all that apply.*

| | |
|---|---|
| Work | 801 |
| School | 180 |
| Medical | 516 |
| Groceries/Errands | 1059 |
| Recreation (parks, restaurants, entertainment, etc.) | 869 |
| Place of worship | 128 |
| Other | 110 |



4. Would you support improved crossing locations on SR 273? (particularly outside of downtown Redding / Anderson)

| | |
|---|---|
| Yes, it would make me feel safer crossing the road | 205 |
| Yes, it would make me feel safer as a driver | 625 |
| No | 240 |
| No opinion | 152 |
| I don't know | 78 |

5. Would you use a paved trail between Redding and Anderson?

| | |
|---|---|
| Yes | 536 |
| No | 759 |

6. Explain your answer to the question above.

1049
Responses

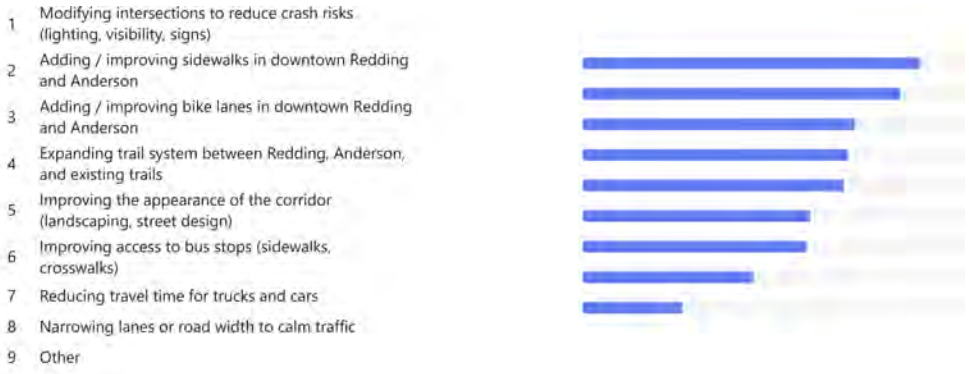
Latest Responses
"Safe way to ride my bike"
...

**242 respondents (23%) answered Bike for this question.**

7. Would you support improved bus (transit) service on SR 273? (more frequent and reliable)

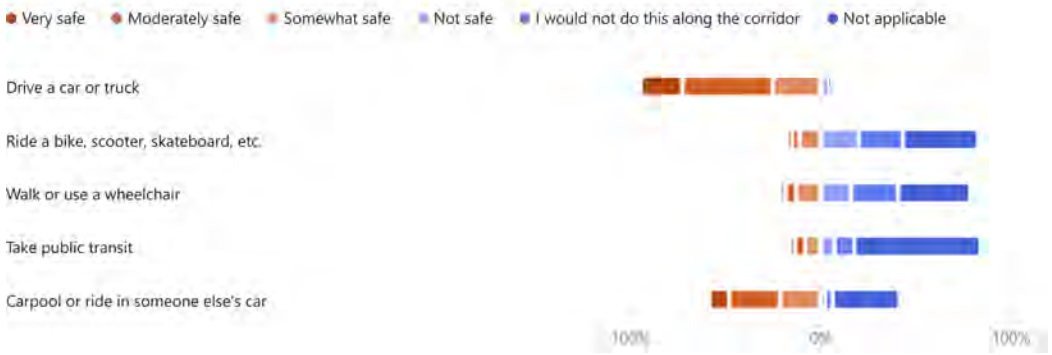
| | |
|---|---|
| Yes, it would take other cars off the road | 349 |
| Yes, I would use it if it were more convenient | 114 |
| No | 236 |
| No opinion | 493 |
| I don't know | 110 |

8. How would you prioritize changes to SR 273? *Rank options from most to least important by dragging each option or using the arrows to the right.*




9. On this segment, how often do you _____? *Select all that apply.*

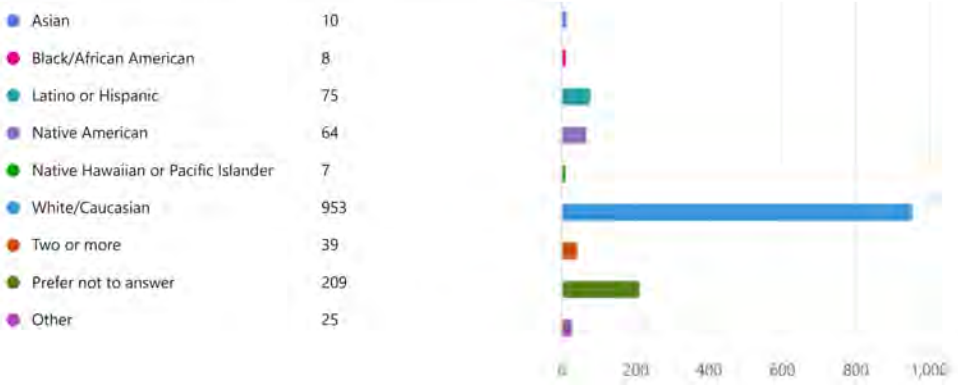
10. On this segment, how safe do you feel when you _____? *Select all that apply.*



11. If you answered, 'Somewhat unsafe' or 'Not safe,' on the prior question, what makes you feel unsafe? *Select the main reason you feel uns afe.*

12. What is your age?

13. Please select the race/ethnicity with which you identify. *Select all that apply.*



14. Zip code

1294
Responses

Latest Responses
"96001"
"96001"
"96007"
...

559 respondents (43%) answered 96001 for this question.

15. Thank you for your interest in the SR 273 Multimodal Corridor Plan. Please enter your email. Your contact information will not be shared and will be used to ensure only one response is submitted per person.

1019
Responses

Latest Responses
"birdcentral365@gmail.com"
"Bestbuddygorilla@gmail.com"
...

2 respondents (0%) answered highway for this question.

# Appendix E.

## Planned and Programmed Projects

*Table E-1: Planned and Programmed Projects*

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Arterial | City of Redding 2016 Downtown Redding Community Based Transportation Plan | Redding | Vehicular Action Plan | Downtown Redding | Road Diet:<br>Shasta St (Court St to Pine St) and South St (Court St to East St)<br><br>Signal Timing:<br>Coordinate for Less than 25 MPH<br><br>Improve Cypress Ave / Pine St / Market St Intersection (Additional Study Required):<br>Modern Roundabout | Operations & Reliability | Road Diet:<br>$2,250,000<br><br>Signal Timing:<br>No capital cost<br><br>Improve Cypress Ave / Pine St / Market St Intersection (Additional Study Required):<br>$ 4,000,000 | Not Listed |
| 2 | Arterial | City of Redding 2022-2027 CIP | Redding | Westside Rd Bridge over Canyon Hollow Creek | Westside Rd Bridge | Replace the bridge on Westside Rd over Canyon Hollow Creek. | Operations & Reliability | $3,900,000.00 | 2023-2024 |
| 3 | Arterial | City of Redding 2022-2027 CIP | Redding | Eastside Rd Bridge over Canyon Hollow Creek | Eastside Rd Bridge | Replace the bridge on Eastside Rd over Canyon Hollow Creek. | Operations & Reliability | $3,865,000.00 | 2023-2024 |
| 4 | Arterial | City of Redding 2022-2027 CIP | Redding | Eastside Rd Bridge over Olney Creek | Eastside Rd Bridge | Replace the bridge on Eastside Road over Olney Creek. | Operations & Reliability | $4,655,676.00 | 2022-2023 |
| 5 | Arterial | SRTA 2022 RTP | Redding | Railroad Ave (Sheridan St to Grandview Ave) - Widening (including class II bike lanes) | Railroad Ave | Railroad Ave (Sheridan St to Grandview Ave) - Widening (including class II bike lanes) | Operations & Reliability | $2,308,000.00 | 2033-2042 |
| 6 | Arterial | SRTA 2022 RTP | Redding | Westside Rd (Glengary Dr to Clear Creek Rd) - Extension | Westside Rd | Westside Rd (Glengary Dr to Clear Creek Rd) - Extension | Operations & Reliability | $1,669,000.00 | 2033-2042 |
| 7 | Arterial | SRTA 2022 RTP | Redding | Cedars Rd (El Reno Ln to Buenaventura Blvd) - Extension | Cedars Rd | Cedars Rd (El Reno Ln to Buenaventura Blvd) - Extension | Operations & Reliability | $1,152,000.00 | 2033-2042 |
| 8 | Arterial | SRTA 2022 RTP | Redding | Eastside Rd (Girvan Rd to Southern City Limits) - Extension | Eastside Rd | Eastside Rd (Girvan Rd to Southern City Limits) - Extension | Operations & Reliability | $7,232,000.00 | 2033-2042 |
| 9 | Arterial | SRTA 2022 RTP | Redding | George Dr (North Terminus to Oasis Rd) - Extension | George Dr | George Dr (North Terminus to Oasis Rd) - Extension | Operations & Reliability | $1,280,000.00 | 2033-2042 |
| 10 | Freight | SRTA 2022 RTP | Redding | South St Railroad Crossing - Grade Separation | South St | South St Railroad Crossing - Grade Separation | Operations & Reliability | $12,097,000.00 | 2033-2042 |
| 11 | Arterial | SRTA 2022 RTP | Anderson | East St (North of Willow Glen Dr) - Extension | East St | East St (North of Willow Glen Dr) - Extension | Operations & Reliability | $2,128,000.00 | 2033-2042 |
| 12 | Arterial | SRTA 2022 RTP | Anderson | Rhonda Rd (Factory Outlets Dr to Pleasant Hills) - Intersection Reconstruction | Rhonda Rd | Rhonda Rd (Factory Outlets Dr to Pleasant Hills) - Intersection Reconstruction | Operations & Reliability | $2,927,000.00 | 2033-2042 |
| 13 | Arterial | SRTA 2022 RTP | Anderson | Anderson Hills Pkwy (Rhonda Rd to Locust St) - Construct 4 lane road | Anderson Hills Pkwy | Anderson Hills Pkwy (Rhonda Rd to Locust St) - Construct 4 lane road | Operations & Reliability | $3,404,000.00 | 2033-2042 |
| 14 | Arterial | SRTA 2022 RTP | Anderson | South St (SR 273 west to City Limits) - Widening | South St | South St (SR 273 west to City Limits) - Widening | Operations & Reliability | $4,800,000.00 | 2033-2042 |
| 15 | Arterial | SRTA 2022 RTP | Anderson | Fairgrounds Dr (1st St to 3rd St) - Widening | Fairgrounds Dr | Fairgrounds Dr (1st St to 3rd St) - Widening | Operations & Reliability | $1,408,000.00 | 2033-2042 |
| 16 | Arterial | SRTA 2022 RTP | Anderson | 3rd Street (SR 273 to Fairgrounds Dr) - Widening | 3rd St | 3rd Street (SR 273 to Fairgrounds Dr) - Widening | Operations & Reliability | $2,304,000.00 | 2033-2042 |
| 17 | Arterial | SRTA 2022 RTP | Anderson | SR 273 @ North St - Intersection Improvements | SR 273/North St | SR 273 @ North St - Intersection Improvements | Safety | $1,500,000.00 | 2022-2032 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 18 | Arterial | SRTA 2022 RTP | Anderson | SR 273 @ South St - Intersection Improvements | SR 273/South St | SR 273 @ South St - Intersection Improvements | Safety | $1,920,000.00 | 2033-2042 |
| 19 | Arterial | SRTA 2022 RTP | Shasta County | Whitehouse Dr @ ACID Canal - Replace Bridge | Whitehouse Dr/ACID Canal | Whitehouse Dr @ ACID Canal - Replace Bridge | Operations & Reliability | $456,049.00 | 2022-2032 |
| 20 | Arterial | SRTA 2022 RTP | Redding | State Bridge # 06C0070, Westside Rd @ Oregon Gulch - Bridge Rehabilitation | Westside Rd/Oregon Gulch | State Bridge # 06C0070, Westside Rd @ Oregon Gulch - Bridge Rehabilitation | Operations & Reliability | $1,379,000.00 | 2033-2042 |
| 21 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | Safety Fences CCEP | SR 44 | Install Fencing. In Construction Phase. EA: 3J650. Route 44. Post Miles R0.70/R1.20. Program: State. Project Manager: Molz, Kerry A | Safety | $1,321,001.00 | 8/22/2023 - 6/24/2024 |
| 22 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | Safety Fences CCEP | SR 273 | Install Fencing. In Construction Phase. EA: 3J650. Route 273. Post Miles 17.04/17.09. Program: State. Project Manager: Molz, Kerry A | Safety | $13,201,004.00 | 8/22/2023 - 6/24/2024 |
| 23 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | Lake Blvd Pavement | SR 273 | Pavement Rehabilitation. In Construction Phase. EA: 4H050. Post Miles 18.50/18.70. Program: SHOPP. Project Manager: Timmons, Kelly B. | Operations & Reliability | $34,720,000.00 | 12/19/2023 - 12/9/2024 |
| 24 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | Westside Closure (Westside at Breslauer Improvements) | SR 273 | Improvements. In Project Development Phase. EA: 0K820. Post Miles 0.00/0.00. Program: MINOR-A. Project Manager: Molz, Kerry A. | Mobility & Connectivity | $1,250,000.00 | 9/30/2027 - 1/13/2028 |
| 25 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | Buena Wyndam Lighting | SR 273 | Pedestrian and Bicycle Lighting. In Project Development Phase. EA: 0K800. Post Miles 14.47/15.00. Program: MINOR-A. Project Manager: Molz, Kerry A. | Safety | $1,250,000.00 | 10/31/2031 - 12/3/2035 |
| 26 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | SR 273 MMBN 16.833/20.03 | SR 273 | Install Broadband. In Project Development Phase. EA: 4J560. Post Miles 16.83/20.03. Program: LOCAL. Project Manager: Buist, Austin V. | Social Equity | $1,120,000.00 | 11/28/2024 - 6/30/2026 |
| 27 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | SR 273 Median Barrier Safety | SR 273 | Safety Improvement. In Planning Phase. EA: 0K210. Post Mile 12.85/14.10. Program: SHOPP. Project Manager: Molz, Kerry A. | Safety | Not Listed | 4/6/2027 - 1/20/2028 |
| 28 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | Downtown Redding CAPM | SR 44 | Pavement Preservation. In Planning Phase. EA: 2J600. Post Miles L0.00/L0.54. Program: PLANNING. Project Manager: Timmons, Kelly B. | Operations & Reliability | $63,070.00 | 9/5/2028 - 1/19/2031 |
| 29 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | Downtown Redding CAPM | SR 273 | Pavement Preservation. In Planning Phase. EA: 2J600. Post Miles: 14.50/20.03. Program: PLANNING. Project Manager: Timmons, Kelly B. | Operations & Reliability | $63,070.00 | 9/5/2028 - 1/19/2031 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 30 | Highway | Caltrans District 2 Current Projects (https://dot.ca.gov/caltrans-near-me/district-2/d2-projects, Accessed 03/11/24) | Caltrans | NE Redding Multi Modal Connector | SR 299 | Construct Bicycle and Pedestrian Path. In Planning Phase. EA: 0K280. Post Miles 25.00/27.20. Program: LOCAL. Project Manager: Timmons, Kelly B. | Mobility & Connectivity | Not Listed | 9/9/2031 - 10/10/2035 |
| 31 | Complete Streets | City of Redding 2018 ATP | Caltrans | Intersection Improvement: W Cypress Ave and Pine St | W Cypress Ave/Pine St | Bicycle and Pedestrian Intersection Improvement | Mobility & Connectivity; Safety | $312,576.00 | 2026-2040 |
| 32 | Complete Streets | City of Redding 2018 ATP | Caltrans | Intersection Improvement: Eureka Way and Walnut Ave | Eureka Way/Walnut Ave | Bicycle and Pedestrian Intersection Improvement | Mobility & Connectivity | $312,576.00 | 2026-2040 |
| 33 | Complete Streets | City of Redding 2018 ATP | Caltrans | Intersection Improvement: SR 273 and Breslauer Way | SR 273/Breslauer Way | Bicycle and Pedestrian Intersection Improvement | Mobility & Connectivity | $312,576.00 | 2026-2040 |
| 34 | Complete Streets | City of Redding 2018 ATP | Caltrans | Intersection Improvement: Sundial Bridge Dr and SR 44 | Sundial Bridge Dr/SR 44 | Bicycle and Pedestrian Intersection Improvement | Mobility & Connectivity | $312,576.00 | 2026-2040 |
| 35 | Complete Streets | SRTA 2018 GoShasta Regional ATP | Caltrans | Intersection Improvement: SR 273 and South St | SR 273/South St | Bicycle and Pedestrian Intersection Improvement | Mobility & Connectivity | $94,927.00 | 2026-2040 |
| 36 | Complete Streets | SRTA 2018 GoShasta Regional ATP | Caltrans | Intersection Improvement: SR 273 and Factory Outlet Dr | SR 273/Factory Outlet Dr | Bicycle and Pedestrian Intersection Improvement | Mobility & Connectivity | $94,927.00 | 2026-2040 |
| 37 | Complete Streets | SRTA 2018 GoShasta Regional ATP | Caltrans | Intersection Improvement: SR 273 and North St | SR 273/North St | Bicycle and Pedestrian Intersection Improvement | Mobility & Connectivity | $94,927.00 | 2026-2040 |
| 38 | Highway | SRTA 2022 RTP | Caltrans | SR 299 (PM 24.1 to 30.3), Lake Blvd Pavement | SR 299, Lake Blvd | Pavement Overlay, Lane Mile(s) | Operations & Reliability | $35,580,000.00 | 2022-2032 |
| 39 | Highway | SRTA 2022 RTP | Caltrans | SR 299, Mitigation | SR 299 | Mitigation | Operations & Reliability | $1,300,000.00 | 2022-2032 |
| 40 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 4.1 to 5.9), Anderson Quarter Century Signals | SR 273 | Signal Replacement | Operations & Reliability | $9,075,000.00 | 2022-2032 |
| 41 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 14.5 to 18.5), Downtown Redding CAPM | SR 273 | Pavement Overlay | Operations & Reliability | $52,124,000.00 | 2022-2032 |
| 42 | Highway | SRTA 2022 RTP | Caltrans | SR 44 (PM 0.0 to 71.39), Shoulder Widening | SR 44 | Widen Shoulders | Operations & Reliability | $26,000,000.00 | 2033-2042 |
| 43 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 17.031), Caltrans D2 Office | SR 273 | Facilities - Caltrans District Office | Operations & Reliability | $36,800,000.00 | 2033-2042 |
| 44 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 17.0), Caltrans D2 Redding Materials Lab | SR 273 | Facilities - Caltrans Redding Materials Lab | Operations & Reliability | $15,413,000.00 | 2033-2042 |
| 45 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 14.1 to 19.8), Redding Quarter Century Signals | SR 273 | Signal Replacement | Operations & Reliability | $8,556,000.00 | 2033-2042 |
| 46 | Highway | SRTA 2022 RTP | Caltrans | SR 299 (PM 75.7), Burney Fuel Island Canopy;<br>SR 273 (PM 9.8), Redding Fuel Island Canopy | SR 273, SR 299 | Facilities | Operations & Reliability | $3,825,000.00 | 2033-2042 |
| 47 | Highway | SRTA 2022 RTP | Caltrans | SR 44, Remove STAA Barriers | SR 44 | Remove STAA Barriers | Operations & Reliability | $20,000,000.00 | 2030-2042 |
| 48 | Highway | SRTA 2022 RTP | Caltrans | SR 273/SR 299, Redding Signal Upgrades and Synchronization on SR 299 between Lake Blvd and I-5 | SR 273/SR 299 | Intelligent Transportation Systems | Operations & Reliability | $210,000.00 | 2022-2032 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 49 | Highway | SRTA 2022 RTP | Caltrans | SR 44/SR 299, Shasta County, Connect I-5 Fiber Backbone to the District Office | SR 44/SR299 | Intelligent Transportation Systems | Operations & Reliability | $4,482,000.00 | 2022-2032 |
| 50 | Highway | SRTA 2022 RTP | Caltrans | SR 44/SR 299, Redding, Redding Local TMS Fiber Spurs | SR 44/SR299 | Intelligent Transportation Systems | Operations & Reliability | $1,377,000.00 | 2022-2032 |
| 51 | Highway | SRTA 2022 RTP | Caltrans | I-5/SR 273, Redding Northern Redding TMS Fiber | I-5/SR 273 | Intelligent Transportation Systems | Operations & Reliability | $345,000.00 | 2022-2032 |
| 52 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 12.68), Bonnyview Rd, 1 CCTV at S. Bonnyview Rd on SR 273 | SR 273 | Intelligent Transportation Systems | Operations & Reliability | $237,000.00 | 2022-2032 |
| 53 | Highway | SRTA 2022 RTP | Caltrans | SR 273, Redding, South Redding TMS Fiber Loop | SR 273 | Intelligent Transportation Systems | Operations & Reliability | $54,000.00 | 2022-2032 |
| 54 | Highway | SRTA 2022 RTP | Caltrans | SR 273, Redding, Redding Rural TMS | SR 273 | Intelligent Transportation Systems | Operations & Reliability | $1,357,000.00 | 2022-2032 |
| 55 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 16.0R to 16.833), Pine Street | SR 273 | Intelligent Transportation Systems | Operations & Reliability | $6,600,000.00 | 2033-2042 |
| 56 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 12.0), South Bonnyview Rd, CMS FNBT | SR 273 | Intelligent Transportation Systems | Operations & Reliability | $1,024,000.00 | 2033-2042 |
| 57 | Highway | SRTA 2022 RTP | Caltrans | SR 273 (PM 13.5), South Bonnyview Rd, CMS FSBT | SR 273 | Intelligent Transportation Systems | Operations & Reliability | $1,024,000.00 | 2033-2042 |
| 58 | Highway | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Traffic Signals: SR 273 | SR 273 (Multiple Locations) | Replace existing traffic signals at 25 intersections. | Operations & Reliability | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 59 | Highway | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Culverts: SR 274 | SR 273 (Multiple Locations) | Replace 20 culvert segments and repair 4 culvert segments | Sustainability | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 60 | Highway | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Bridge: SR 299 (at Bridge No. 06-0035) | SR 299 (at Bridge No. 06-0035) (w/o California St) | Replace 3,115 linear feet of MBGR with MGS with steel posts and install 4 bridge transition anchor blocks on Redding OH Bridge No. 06-0035. | Safety | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 61 | Highway | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Crash Cushions: SR 273 (n/o Buenaventura Blvd and s/o Wyndham Ln) | SR 273 (n/o Buenaventura Blvd and s/o Wyndham Ln) | Replace two crash cushions at terminals of existing concrete barriers located n/o Buenaventura Blvd and s/o Wyndham Ln. | Safety | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 62 | Highway; Arterial | Caltrans 2023 HSIP Implementation Plan | Caltrans; Redding | Safety Improvements | 6 intersections in Redding | 4 Focus Areas including 6 Intersections: Continental St/Butte St; Placer St/Continental St; Placer St/East St; Court St/Tehama St; South St/California St; South St/Market St.<br><br>Provide left turn lanes and left turn protected phasing where none exists at selected intersections. Install striping between intersections to facilitate intersection modifications. | Safety | $890,000.00 | Not Listed |
| 63 | Transit | City of Redding 2016 Downtown Redding Community Based Transportation Plan | Redding | Transit Action Plan | Downtown Redding | Bus Stop Improvements:<br>Provide Shelters & Seating, and Improve ADA Access & Lighting | Mobility & Connectivity | Bus Stop Improvements: $660,000 | Not Listed |
| 64 | Transit | RABA 2023 SRTP | Redding | Route 1 | SR 273 (N. Redding & Downtown Redding) | Route 1 will be extended to the Downtown Transit Center (via Market St), eliminating service to the Masonic Transit Center. To improve travel times between Downtown Redding and Shasta Lake, service around the Northpoint Dr/Redwood | Operations & Reliability | Not Listed | July 2024 or Later |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Blvd/Caterpillar Rd/Twin View Blvd loop will be eliminated. | | | |
| 65 | Transit | RABA 2023 SRTP | Redding | Route 2E/2W | SR 273 (Downtown Redding) | Route 2E/2W will be eliminated and replaced with Microtransit Service (Central Service Area). | Operations & Reliability | Not Listed | July 2024 or Later |
| 66 | Transit | RABA 2023 SRTP | Redding | Route 3 | SR 273 (Downtown Redding & S. Redding) | In Downtown Redding, Route 3 will be streamlined by traveling along S. Market St rather than Court St, West St, and Railroad Ave. Route 3 will terminate at the Girvan Rd/Eastside Rd intersection, in consideration of the Route 9 extension to Downtown Transit Center. | Operations & Reliability | Not Listed | July 2024 or Later |
| 67 | Transit | RABA 2023 SRTP | Redding | Route 7 | SR 273 (N. Redding) | Route 7 will continue to serve Shasta College and the Northpoint Dr/Redwood Blvd/Caterpillar Rd/Twin View Blvd loop but will be revised to connect with the Canby Transit Center rather than the Downtown Transit Center. | Operations & Reliability | Not Listed | July 2024 or Later |
| 68 | Transit | RABA 2023 SRTP | Redding; Anderson | Route 9 | SR 273 (Redding & Anderson) | Route 9 will be extended to the Downtown Transit Center. Service will largely follow SR 273, eliminating City of Anderson segments east of SR 273 (North St, Stingy Ln, and Balls Ferry Rd). | Operations & Reliability | Not Listed | July 2024 or Later |
| 69 | Transit | RABA 2023 SRTP | Redding | Routes 11 and 14 | SR 273 (N. Redding) | Routes 11 and 14 largely will be unchanged. Rather than traveling along Masonic Ave to serve Masonic Transit Center, both routes will instead travel a clockwise loop around Lake Blvd, Northpoint Dr, and N. Market St. | Operations & Reliability | Not Listed | July 2024 or Later |
| 70 | Transit | RABA 2023 SRTP | Redding; Shasta County | Route 15 | SR 273 (Downtown Redding) | New Route 15 (initial 1-year pilot) will connect the Downtown Transit Center and Canby Transit Center (via SR 44) with the Redding Regional Airport. This route will replace Crosstown Express. | Operations & Reliability | Not Listed | July 2024 or Later |
| 71 | Transit | RABA 2023 SRTP | Redding; Anderson | Anderson Commuter | SR 273 (Redding & Anderson) | The Anderson Commuter will be eliminated and replaced with Route 9 | Operations & Reliability | Not Listed | July 2024 or Later |
| 72 | Transit | RABA 2023 SRTP | Anderson | Microtransit Service: Anderson Service Area | Anderson | This service area encompasses the City of Anderson.<br><br>Microtransit service (9:00 AM to 4:00 PM on weekdays and 9:20 AM to 5:15 PM on Saturdays) will supplement Route 9. | Operations & Reliability | Not Listed | July 2024 or Later |
| 73 | Transit | RABA 2023 SRTP | Redding | Microtransit Service: Central Service Area | Downtown Redding | This service area encompasses Downtown Redding and adjacent areas, including Turtle Bay, Redding City Hall, and hospitals. It is bounded by the Sacramento River to the north and east, Ridge Rd to the west, and roughly Parkview Ave on the southeast and Placer St, Airpark Dr, and Laurel Dr to the southwest.<br><br>Microtransit service (6:20 AM to 6:00 PM on weekdays and 9:20 AM to 5:15 PM on Saturdays) will replace Route 2. | Operations & Reliability | Not Listed | July 2024 or Later |
| 74 | Transit | RABA 2023 SRTP | Redding; Anderson; Shasta County | Microtransit Service: Weekday Evenings | Redding; Anderson; Shasta County | A weekday evening microtransit service will be initiated throughout the entire RABA paratransit service area from 6:00 PM to 9:00 PM. | Operations & Reliability | Not Listed | July 2024 or Later |
| 75 | Complete Streets | City of Anderson 2011 Pedestrian Accessibility and Safety Master Plan | Anderson | SR 273 Bike/Ped Trail (North) | SR 273 (Briggs St and Spring Gulch Rd) | New hot mix asphalt (HMA) path along west side of SR 273 (similar to new path to Walmart Shopping Center) | Mobility & Connectivity | $1,000,000+ | Not Listed |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 76 | Complete Streets | City of Redding 2016 Downtown Redding Community Based Transportation Plan | Redding | Pedestrian Action Plan | Downtown Redding | Intersection Safety & Traffic Calming: Intersection Enhancements<br><br>Improve Cypress Ave / Pine St / Market St Intersection (Additional Study Required): Pedestrian Access Improvements | Mobility & Connectivity; Safety | Intersection Safety & Traffic Calming: $ 5,000,000<br><br>Improve Cypress Ave / Pine St / Market St Intersection: $ 1,000,000 (Pedestrian Access Improvements) | Not Listed |
| 77 | Complete Streets | City of Redding 2016 Downtown Redding Community Based Transportation Plan | Redding | Bicycle Action Plan | Downtown Redding | Area-wide Design Elements: Signing, Intersection Markings, Crossing Signals, Bike Parking | Mobility & Connectivity; Safety | Area-wide Design Elements: $1,150,000 | Not Listed |
| 78 | Complete Streets | City of Redding 2018 ATP | Caltrans; Redding | Class IV Bikeway: California St (Division St to Yuba St) | California St | Separated Bike Lane, 0.27 miles | Mobility & Connectivity | $550,000.00 | 2018-2025 |
| 79 | Complete Streets | City of Redding 2018 ATP | Caltrans; Redding | Class IV Bikeway: California St (Yuba St to Placer St) | California St | Separated Bike Lane, 0.07 miles | Mobility & Connectivity | $10,043.32 | 2026-2040 |
| 80 | Complete Streets | City of Redding 2018 ATP | Caltrans; Redding | Class II Bike Lane: California St; Gold St; S Market St (California St/Placer St to S Market St/Cypress Ave) | California St; Gold St; S Market St | Buffered Bike Lane, 0.60 miles | Mobility & Connectivity | $38,293.02 | 2026-2040 |
| 81 | Complete Streets | City of Redding 2018 ATP | Caltrans; Redding | Class II Bike Lane: S Market St (Trinity St to Quartz Hill Rd) | S Market St | Bike Lane, 0.47 miles | Mobility & Connectivity | $18,424.71 | 2026-2040 |
| 82 | Complete Streets | City of Redding 2018 ATP | Caltrans; Redding | Class II Bike Lane: N Market St (Sulphur Creek Rd to Benton Dr) | N Market St | Bike Lane, 0.09 miles | Mobility & Connectivity | $3,686.82 | 2026-2040 |
| 83 | Complete Streets | City of Redding 2018 ATP | Redding | Class I Bike Path: Westside Rd (Buenaventura Blvd to Canyon Rd) | Westside Rd | Shared-Use Path, 3.55 miles | Mobility & Connectivity | $3,152,907.53 | 2026-2040 |
| 84 | Complete Streets | City of Redding 2018 ATP | Redding | Class I Bike Path: Eastside Rd (N Bonnyview Rd to S Bonnyview Rd) | Eastside Rd | Shared-Use Path, 1.02 miles | Mobility & Connectivity | $901,135.75 | 2026-2040 |
| 85 | Complete Streets | City of Redding 2018 ATP | Caltrans; Redding | Sidewalk: California St (Gold St to SR 273) | California St | Sidewalk, 1.14 miles | Mobility & Connectivity | $644,656.97 | 2026-2045 |
| 86 | Complete Streets | City of Redding 2018 ATP | Redding | Sidewalk: Westside Rd (El Reno Ln to Cedars Rd) | Westside Rd | Sidewalk, 1.15 miles | Mobility & Connectivity | $652,204.01 | 2026-2045 |
| 87 | Complete Streets | City of Redding 2018 ATP | Caltrans; Redding | Sidewalk: Eureka Way (Buenaventura Blvd to e/o Overhill Dr) | Eureka Way | Sidewalk, 1.23 miles | Mobility & Connectivity | $698,204.28 | 2026-2045 |
| 88 | Complete Streets | City of Redding 2018 ATP | Redding | Sidewalk: Waverly Ave; Eastside Rd (Waverly Ave/Beretta Ln to Eastside Rd/Girvan Rd) | Waverly Ave; Eastside Rd | Sidewalk, 1.07 miles | Mobility & Connectivity | $608,020.99 | 2026-2045 |
| 89 | Complete Streets | City of Redding 2018 ATP | Redding | Class II Bike Lane: Placer St (Pleasant St to Court St) | Placer St | Buffered Bike Lane, 0.95 miles | Mobility & Connectivity | $60,578.99 | 2026-2040 |
| 90 | Complete Streets | City of Redding 2022-2027 CIP | Redding | Turtle Bay to Downtown | Turtle Bay area | Turtle Bay to Downtown multi-use trail connecting Dana to Downtown and Turtle Bay boat ramp to Continental. Includes a tunnel; shared use path; and pedestrian safety lighting. | Mobility & Connectivity | $6,550,000.00 | 2024-2025 |
| 91 | Complete Streets | City of Redding 2022-2027 CIP | Redding | California St Bikeway Project | California St | Construction of a two-way Class IV bikeway along California St, between Yuba St and Tehama St. | Mobility & Connectivity | $4,140,000.00 | 2023-2024 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Improvements of pedestrian access by rebuilding curb ramps, creating bulb-outs, and increasing crossing visibility. | | | |
| 92 | Complete Streets | SRTA 2018 GoShasta Regional ATP | Caltrans; Anderson; Shasta County | Class IV Bikeway: SR 273 (Pleasant Hills Dr to City of Redding Boundary) | SR 273 (Anderson to Redding) | Separated Bike Lane, 11.77 miles | Mobility & Connectivity | $11,786,458.00 | 2026-2040 |
| 93 | Complete Streets | SRTA 2018 GoShasta Regional ATP | Anderson; Shasta County | Class II Bike Lane: Rhonda Rd/Pleasant Hills Dr (SR 273 to Cremia Pl) | Rhonda Rd/Pleasant Hills Dr | Bike Lane, 0.05 miles | Mobility & Connectivity | $474,873.00 | 2026-2040 |
| 94 | Complete Streets | SRTA 2022 RTP | Caltrans; Redding; Shasta County | Known as the North Redding Active Transportation Trunkline, a partnership project to construct Complete Street Elements from sections of Lake Blvd west of SR 273, along 273, on College View Drive in Redding to Old Oregon Trail | SR 273 | Complete Street Elements | Mobility & Connectivity | $20,000,000.00 | 2022-2032 |
| 95 | Complete Streets | SRTA 2022 RTP | Caltrans | As part of Caltrans South Market ADA – SR 273 add a bike lane in City of Redding | SR 273 | Construct a class II bike lane between postmiles 14.9 -15.7 | Mobility & Connectivity | $1,500,000.00 | 2022-2032 |
| 96 | Complete Streets | SRTA 2022 RTP | Caltrans | Entire length of SR 273, multi-modal facility | SR 273 | Complete Street Elements | Mobility & Connectivity | $30,000,000.00 | 2033-2042 |
| 97 | Complete Streets | SRTA 2022 RTP | Caltrans | SR 273 (PM 3.812 to 11.1), various locations in high pedestrian areas, Pedestrian Facilities - Consistent with ADA and Caltrans Design Standards | SR 273 | Pedestrian facilities | Mobility & Connectivity; Safety | $8,961,000.00 | 2033-2042 |
| 98 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Crosswalk: SR 273 (at California St) | SR 273 (at California St) (PM 15.653) | Crosses California St. Requires installing bulb out sidewalk, removing and replacing existing accessible ramp, removing existing valley gutter and fixing any potential drainage issues. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 99 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Crosswalk: SR 273 (at SR 299) | SR 273 (at SR 299) (PM 18.62) | Crosses SR 299 (Lake Blvd). Requires modification to existing concrete island and sidewalk curbs. Existing striping will need to be modified to accommodate new crosswalks. Traffic signal is being replaced and will accommodate new crossings. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 100 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Crosswalk: SR 273 (at Twin View Blvd) | SR 273 (at Twin View Blvd) (PM 18.92) | Crosses Twin View Blvd. Requires sidewalk/curb modifications and/or partial rebuild and installing 2 new accessible ramps. Existing striping will need to be modified and traffic signal is being replaced and will accommodate new crossings. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 101 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Crosswalk: SR 273 (at Northpoint Dr) | SR 273 (at Northpoint Dr) (PM 18.92) | Crosses Northpoint Dr. Requires sidewalk/curb modifications and/or partial rebuild and installing 2 new accessible ramps. Existing striping will need to be modified and traffic signal is being replaced and will accommodate new crossings. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 102 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Enhanced Crosswalk: SR 273 (near Lincoln St) | SR 273 (near Lincoln St) (PM 16.184) | The enhanced crosswalk at Lincoln St is to be installed before the construction of this project. The Downtown Redding CAPM will connect RRFB across Pine St to power. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 103 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Enhanced Crosswalk: SR 44 (Eureka and Pine) | SR 44 (Eureka and Pine) (PM L0.079L) | Requires installing solar power RRFB across Pine St and high visibility crosswalk marking/striping across Eureka Wy. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 104 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Class I Bike Path: SR 273 (Lake Blvd to Northpoint Dr) | SR 273 (Lake Blvd to Northpoint Dr) (PM 18.64 to 18.9) | Requires cutting into the median approximately 6', includes a new structural section in the median with curb and gutter, shifting the existing highway geometry, and installing a 5'-wide unpaved buffer, 8'-wide class I bike path with 2' shoulders. A soldier pile wall approximately 8' x 339' will be required in existing fill section adjacent to pond. Median may require irrigation for future landscaping. If no modifications are made to the existing median, additional retaining walls may be necessary and construction may include significant earthwork due to varied terrain* (*If a Class I path on this side is not feasible, a Class I path on the east side or Class II bike lanes on each shoulder are possible options.) | Mobility & Connectivity; Safety | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 105 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Class II Bike Lane: SR 273 (Hill St to California St) | SR 273 (Hill St to California St) (PM 15.66 to 16.04) | Requires removing existing southbound #2 lane on SR 273, installing a Class II bike lane with buffered striping. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 106 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Class II Bike Lane: SR 273 (Fell St to East St) | SR 273 (Fell St to East St) (PM 15.53 to 16.06) | Requires removing free right on Angelo Ave by adding "STOP" striping and installing "STOP" signage at existing crosswalk. Requires removing free right from Parkview Ave by regrading, installing new accessible ramp and restriping. Requires significant concrete removal and replacement or reconfiguring lanes at Cypress Ave from 12'-0" to 11'-0" wide in order to fit new 5'-0" wide bike lane. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 107 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Class II Bike Lane: SR 273/Pine St (Cypress Ave to Eureka Wy) | SR 273/Pine St (Cypress Ave to Eureka Wy) (PM 16.01R to L–0.078) | Requires lane reduction or elimination of on-street parking and installing striping for buffered bike lane. (This element is dependent on results of a traffic study during the PA&ED phase.) | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 108 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Class II Bike Lane: SR 273 (Northpoint Dr to Caterpillar Dr) | SR 273 (Northpoint Dr to Caterpillar Dr) (PM 17.8 to 18.6) | Requires removing traffic signals from original locations, highway widening for right turn lanes on Twin view Dr and Caterpillar Dr, additional minor concrete/sidewalk repair to accommodate for widening existing highway and installing buffered striping for bike lanes. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 109 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Sidewalk: SR 273 (Angelo Ave to Parkview Ave) | SR 273 (Angelo Ave to Parkview Ave) (PM 15.72 to 15.8) | Complete segment between Angelo Ave and Parkview Ave; current sidewalk ends mid-block. Future development of empty lot adjacent to SR 273 could impact need. | Mobility & Connectivity; Safety | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 110 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Sidewalk: SR 273 (Hill St to California St) | SR 273 (Hill St to California St) (PM15.66 to 16.04) | Requires removing existing southbound #2 lane on SR 273, installing retaining wall, curb and gutter, buffered striping for bike lane, retaining wall structure, drain inlets and removing and replacing accessible ramps. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 111 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Sidewalk: SR 273 (at Benton Dr) | SR 273 (at Benton Dr) (PM 17.8) | Constructing new bulbout east of the intersection of SR 273 and Benton Dr. Construction requires removing existing right turn lane, installing new sidewalk, and removing and replacing accessible ramp. Bulbout will improve pedestrian walking | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | conditions by shortening walking distance within crosswalk. | | | |
| 112 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Sidewalk: SR 273 (at Lake Blvd) | SR 273 (at Lake Blvd) (PM 17.8) | Requires constructing 10'-0" wide sidewalk east of SR 273 from existing sidewalk at Lake Blvd to existing continental crosswalk and accessible ramp on Hilltop Dr. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 113 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A1 | Caltrans | Curb Ramps: SR 273 | SR 273 (Multiple Locations) | Reconstruct 96 curb ramps and install 10 new curb ramps to accommodate newly installed crosswalks. | Mobility & Connectivity | $63,070,000 (Capital Const--All Projects) | 2027/2028 |
| 114 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A2 | Caltrans | Multiuse Path: SR 273 (Buenaventura Blvd to Wyndham Ln) | SR 273 (Buenaventura Blvd to Wyndham Ln) (PM 14.5 to 15.0) | Requires repurposing the 2nd southbound lane on SR 273 from Buenaventura Blvd to Wyndham Ln from a traffic lane to a multi-use path. Requires installing a concrete barrier and striping for multiuse path. Complete streets item will require a trial run with plastic delineators to determine if multiuse path will have a significant impact on traffic flow/safety. Trial run was installed by maintenance on June 11, 2023 and will determine feasibility of Multi-Use Path at this location. | Mobility & Connectivity; Safety | Unknown | 2027/2028 |
| 115 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A2 | Caltrans | Sidewalk: SR 273 (Benton Dr to Lake Blvd) | SR 273 (Benton Dr to Lake Blvd) (PM 17.8 to 18.6) | Requires constructing a 6'-wide sidewalk with curb and gutter adjacent to existing highway from Benton Dr to Lake Blvd. Construction will require additional retaining walls and lighting. | Mobility & Connectivity | Unknown | 2027/2028 |
| 116 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A2 | Caltrans | Class I Bike Path: SR 273 (Lake Blvd to Northpoint Dr) | SR 273 (Lake Blvd to Northpoint Dr) (PM 18.62 to 18.92) | Second design option for #104. Requires constructing new Class I Bike Path on east side of SR 273. | Mobility & Connectivity; Safety | Unknown | 2027/2028 |
| 117 | Complete Streets | Caltrans Downtown Redding CAPM PIR: Alternative A2 | Caltrans | Class II Bike Lane: SR 273 (Lake Blvd to Northpoint/Twinview Dr) | SR 273 (Lake Blvd to Northpoint Dr/Twinview Dr) (PM 18.62 to 18.92) | Third design option for #104. Requires widening southbound travel way with a retaining system and installing striping for bike lanes. | Mobility & Connectivity | Unknown | 2027/2028 |
| 118 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Bridge: Bridge Number 06 0006 | SR 273 (crossing Spring Gulch) at PM 7.1 | Priority Bridge: Riverine Flooding | Sustainability | Not Listed | Not Listed |
| 119 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Large Culvert: Bridge Number 06 0007 | SR 273 (crossing China Gulch) at PM 10.97 | Priority Large Culvert: Riverine Flooding | Sustainability | Not Listed | Not Listed |
| 120 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway: SR 273 (PM 11.816 to 12.674) | SR 273 (PM 11.816 to 12.674) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 121 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway: SR 273 (PM 16.834 to 17.381) | SR 273 (PM 16.834 to 17.381) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 122 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway: SR 273 (PM 17.385 to 17.809) | SR 273 (PM 17.385 to 17.809) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 123 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway: SR 273 (PM 3.825 to 4.493) | SR 273 (PM 3.825 to 4.493) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 124 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway: SR 273 (PM 5.053 to 5.441) | SR 273 (PM 5.053 to 5.441) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 125 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 6.398 to 7.419) | SR 273 (PM 6.398 to 7.419) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 126 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 9.427 to 11.096) | SR 273 (PM 9.427 to 11.096) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 127 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 11.819 to 12.671) | SR 273 (PM 11.819 to 12.671) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 128 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 16.834 to 17.382) | SR 273 (PM 16.834 to 17.382) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 129 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 17.561 to 17.819) | SR 273 (PM 17.561 to 17.819) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 130 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 3.812 to 4.589) | SR 273 (PM 3.812 to 4.589) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 131 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 5.052 to 5.439) | SR 273 (PM 5.052 to 5.439) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 132 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 6.395 to 7.458) | SR 273 (PM 6.395 to 7.458) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 133 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway:  SR 273 (PM 9.424 to 11.095) | SR 273 (PM 9.424 to 11.095) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 134 | Climate Change Adaptation and Resiliency | Caltrans 2020 D2 Adaptation Priorities Report | Caltrans | Priority Roadway: SR 273 (PM R16.659R to R16.73R) | SR 273 (PM R16.659R to R16.73R) | Priority Roadway: Temperature Change Pavement Performance | Sustainability | Not Listed | Not Listed |
| 135 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class IV Separated Bikeway | Trinity Street: Center Street to Continental | Complete Streets Elements | Mobility & Connectivity | $59,894.92 | 2018-2025 |
| 136 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class IV Separated Bikeway | Continental Street: Trinity St to Butte St | Complete Streets Elements | Mobility & Connectivity | $43,456.38 | 2018-2025 |
| 137 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | Pine St: Trinity St to Eureka Way | Complete Streets Elements. Extends Caltrans CAPM recommended Class II Buffered Bike Lane north of Eureka Way to Trinity St | Mobility & Connectivity | Full Segment cost (S Market St to Trinity St): $64,624.67 | 2026-2040 |
| 138 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Bike Lane | East St: Trinity St to Placer St | Complete Streets Elements | Mobility & Connectivity | $17,988.78 | 2026-2040 |
| 139 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class IV Separated Bikeway | Butte St: Continental St to Yuba St | Complete Streets Elements | Mobility & Connectivity | $19,484.10 | 2026-2040 |
| 140 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class IV Separated Bikeway | Yuba St: Continental St to California St | Complete Streets Elements | Mobility & Connectivity | $50,461.63 | 2026-2040 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 141 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding; Caltrans | Class II Bike Lane | Eureka Way (SR 299): Buenaventura Blvd to Court St | Complete Streets Elements. Subject to Caltrans Process Bike Lane | Mobility & Connectivity | $63,355.57 | 2026-2040 |
| 142 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Blvd | Shasta St (Court St to Walnut Ave) | Complete Streets Elements | Mobility & Connectivity | $585,817.80 | 2018-2025 |
| 143 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | Court St (South to Court St/Schley Ave); Schley Ave (Court St to Sheridan St) | Complete Streets Elements | Mobility & Connectivity | $115,263.65 | 2026-2040 |
| 144 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Bike Lane | Court St (Eureka Way to South St) | Complete Streets Elements | Mobility & Connectivity | $32,375.91 | 2026-2040 |
| 145 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Blvd | West St; Gold St; Airpark Dr (West St/Eureka Way to Airpark Dr/Placer St) | Complete Streets Elements | Mobility & Connectivity | $490,624.46 | 2026-2040 |
| 146 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Blvd | South St (West St to Court St) | Complete Streets Elements | Mobility & Connectivity | $33,133.60 | 2026-2040 |
| 147 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Route | Tehama St (Court St to California St) | Complete Streets Elements | Mobility & Connectivity | $10,942.18 | 2026-2040 |
| 148 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Route | Yuba St (Court St to California St) | Complete Streets Elements | Mobility & Connectivity | $7,705.73 | 2026-2040 |
| 149 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Blvd | Continental St (Butte St to South St) | Complete Streets Elements | Mobility & Connectivity | $126,183.42 | 2026-2040 |
| 150 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Blvd | Placer St (Continental St to terminus of proposed Class I e/o Sequoia St) | Complete Streets Elements | Mobility & Connectivity | $124,498.34 | 2026-2040 |
| 151 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Route | Market St (Placer St to South St) | Complete Streets Elements | Mobility & Connectivity | $4,442.02 | 2026-2040 |
| 152 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding; Caltrans | Class I Shared Use Path | Placer Street (Off-Street): (Placer St (East End) to Park Marina Dr | Complete Streets Elements. Subject to Caltrans Process Shared Use Path | Mobility & Connectivity | $72,044.33 | 2026-2040 |
| 153 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | Railroad Ave (Grandview Ave to Buenaventura Blvd) | Complete Streets Elements | Mobility & Connectivity | Not Listed | Not Listed |
| 154 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Bike Lane | Twinview Blvd (Mountain View Dr to N Market St(SR 273)); Northpoint Dr (N Market St(SR 273)) to Lake Blvd | Complete Streets Elements | Mobility & Connectivity | $54,597.09 | 2026-2040 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 155 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | Lake Blvd (Northpoint Dr to SR 273) | Complete Streets Elements | Mobility & Connectivity | Not Listed | Not Listed |
| 156 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | Adjacent to SR 273 in Sulphur Creek Hill Area, connecting from s/o Lake Blvd at SR 273, Benton Dr at SR 273 and SR 273 near Sulphur Creek | Complete Streets Elements | Mobility & Connectivity | $295,577.90 | 2026-2040 |
| 157 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Bike Lane | Benton Dr (SR 273 to Quartz Hill Rd) | Complete Streets Elements | Mobility & Connectivity | $58,026.91 (Cost in ATP is for N Court/Riverside Dr to N Market St - N Court to Quartz Hill Rd already constructed) | 2026-2040 |
| 158 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Route | Locust St / Civic Center Dr (SR 273 to Cypress Ave) | Complete Streets Elements | Mobility & Connectivity | $18,177.29 | 2026-2040 |
| 159 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Bike Lane | East St (Locust St to Pine St) | Complete Streets Elements | Mobility & Connectivity | Not Listed | Not Listed |
| 160 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | Cypress Ave (S Market St to Athens Ave) | Complete Streets Elements | Mobility & Connectivity | Cost only listed in ATP for segment from Pine St to Grape Ave ($11,766.96) | 2026-2040 |
| 161 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | South City Park, Tiger Field Perimeter at west side; along Parkview Ave; along Cypress Ave to Cottonwood Canal | Complete Streets Elements | Mobility & Connectivity | Not Listed | Not Listed |
| 162 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | Cottonwood Canal (Cypress Ave to Parkview Ave) | Complete Streets Elements | Mobility & Connectivity | Not Listed | Not Listed |
| 163 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | Cottonwood Canal (Parkview Ave to N Bonnyview Rd / Eastside Rd) | Complete Streets Elements. ACID Canal Trail | Mobility & Connectivity | $1,986,569.01 | 2026-2040 |
| 164 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path, New Sidewalk | Railroad Ave (South St to Buenaventura Blvd) | Complete Streets Elements | Mobility & Connectivity | $1,599,192.21 (Class I Path); 2,001,463.13 (Sidewalk) | 2018-2025 |
| 165 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | Buenaventura Blvd (S Market St to Existing Class I Path terminus at Canyon Creek Rd) | Complete Streets Elements | Mobility & Connectivity | Not Listed | Not Listed |
| 166 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | Buenaventura Blvd (S Market St to Placer St) | Complete Streets Elements | Mobility & Connectivity | Not Listed | |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| 167 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | Turtle Bay Boat Launch Area (Existing Class I terminus near Riverfront Park to Proposed Class I along north side of SR 299) | Complete Streets Elements | Mobility & Connectivity | Not Listed | Not listed |
| 168 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | S Bonnyview Rd (S Market/273 to Bechelli Ln) | Complete Streets Elements | Mobility & Connectivity | $108,584.62 | 2026-2040 |
| 169 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Bike Lane | Girvan Rd (SR 273 to Creekside St) | Complete Streets Elements | Mobility & Connectivity | Not Listed | Not Listed |
| 170 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | Butte St (Continental Dr to Sundial Bridge Dr) | Complete Streets Elements | Mobility & Connectivity | $25,233.99 | 2018-2025 |
| 171 | Complete Streets | City of Redding 2018 ATP | City of Redding | Class II Bike Lane | N Market St (Sulphur Creek Rd Proposed Class I to Benton Dr) | Complete Streets Elements | Mobility & Connectivity | $3,686.82 | 2026-2040 |
| 172 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class II Buffered Bike Lane | Buenaventura Blvd (Placer St to Eureka Way) | Complete Streets Elements | Mobility & Connectivity | $52,853.48 | 2026-2040 |
| 173 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | Buenaventura Blvd (Placer St to Eureka Way) (Already constructed between Foothill Blvd and Eureka Way) | Complete Streets Elements | Mobility & Connectivity | $731,506.22 | 2026-2040 |
| 174 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding; Caltrans | Class I Shared Use Path | State Highway 44 Crossing (Park Marina Dr to WB State Highway 44 On- and Off-Ramps) | Complete Streets Elements. Subject to Caltrans Process Shared-Use Path | Mobility & Connectivity | $72,044.33 | 2026-2040 |
| ~~175*~~ | ~~Complete Streets~~ | ~~City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP~~ | ~~City of Redding~~ | ~~Class I Shared Use Path~~ | ~~Adjacent to SR 273 in Sulphur Creek Hill Area, connecting from s/o Lake Blvd at SR 273, Benton Dr at SR 273 and SR 273 near Sulphur Creek~~ | ~~Complete Streets Elements~~ | ~~Mobility & Connectivity~~ | ~~$1,299,051.37~~ | ~~2026-2040~~ |
| 176 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | New Sidewalk | Oregon St (Shasta St to Yuba St) | Complete Streets Elements | Mobility & Connectivity | $244,853.46 | 2026-2040 |
| 177 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Blvd | Walnut Ave (Eureka Way to Shasta St) | Complete Streets Elements | Mobility & Connectivity | $90,400.74 | 2026-2040 |
| 178 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Blvd | LAKESIDE DR; FOOTHILL BLVD; LAS ANIMAS DR; MONTE BELLO DR; MANZANITA HILLS AVE (MANZANITA | Complete Streets Elements | Mobility & Connectivity | $376,944.94 | 2026-2040 |

| Project # | Type of Project | Source | Jurisdiction | Name | Location | Scope | Purpose and Need | Estimated Total Cost (Capital and Support) | Time |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | HILLS AVE/SHASTA ST to LAKESIDE DR/ BUENAVENTURA BLVD) | | | | |
| 179 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | New Sidewalk | Continental St (Trinity St to SR 44 Overcrossing) | Complete Streets Elements | Mobility & Connectivity | $242,232.20 | 2026-2045 |
| 180 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | Buenaventura Blvd (east side): Placer St to Starlight Blvd | Complete Streets Elements | Mobility & Connectivity | $1,617,962.31 | 2026-2045 |
| 181 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class I Shared Use Path | Off Street (Linden Creek): Buenaventura Blvd to West St | Complete Streets Elements | Mobility & Connectivity | $810,952.41 | 2026-2040 |
| 182 | Complete Streets | City of Redding 2045 General Plan Transportation Element; City of Redding 2018 ATP | City of Redding | Class III Bike Blvd | West St; Logan St (West St / Linden Ave to Logan St / Railroad Ave | Complete Streets Elements | Mobility & Connectivity | $7,400.23 | 2026-2040 |
| 183 | Complete Streets | Caltrans High-Cost Safety Projects Tier 4 Fact Sheet | Caltrans | Pedestrian Safety Corridor Lighting Project (Brighter 273 Safety) | PM 5.206/14.47 (South St intersection in Anderson to Buenaventura Blvd in Redding) | Provide continuous lighting for both northbound and southbound SR 273 that meets Caltrans conventional highway lighting standards. Install buried conduit in the median from PM 5.206 to 11.1. Install conduit in the median concrete barrier (Type 60M and 60MC) from PM 11.1 to 14.47. Install luminaires and pull boxes every 180'. Update all existing intersection/crosswalk lighting to meet American National Standards Institute / Illuminating Engineering Society (ANSI/IES) standards. Install service connections throughout the project (about 13). Potentially consider combining median concrete barrier project 02-0K210 for construction to add luminaires and electrical components (PM 12.68 to 14.18). | Safety | $48,800,000 | 2030 |

*Project 175 was removed as it is a duplicate of Project 156.

# Appendix F.

## Feasibility Studies

# Technical Memorandum

**November 19, 2024**

| | | | |
|---|---|---|---|
| **To** | Michael Kuker, SRTA;<br>Laurent Beauregard, SRTA | **Contact No.** | |
| **Copy to** | Natalie Kinney, Caltrans;<br>Aaron Casas, Caltrans;<br>Christina Prosperi, Caltrans;<br>Sergio Amezquita, Caltrans; | **Email** | Todd.tregenza@ghd.com |
| **From** | Todd Tregenza, GHD | **Project No.** | 12560002 |
| **Project Name** | Envision 273 Comprehensive Multimodal Corridor Plan | | |
| **Subject** | Task 6 Technical Memorandum: Feasibility Study #1 (One-way Couplet Reversion) | | |

## 1. Introduction

The Task 6 Technical Memorandums (TMs) will evaluate potential projects that may support corridor solutions, as described in the Task 5 TM.

Each Task 6 TM presents the feasibility of a potential project or group of projects. Task 6 includes six feasibility studies (FSs):

1. One-way Couplet Reversion
2. Cypress Avenue Roundabout
3. Downtown Redding Gateways
4. Class I/IV from Redding to Anderson
5. Shasta County (SR 273/Whitehouse Drive) Grade Crossing Relocation
6. Redding (SR 273/Breslauer Way) Grade Crossing Relocation

This TM presents *FS #1: One-way Couplet Reversion.*

The TMs will be combined or summarized in the draft/final report, as appropriate.

# 2. Scope

This TM evaluates the feasibility of converting the State Route (SR) 273 One-way Couplet in Downtown Redding from one-way streets to two-way streets. As shown in Figure 1, in the southbound direction, SR 273 consists of Market Street (from Eureka Way to Tehama Street), Tehama Street (from Market Street to California Street), California Street (from Tehama Street to Gold Street), Gold Street (from California Street to Market Street), and Market Street (from Gold Street to Cypress Avenue). In the northbound direction, SR 273 consist of Pine Street (from Cypress Avenue to Eureka Way) and Eureka Way (from Pine Street to Market Street).

This TM considered two alternatives:

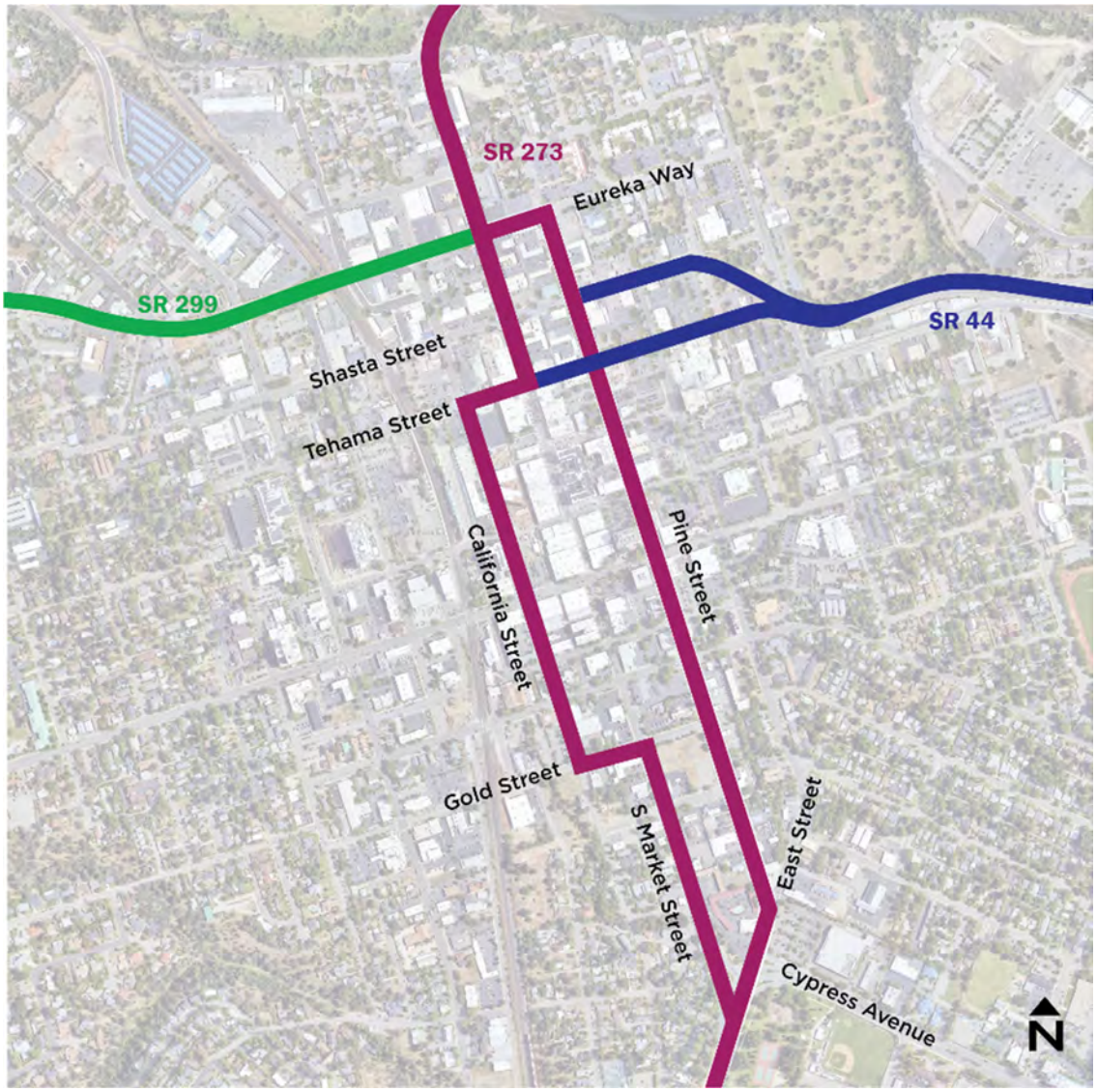
1) Partial Conversion (the streets south of Tehama Street)
2) Full Conversion (all of the streets listed above).

The partial conversion avoids the two adjacent highways that start/end at SR 273: SR 299 (west of the Market St/Eureka Way intersection) and SR 44 (east of both the Pine Street/Tehama Street and Pine Street/Shasta Street intersections).

Within the corridor, Downtown Redding is unique in that it contains the primary urban core, with recently constructed high-density, mixed-use development. Downtown Redding also is unique in that it is bisected by multiple highways—SR 273 in the north-south direction, which supports mostly intraregional trips, and both SR 44 and SR 299 in the east-west direction, which support (but are not limited to) interregional trips (e.g., freight trucks). Downtown Redding has been primarily designed for private motorized vehicles since the 1950s, when the first autos came to town.

Downtown Redding needs streets that help the people and the community thrive, including promoting non-vehicular modes of travel (e.g., walking and bicycling). The City of Redding vision is to “create a revitalized Downtown Redding that is attractive, safe, and economically vibrant” with a mix of “pedestrian- and bicycle-oriented shops, housing, workplaces, parks, and civic facilities, inviting to residents and visitors alike” (City of Redding Downtown Specific Plan Update, 2018).

*Figure 1* *SR 273 One-Way Couplet in Downtown Redding*



# 3. Data Collection and Analysis Approach

The following section presents the data collection process and analysis approach used to determine the traffic conditions within the study area.

## 3.1 Data Collection

Weekday AM (7-9 AM) and PM (4-6 PM) peak period turning movement counts were collected in October 2023. The turning movement counts included autos, trucks, pedestrians, and bicyclists. For signalized study intersections, signal timing sheets were provided by either the City of Redding, City of Anderson, Caltrans, or Shasta County. Field observations of AM and PM peak hour traffic conditions were performed in early November 2023.

## 3.2 Analysis Approach

The traffic analysis software, Synchro 11, was used to model the two-way conversion with existing (2023) and future year (2040) traffic volumes. A planning-level analysis (delay and level of service) for the AM and PM peak hour was performed at 37 intersections, including major intersections within the Downtown Redding area and along the entire SR 273 corridor (from Interstate 5 (I-5) on the north to I-5 on the south). Although only the intersections within the Downtown Redding area would be expected to be impacted by the one-way to two-way street conversion, the planning-level analysis includes a much larger study area to provide a traffic operations baseline for the other feasibility studies.

Level of service (LOS) is a qualitative description of traffic flow from a vehicle driver's perspective based on factors such as speed, travel time, delay, and freedom to maneuver as presented in the Transportation Research Board's *Highway Capacity Manual*. Six levels of service are defined ranging from LOS A (free-flow conditions) to LOS F (over capacity conditions), with LOS B to E representing decreasing desirable conditions. The City of Redding and City of Anderson generally strive to maintain LOS D or better for intersection operations, while Shasta County generally strives to maintain LOS C or better for intersection operations.

# 4. Existing Conditions

Existing intersection lane configurations, signal timings, and peak hour turning movement volumes were used to calculate the LOS for the study intersections during each peak hour, as presented in Table 1. Observed peak hour factors were used at all intersections for the existing conditions analysis. Trucks and pedestrian/bicycle activity also were factored into the analysis.

A brief summary of the existing conditions analysis is presented below.

- The majority of study intersections operate at acceptable LOS C or better conditions
- None of the study intersections operate at unacceptable LOS E or F conditions
- Three locations are operating at LOS D conditions (approaching capacity conditions)
    - Market Street/Eureka Way (PM Peak)
    - California Street/Tehama Street (PM Peak)
    - SR 273/S. Bonnyview Road (AM Peak)

*Table 1 FS #1 Existing Intersection Level of Service*

| Intersection | Local Jurisdiction / LOS Threshold | Traffic Control | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS |
| Market St & Caterpillar Rd | City of Redding / D | Signal | 27 | C | 26 | C |
| Market St & Northpoint Dr/Twin View Blvd | City of Redding / D | Signal | 18 | B | 24 | C |
| Market St & Lake Blvd | City of Redding / D | Signal | 29 | C | 30 | C |
| Market St & Benton Dr | City of Redding / D | Signal | 21 | C | 19 | B |
| Market St & Quartz Hill Rd/Travelled Wy | City of Redding / D | Signal | 27 | C | 25 | C |
| Market St & Trinity St | City of Redding / D | Signal | 18 | B | 17 | B |
| Market St & Eureka Wy | City of Redding / D | Signal | 30 | C | 36 | D |
| Market St & Shasta St | City of Redding / D | Signal | 22 | C | 22 | C |
| Shasta St & Pine St | City of Redding / D | Signal | 7 | A | 10 | A |
| California St & Tehama St | City of Redding / D | Signal | 28 | C | 36 | D |
| Pine St & Tehama St | City of Redding / D | Signal | 16 | B | 25 | C |
| Yuba St & East St | City of Redding / D | Side-Street Stop | 15 | C | 14 | B |
| California St & Placer St | City of Redding / D | Signal | 27 | C | 28 | C |
| Pine St & Placer St | City of Redding / D | Signal | 23 | C | 21 | C |
| California St & South St | City of Redding / D | Signal | 25 | C | 27 | C |
| Pine St & South St | City of Redding / D | Signal | 16 | B | 20 | B |
| East St & South St | City of Redding / D | All-Way Stop | 10 | A | 11 | B |
| Gold St & Market St | City of Redding / D | Signal | 17 | B | 22 | C |
| East St & Market St/Cypress Ave | City of Redding / D | Signal | 17 | B | 21 | C |
| Market St & Grange St | City of Redding / D | Signal | 9 | A | 8 | A |
| Westside Rd/Railroad Ave & Buenaventura Blvd | City of Redding / D | Signal | 18 | B | 19 | B |
| SR 273 & Buenaventura Blvd | City of Redding / D | Signal | 16 | B | 14 | B |
| SR 273 & Kenyon Dr | City of Redding / D | Side-Street Stop | 24 | C | 24 | C |
| SR 273 & Branstetter Ln | City of Redding / D | Side-Street Stop | 11 | B | 13 | B |
| SR 273 & Cedars Rd/ Bonnyview Rd | City of Redding / D | Signal | 36 | D | 33 | C |
| Eastside Rd & Bonnyview Rd | City of Redding / D | Signal | 32 | C | 28 | C |
| SR 273 & Clear Creek Rd | City of Redding / D | Signal | 11 | B | 12 | B |
| SR 273 & Canyon Rd / Redding Rancheria | City of Redding / D | Signal | 21 | C | 21 | C |
| SR 273 & Whitehouse Dr | City of Redding / D | Side-Street Stop | 20 | C | 26 | D |
| SR 273 & Happy V Rd | Shasta County / C | Signal | 12 | B | 11 | B |
| SR 273 & Amen St/Latona Rd | Shasta County / C | Side-Street Stop | 20 | C | 18 | C |
| SR 273 & Ox Yoke Rd | City of Anderson / D | Signal | 24 | C | 18 | B |
| SR 273 & North St | City of Anderson / D | Signal | 29 | C | 24 | C |
| SR 273 & South St | City of Anderson / D | Signal | 30 | C | 26 | C |

| Intersection | Local Jurisdiction / LOS Threshold | Traffic Control | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS |
| SR 273 & Factory Outlets Dr | City of Anderson / D | Signal | 13 | B | 15 | B |
| SR 273 & Pleasant Hills Dr | City of Anderson / D | Signal | 18 | B | 23 | C |
| Branstetter Ln & Westside Rd | City of Redding / D | Side-Street Stop | 10 | A | 10 | A |

Note: LOS results based on the 2000 *Highway Capacity Manual*.

# 5. Alternative Assumptions

The two alternatives under consideration are Partial Conversion and Full Conversion. The preliminary geometric design of the alternatives is on-going; however, the following are the assumptions used in the traffic analysis:

- One-left turn lane on every approach where the street is being converted from one-way to two-way
- One through lane in each direction
- No dedicated right-turn lanes

## Partial Conversion Alternative Assumptions

The following are the specific roadway conversion assumptions:

- California Street: Convert to two-way between Tehama Street & Gold Street
- Gold Street: Convert to two-way between California Street & Market Street
- Market Street: Convert to two-way between Gold Street and the Market Street/Cypress Avenue Intersection
- Reconfigure Market Street/Cypress Avenue intersection to a standard compact four-legged intersection (all movements in all directions allowed)
- Pine Street: Convert to two-way between Cypress Avenue and Tehama Street

## Full Conversion Alternative Assumptions

- Same assumptions as the Partial Conversion Alternative
- Market Street: Convert to two-way between Butte Street and Eureka Way
- Pine Street: Convert to two-way between Tehama Street and Trinity Street
- Tehama Street: Convert to two-way between Market Street and Liberty Street
- Shasta Street: Convert to two-way between Pine Street and Liberty Street
- Eureka Way: Convert to two-way between Market Street and Pine Street

## Volume Redistribution Assumptions

The following assumptions were used to redistribute the traffic under both alternatives:

- Total traffic volume into and out of the study area remains constant
- Traffic volume redistributed based on:
    - Available origin-destination data (source: Replica)
    - Engineering judgement (assume drivers would choose faster/more direct travel route)

# 6. Alternatives Evaluation

The two alternatives were evaluated under existing (2023) traffic volumes and future year (2040) traffic volumes. Future year (2040) traffic volumes were developed based on the Shasta County Activity-Based Travel Model 2.0. In general, traffic volumes are anticipated to grow by about 0.5 percent per year during the AM and PM peak hour.

## 6.1 Existing Traffic Volumes

Table 2 presents the LOS for the AM peak hour, while Table 3 presents the LOS for the PM peak hour under various roadway configurations (Existing, Partial Conversion, and Full Conversion).

### AM Peak Hour

Under the Partial Conversion Alternative, the intersection LOS during the AM Peak hour is anticipated to remain the same as the Existing Configuration at all of the study intersections except at the East Street/Market Street/Cypress Avenue intersection, where the LOS would degrade from LOS B to LOS C.

Under the Full Conversion Alternative, the intersection LOS during the AM Peak hour is anticipated to worsen compared to the Existing Configuration at several of the study intersections including:

- Market Street/Eureka Way (from LOS C to LOS F)
- Market Street/Shasta Street (from LOS C to LOS D)
- Shasta Street/Pine Street (from LOS A to LOS F)
- Pine Street/Tehama Street (from LOS B to LOS F)
- East Street/Market Street/Cypress Avenue (from LOS B to LOS C)

As shown in Table 2, several of the study intersections are expected to operate at LOS F under the Full Conversion Alternative. The AM peak hour traffic volumes on Market Street, Shasta Street, and Tehama Street exceed the capacity of a single through lane at the intersections and cannot accommodate two-way travel.

### PM Peak Hour

Under the Partial Conversion Alternative, all of the study intersections are anticipated to operate at acceptable service levels during the PM peak hour. However, there are a couple of locations where the LOS would degrade and they are:

- Shasta Street/Pine Street (from LOS A to LOS B)
- East Street/Market Street/Cypress Avenue (from LOS C to LOS D)

Under the Full Conversion Alternative, the intersection LOS during the PM Peak hour is anticipated to worsen compared to the Existing Configuration at several of the study intersections including:

- Market Street/Eureka Way (from LOS D to LOS F)
- Shasta Street/Pine Street (from LOS A to LOS F)
- Pine Street/Tehama Street (from LOS C to LOS F)
- East Street/Market Street/Cypress Avenue (from LOS C to LOS D)

As shown in Table 3, several of the study intersections are expected to operate at LOS F under the Full Conversion Alternative. Similar to the AM peak hour, the PM peak hour traffic volumes on Market Street, Shasta Street, and Tehama Street exceed the capacity of a single through lane at the intersections and cannot accommodate two-way travel.

*Table 2 FS #1 AM Peak Hour LOS Under Various Roadway Configurations With Existing Traffic Volumes*

| Intersection | Traffic Control | Existing Configuration | | Partial Conversion | | Full Conversion | |
|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS |
| Market St & Caterpillar Rd | Signal | 27 | C | 27 | C | 27 | C |
| Market St & Northpoint Dr/Twin View Blvd | Signal | 18 | B | 18 | B | 18 | B |
| Market St & Lake Blvd | Signal | 29 | C | 29 | C | 29 | C |
| Market St & Benton Dr | Signal | 21 | C | 21 | C | 21 | C |
| Market St & Quartz Hill Rd/Travelled Wy | Signal | 27 | C | 27 | C | 27 | C |
| Market St & Trinity St | Signal | 18 | B | 17 | B | 16 | B |
| Market St & Eureka Wy | Signal | 30 | C | 30 | C | **125** | **F** |
| Market St & Shasta St | Signal | 22 | C | 22 | C | 38 | D |
| Shasta St & Pine St | Signal | 7 | A | 8 | A | **265** | **F** |
| California St & Tehama St | Signal | 28 | C | 32 | C | 34 | C |
| Pine St & Tehama St | Signal | 16 | B | 15 | B | **96** | **F** |
| Yuba St & East St | Side-Street Stop | 15 | C | 16 | C | 15 | C |
| California St & Placer St | Signal | 27 | C | 26 | C | 27 | C |
| Pine St & Placer St | Signal | 23 | C | 26 | C | 25 | C |
| California St & South St | Signal | 25 | C | 23 | C | 24 | C |
| Pine St & South St | Signal | 16 | B | 18 | B | 17 | B |
| East St & South St | All-Way Stop | 10 | A | 10 | A | 10 | A |
| Gold St & Market St | Signal | 17 | B | 8 | A | 8 | A |
| East St & Market St/Cypress Ave | Signal | 17 | B | 31 | C | 32 | C |
| Market St & Grange St | Signal | 9 | A | 9 | A | 9 | A |
| Westside Rd/Railroad Ave & Buenaventura Blvd | Signal | 18 | B | 18 | B | 18 | B |
| SR 273 & Buenaventura Blvd | Signal | 16 | B | 16 | B | 16 | B |
| SR 273 & Kenyon Dr | Side-Street Stop | 24 | C | 24 | C | 24 | C |
| SR 273 & Branstetter Ln | Side-Street Stop | 11 | B | 11 | B | 11 | B |
| SR 273 & Cedars Rd/Bonnyview Rd | Signal | 36 | D | 36 | D | 36 | D |
| Eastside Rd & Bonnyview Rd | Signal | 32 | C | 32 | C | 32 | C |
| SR 273 & Clear Creek Rd | Signal | 11 | B | 11 | B | 11 | B |
| SR 273 & Canyon Rd / Redding Rancheria | Signal | 21 | C | 21 | C | 21 | C |
| SR 273 & Whitehouse Dr | Side-Street Stop | 20 | C | 20 | C | 20 | C |
| SR 273 & Happy V Rd | Signal | 12 | B | 12 | B | 12 | B |
| SR 273 & Amen St/Latona Rd | Side-Street Stop | 20 | C | 20 | C | 20 | C |
| SR 273 & Ox Yoke Rd | Signal | 24 | C | 24 | C | 24 | C |
| SR 273 & North St | Signal | 29 | C | 29 | C | 29 | C |
| SR 273 & South St | Signal | 30 | C | 30 | C | 30 | C |
| SR 273 & Factory Outlets Dr | Signal | 13 | B | 13 | B | 13 | B |
| SR 273 & Pleasant Hills Dr | Signal | 18 | B | 18 | B | 18 | B |

| Intersection | Traffic Control | Existing Configuration | | Partial Conversion | | Full Conversion | |
|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS |
| Branstetter Ln & Westside Rd | Side-Street Stop | 10 | A | 10 | A | 10 | A |

*Table 3 FS #1 PM Peak Hour LOS Under Various Roadway Configurations With Existing Traffic Volumes*

| Intersection | Traffic Control | Existing Configuration | | Partial Conversion | | Full Conversion | |
|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS |
| Market St & Caterpillar Rd | Signal | 26 | C | 26 | C | 26 | C |
| Market St & Northpoint Dr/Twin View Blvd | Signal | 24 | C | 24 | C | 24 | C |
| Market St & Lake Blvd | Signal | 30 | C | 30 | C | 30 | C |
| Market St & Benton Dr | Signal | 19 | B | 19 | B | 19 | B |
| Market St & Quartz Hill Rd/Travelled Wy | Signal | 25 | C | 25 | C | 25 | C |
| Market St & Trinity St | Signal | 17 | B | 18 | B | 19 | B |
| Market St & Eureka Wy | Signal | 36 | D | 34 | C | **147** | **F** |
| Market St & Shasta St | Signal | 22 | C | 22 | C | 26 | C |
| Shasta St & Pine St | Signal | 10 | A | 11 | B | **115** | **F** |
| California St & Tehama St | Signal | 36 | D | 40 | D | 41 | D |
| Pine St & Tehama St | Signal | 25 | C | 24 | C | **394** | **F** |
| Yuba St & East St | Side-Street Stop | 14 | B | 14 | B | 14 | B |
| California St & Placer St | Signal | 28 | C | 25 | C | 26 | C |
| Pine St & Placer St | Signal | 21 | C | 26 | C | 25 | C |
| California St & South St | Signal | 27 | C | 24 | C | 25 | C |
| Pine St & South St | Signal | 20 | C | 23 | C | 22 | C |
| East St & South St | All-Way Stop | 11 | B | 11 | B | 11 | B |
| Gold St & Market St | Signal | 22 | C | 9 | A | 9 | A |
| East St & Market St/Cypress Ave | Signal | 20 | C | 36 | D | 36 | D |
| Market St & Grange St | Signal | 8 | A | 8 | A | 8 | A |
| Westside Rd/Railroad Ave & Buenaventura Blvd | Signal | 19 | B | 19 | B | 19 | B |
| SR 273 & Buenaventura Blvd | Signal | 14 | B | 14 | B | 14 | B |
| SR 273 & Kenyon Dr | Side-Street Stop | 24 | C | 24 | C | 24 | C |
| SR 273 & Branstetter Ln | Side-Street Stop | 13 | B | 13 | B | 13 | B |
| SR 273 & Cedars Rd/Bonnyview Rd | Signal | 33 | C | 33 | C | 33 | C |
| Eastside Rd & Bonnyview Rd | Signal | 28 | C | 28 | C | 28 | C |
| SR 273 & Clear Creek Rd | Signal | 12 | B | 12 | B | 12 | B |
| SR 273 & Canyon Rd / Redding Rancheria | Signal | 21 | C | 21 | C | 21 | C |
| SR 273 & Whitehouse Dr | Side-Street Stop | 26 | C | 26 | C | 26 | C |
| SR 273 & Happy V Rd | Signal | 11 | B | 11 | B | 11 | B |

| Intersection | Traffic Control | Existing Configuration | | Partial Conversion | | Full Conversion | |
|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS |
| SR 273 & Amen St/Latona Rd | Side-Street Stop | 18 | B | 18 | B | 18 | B |
| SR 273 & Ox Yoke Rd | Signal | 18 | B | 18 | B | 18 | B |
| SR 273 & North St | Signal | 24 | C | 24 | C | 24 | C |
| SR 273 & South St | Signal | 26 | C | 26 | C | 26 | C |
| SR 273 & Factory Outlets Dr | Signal | 15 | B | 15 | B | 15 | B |
| SR 273 & Pleasant Hills Dr | Signal | 23 | C | 23 | C | 23 | C |
| Branstetter Ln & Westside Rd | Side-Street Stop | 10 | A | 10 | A | 10 | A |

## 6.2 Future Year (2040) Traffic Volumes

Based on the results presented in Table 2 and Table 3, the Full Conversion Alternative was not advanced for further evaluation under future year (2040) traffic volumes given that the alternative severely degrades operations at the intersections of Market St & Eureka Way, Shasta St & Pine St, and Pine St & Tehama St with Existing traffic volumes.

Under the Partial Conversion Alternative, the intersection LOS during the AM Peak hour is anticipated to remain the same as the Existing Configuration at all of the study intersections except at the East Street/Market Street/Cypress Avenue intersection, where the LOS would degrade from LOS B to LOS C.

Under the Partial Conversion Alternative, all of the study intersections are anticipated to operate at acceptable service levels during the PM peak hour. However, there are a couple of locations where the LOS would degrade and they are:

- Shasta Street/Pine Street (from LOS A to LOS B)
- East Street/Market Street/Cypress Avenue (from LOS C to LOS D)

*Table 4 FS #1 AM Peak Hour LOS Under Various Roadway Configurations With Year 2040 Traffic Volumes*

| Intersection | Traffic Control | Existing Configuration | | Partial Conversion | |
|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS |
| Market St & Caterpillar Rd | Signal | 30 | C | 30 | C |
| Market St & Northpoint Dr/Twin View Blvd | Signal | 22 | C | 22 | C |
| Market St & Lake Blvd | Signal | 31 | C | 31 | C |
| Market St & Benton Dr | Signal | 25 | C | 25 | C |
| Market St & Quartz Hill Rd/Travelled Wy | Signal | 31 | C | 31 | C |
| Market St & Trinity St | Signal | 20 | B | 20 | B |
| Market St & Eureka Wy | Signal | 30 | C | 30 | C |
| Market St & Shasta St | Signal | 22 | C | 22 | C |
| Shasta St & Pine St | Signal | 8 | A | 8 | A |
| California St & Tehama St | Signal | 29 | C | 33 | C |
| Pine St & Tehama St | Signal | 16 | B | 15 | B |
| Yuba St & East St | Side-Street Stop | 18 | C | 21 | C |
| California St & Placer St | Signal | 27 | C | 26 | C |
| Pine St & Placer St | Signal | 23 | C | 27 | C |
| California St & South St | Signal | 25 | C | 24 | C |
| Pine St & South St | Signal | 17 | B | 19 | B |
| East St & South St | All-Way Stop | 11 | B | 11 | B |
| Gold St & Market St | Signal | 20 | B | 9 | A |
| East St & Market St/Cypress Ave | Signal | 18 | B | 34 | C |
| Market St & Grange St | Signal | 9 | A | 9 | A |
| Westside Rd/Railroad Ave & Buenaventura Blvd | Signal | 19 | B | 19 | B |
| SR 273 & Buenaventura Blvd | Signal | 16 | B | 16 | B |
| SR 273 & Kenyon Dr | Side-Street Stop | 38 | E | 38 | E |
| SR 273 & Branstetter Ln | Side-Street Stop | 11 | B | 11 | B |
| SR 273 & Cedars Rd/Bonnyview Rd | Signal | 39 | D | 39 | D |
| Eastside Rd & Bonnyview Rd | Signal | 37 | D | 37 | D |
| SR 273 & Clear Creek Rd | Signal | 13 | B | 13 | B |
| SR 273 & Canyon Rd / Redding Rancheria | Signal | 22 | C | 22 | C |
| SR 273 & Whitehouse Dr | Side-Street Stop | 23 | C | 23 | C |
| SR 273 & Happy V Rd | Signal | 12 | B | 12 | B |
| SR 273 & Amen St/Latona Rd | Side-Street Stop | 28 | D | 28 | D |
| SR 273 & Ox Yoke Rd | Signal | 29 | C | 29 | C |
| SR 273 & North St | Signal | 31 | C | 31 | C |
| SR 273 & South St | Signal | 36 | D | 36 | D |
| SR 273 & Factory Outlets Dr | Signal | 14 | B | 14 | B |
| SR 273 & Pleasant Hills Dr | Signal | 20 | C | 20 | C |
| Branstetter Ln & Westside Rd | Side-Street Stop | 11 | B | 11 | B |

*Table 5 FS #1 PM Peak Hour LOS Under Various Roadway Configurations With Year 2040 Traffic Volumes*

| Intersection | Traffic Control | Existing Configuration | | Partial Conversion | |
|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS |
| Market St & Caterpillar Rd | Signal | 26 | C | 26 | C |
| Market St & Northpoint Dr/Twin View Blvd | Signal | 25 | C | 25 | C |
| Market St & Lake Blvd | Signal | 31 | C | 31 | C |
| Market St & Benton Dr | Signal | 21 | B | 21 | B |
| Market St & Quartz Hill Rd/Travelled Wy | Signal | 28 | C | 28 | C |
| Market St & Trinity St | Signal | 18 | B | 18 | B |
| Market St & Eureka Wy | Signal | 36 | D | 33 | C |
| Market St & Shasta St | Signal | 22 | C | 22 | C |
| Shasta St & Pine St | Signal | 10 | A | 11 | B |
| California St & Tehama St | Signal | 36 | D | 41 | D |
| Pine St & Tehama St | Signal | 25 | C | 25 | C |
| Yuba St & East St | Side-Street Stop | 17 | C | 17 | C |
| California St & Placer St | Signal | 28 | C | 25 | C |
| Pine St & Placer St | Signal | 21 | C | 26 | C |
| California St & South St | Signal | 27 | C | 24 | C |
| Pine St & South St | Signal | 20 | B | 23 | C |
| East St & South St | All-Way Stop | 11 | B | 11 | B |
| Gold St & Market St | Signal | 25 | C | 10 | A |
| East St & Market St/Cypress Ave | Signal | 20 | C | 37 | D |
| Market St & Grange St | Signal | 8 | A | 8 | A |
| Westside Rd/Railroad Ave & Buenaventura Blvd | Signal | 20 | C | 20 | C |
| SR 273 & Buenaventura Blvd | Signal | 14 | B | 14 | B |
| SR 273 & Kenyon Dr | Side-Street Stop | 36 | E | 36 | E |
| SR 273 & Branstetter Ln | Side-Street Stop | 13 | B | 13 | B |
| SR 273 & Cedars Rd/Bonnyview Rd | Signal | 37 | D | 37 | D |
| Eastside Rd & Bonnyview Rd | Signal | 32 | C | 32 | C |
| SR 273 & Clear Creek Rd | Signal | 15 | B | 15 | B |
| SR 273 & Canyon Rd / Redding Rancheria | Signal | 22 | C | 22 | C |
| SR 273 & Whitehouse Dr | Side-Street Stop | 38 | E | 38 | E |
| SR 273 & Happy V Rd | Signal | 12 | B | 12 | B |
| SR 273 & Amen St/Latona Rd | Side-Street Stop | 23 | C | 23 | C |
| SR 273 & Ox Yoke Rd | Signal | 24 | C | 24 | C |
| SR 273 & North St | Signal | 27 | C | 27 | C |
| SR 273 & South St | Signal | 29 | C | 29 | C |
| SR 273 & Factory Outlets Dr | Signal | 15 | B | 15 | B |
| SR 273 & Pleasant Hills Dr | Signal | 24 | C | 24 | C |
| Branstetter Ln & Westside Rd | Side-Street Stop | 10 | A | 10 | A |

## 6.3 Conclusion

After evaluating the Existing Traffic Volumes conditions, the Partial Conversion Alternative will have less of an impact on the intersections within the one-way couplet area over the Full Conversion Alternative. While a few locations do see a degradation of the LOS from existing conditions, the overall system will operate at the same or slightly better delay with Partial Conversion Alternative in both peak hours. The Full Conversion Alternative severely degrades operations at the intersections of Market St & Eureka Way, Shasta St & Pine St, and Pine St & Tehama St. These three intersections are vital connections between SR 273, SR 44, and SR 299 and see high traffic volumes that a two-way system cannot handle without roadway widening. Therefore, to maintain the integrity of these intersections and the connections to these corridors, it is recommended that the Partial Conversion Alternative be considered over the Full Conversion Alternative.

# 7. Summary

As evaluated in this TM, which provides a planning-level feasibility analysis, the SR 273 One-way Couplet in Downtown Redding could be converted from one-way streets to two-way streets, with the Partial Conversion Alternative having an acceptable impact on vehicular traffic flows (LOS D or better, per the City of Redding) in the one-way couplet area (i.e., Downtown Redding—"Market Street and Eureka Way" to "East Street and Market Street/Cypress Avenue"), as described in Section 6.

# Technical Memorandum

**November 19, 2024**

| | | | |
|---|---|---|---|
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| **Copy to** | Natalie Kinney, Caltrans;<br>Aaron Casas, Caltrans;<br>Christina Prosperi, Caltrans;<br>Sergio Amezquita, Caltrans; | **Email** | Todd.tregenza@ghd.com |
| **From** | Todd Tregenza, GHD | **Project No.** | 12560002 |
| **Project Name** | Envision 273 Comprehensive Multimodal Corridor Plan | | |
| **Subject** | Task 6 Technical Memorandum: Feasibility Study #3 (Downtown Redding Gateways) and Feasibility Study #2 (Cypress Avenue Roundabout) | | |

## 1. Introduction

The Task 6 Technical Memorandums (TMs) will evaluate potential projects that may support corridor solutions, as described in the Task 5 TM.

Each Task 6 TM presents the feasibility of a potential project or group of projects. Task 6 includes six feasibility studies (FSs):

1. One-way Couplet Reversion
2. Cypress Avenue Roundabout
3. Downtown Redding Gateways
4. Class I/IV from Redding to Anderson
5. Shasta County (SR 273/Whitehouse Drive) Grade Crossing Relocation
6. Redding (SR 273/Breslauer Way) Grade Crossing Relocation

This TM presents *FS #3 Downtown Redding Gateways*, which incorporates *FS #2 Cypress Avenue Roundabout* (located in the Southern Downtown Redding Gateway).

The TMs will be combined or summarized in the draft/final report, as appropriate.

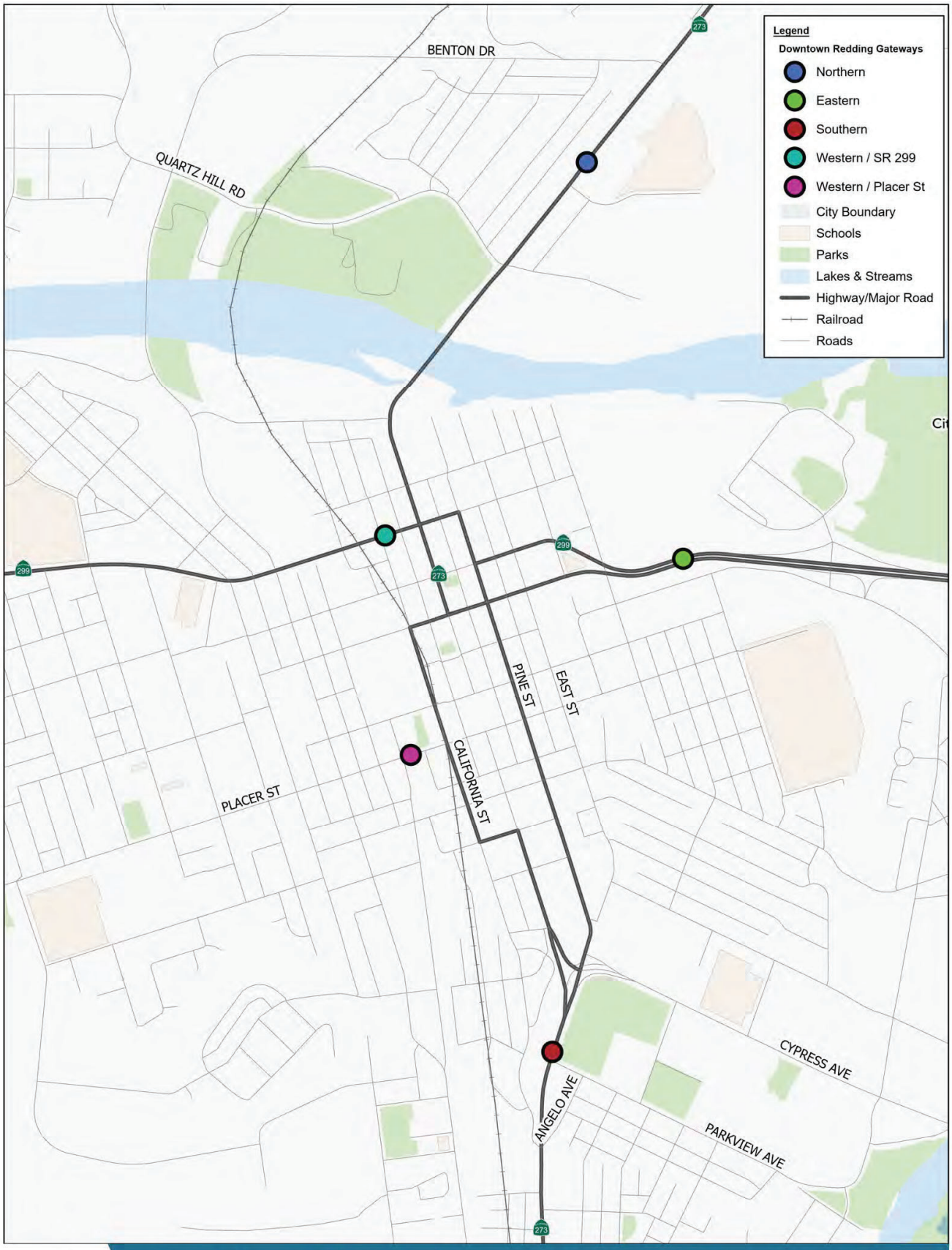
# 2. Scope

This TM evaluates the feasibility of implementing traffic calming measures in Downtown Redding transition zones or gateways. As shown in Figure 1, the following Downtown Redding Gateways will be evaluated:

- **Northern Downtown Redding Gateway**. State Route (SR) 273, from Quartz Hill Road to Benton Drive. This area is known as “Miracle Mile.”
- **Eastern Downtown Redding Gateway**. SR 44, from SR 273 to Sundial Bridge Drive.
- **Southern Downtown Redding Gateway**. SR 273, from Cypress Avenue to Angelo Avenue. This area is referred to as the “South City Park Micro-Corridor.”
- **Western Downtown Redding Gateway**. SR 299 and Placer Street, immediately west of SR 273.

Within the corridor, Downtown Redding is unique in that it contains the primary urban core, with recently constructed high-density, mixed-use development. Downtown Redding also is unique in that it is bisected by multiple highways—SR 273 in the north-south direction, which supports mostly intraregional trips, and both SR 44 and SR 299 in the east-west direction, which support (but are not limited to) interregional trips (e.g., freight trucks). Downtown Redding has been primarily designed for private motorized vehicles since the 1950s, when the first autos came to town.

Downtown Redding needs streets that will help the people and the community thrive, including promoting non-vehicular modes of travel (e.g., walking and bicycling) and creating a sense of place. The City of Redding vision is to “create a revitalized Downtown Redding that is attractive, safe, and economically vibrant” with a mix of “pedestrian- and bicycle-oriented shops, housing, workplaces, parks, and civic facilities, inviting to residents and visitors alike” (City of Redding Downtown Specific Plan Update, 2018).




# Envision 273: SR 273 Multimodal Corridor Plan

## DOWNTOWN REDDING GATEWAYS PROJECTS

Paper Size ANSI B

0 320 640 960

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

Project No. **12560002**
Revision No. -
Date **November 2024**

**FIGURE 1**

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Print date: 08 Nov 2024 - 15:45

Data source: Esri Community Maps Contributors, City of Redding GIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS. Created by: jpeel

# 3. Guidance

For guidance regarding traffic calming measures in transition zones, state and federal highway documents were referenced, as noted in this section.

## 3.1 Caltrans Main Street

*Caltrans Main Street, California: A Guide for Fostering People-Centered State Highway Main Streets* (Main Street) highlights the special importance of State Highways that are functioning as community main streets. “People-centered” main streets are those that are sustained in ways that elevate the needs of people who use main street. They are fostered with an understanding that supporting travel of all modes is essential, and that main streets are also community places that people value. People-centered main streets improve multimodal access, equity, economic prosperity, and environmental quality through partnerships and engagement.

## 3.2 Caltrans Traffic Calming Guide

*Caltrans Traffic Calming Guide* offers strategies to reduce vehicle speeds and traffic volumes in the following categories: Signings and Markings, Physical Intersection Modifications, Roadway Narrowing, Vertical Roadway Elements, Physical Roadway Segment Modifications, and Others. Example strategies relevant to this study on gateways include in-street pedestrian crossing signs and high-visibility crosswalk markings near schools; road diets to accommodate bicyclists, pedestrians, and transit users; and street trees which have been shown to reduce the rate of crashes.

## 3.3 Caltrans Design Information Bulletin 94

*Caltrans Design Information Bulletin-94* (DIB-94*)* provides contextual design guidance for complete streets and identifies place types to describe urban, suburban, and rural areas. Assessing place types along corridor segments and gateways can assist planners and community members with developing projects that best address the challenges, opportunities, and priorities unique to each place. Modal priority, including pedestrian, bicyclist, transit users, freight, and personal vehicles, is shown by place type to suggest relative priority and relative anticipated users.

## 3.4 FHWA Small Town and Rural Multimodal Networks

*Federal Highway Administration (FHWA) Small Town and Rural Multimodal Networks* guide builds upon existing design guidance for bicycle and pedestrian facilities and highlights designs that promote safe and accessible travel for all users. Health disparities, income disparities, and higher crash rates are a few of the issues that rural communities experience, which further the need for a safe multimodal network. The guide provides examples of projects in rural communities depending on the following contextual factors: speed and volume, existing roadway network, and land use types. Example designs relevant to this study include bicycle boulevards with traffic calming measures, shared use paths, and separated bike lanes.

## 3.5 Caltrans Project Development Procedures Manual

*Caltrans Project Development Procedures Manual (*PDPM) provides the functional framework of policies and essential procedures for developing State Highway System improvement projects. It is intended primarily as a resource for the project engineer and the project manager, or other professionals, as appropriate, in the various functional areas responsible for or involved in project development. Part 2 of the Caltrans PDPM discusses the project development process.

# 4. Projects

## 4.1 Existing Planned Projects

As detailed in the Task 5 TM, there are a number of existing planned projects in the corridor. In the Downtown Redding Gateways, this includes operational maintenance projects, as well as projects to calm traffic, increase safety, and promote non-vehicular modes of travel.

### Northern Downtown Redding Gateway

- Project #41. Pavement Rehabilitation: SR 273 (PM 14.5 to 18.5). Pavement Overlay.
- Project #45. Signal Timing Corridor: SR 273 (PM 14.1 to 19.8). Redding Quarter Century Signals. Signal Replacement.
- Project #58. Replace Existing Traffic Signals: SR 273 (Multiple Locations). Replace existing traffic signals at 25 intersections.
- Project #111. Pedestrian Access Improvements: SR 273 (at Benton Drive). Constructing new bulbout east of the intersection. Requires removing existing right turn lane, installing new sidewalk, and removing and replacing accessible ramp.
- Project #122. Pavement Rehabilitation: SR 273 (PM 17.385 to 17.809). Priority Roadway: Temperature Change Pavement Performance.
- Project #129. Pavement Rehabilitation: SR 273 (PM 17.561 to 17.819). Priority Roadway: Temperature Change Pavement Performance.
- Project #171. Class II Bike Lane: N. Market Street (Sulphur Creek Road Proposed Class I to Benton Drive). Complete Streets Elements.

### Eastern Downtown Redding Gateway

- Project #28. Pavement Rehabilitation: SR 44 (PM L0.00 to L0.54). Pavement Preservation.
- Project #42. Shoulder Widening: SR 44 (PM 0.0 to 71.39). Widen Shoulders.
- Project #58. Replace Existing Traffic Signals. SR 273 (Multiple Locations). Replace existing traffic signals at 25 intersections.

### Southern Downtown Redding Gateway

- Project #1. Modern Roundabout: Cypress Avenue / Pine Street / Market Street.
- Project #31. Intersection Improvement: Cypress Avenue and Pine Street.
- Project #41. Pavement Rehabilitation: SR 273 (PM 14.5 to 18.5). Pavement Overlay.
- Project #45. Signal Timing Corridor: SR 273 (PM 14.1 to 19.8). Redding Quarter Century Signals. Signal Replacement.
- Project #58. Replace Existing Traffic Signals, SR 273 (Multiple Locations). Replace existing traffic signals at 25 intersections.
- Project #98. New Crosswalk: SR 273 (at California Street, PM 15.653). Crosses California Street. Requires installing bulb out sidewalk, removing and replacing existing accessible ramp, removing existing valley gutter and fixing any potential drainage issues.
- Project #105. Class II Bike Lane: SR 273 (Hill Street to California Street, PM 15.66 to 16.04). Requires removing existing southbound (SB) #2 lane on SR 273, installing a Class II bike lane with buffered striping.
- Project #106. Class II Bike Lane: SR 273 (Fell Street to East Street, PM 15.53 to 16.06). Requires removing free right on Angelo Avenue by adding "STOP" striping and installing "STOP" signage at existing crosswalk. Requires removing free right from Parkview Avenue by regrading, installing new accessible

ramp and restriping. Requires significant concrete removal and replacement or reconfiguring lanes at Cypress Avenue from 12'-0" to 11'-0" wide in order to fit new 5'-0" wide bike lane.

- Project #109. New Sidewalk: SR 273 (Angelo Avenue to Parkview Avenue, PM 15.72 to 15.8). Complete segment between Angelo Avenue and Parkview Avenue; current sidewalk ends mid-block. Future development of empty lot adjacent to SR 273 could impact need.
- Project #110. New Sidewalk: SR 273 (Hill Street to California Street, PM15.66 to 16.04). Requires removing existing SB #2 lane on SR 273, installing retaining wall, curb and gutter, buffered striping for bike lane, retaining wall structure, drain inlets and removing and replacing accessible ramps.
- Project #161. Class 1 Shared Use Path: South City Park, Tiger Field Perimeter at west side, along Parkview Avenue, along Cypress Avenue to Cottonwood Canal. Complete Streets Elements.

### Western Downtown Redding Gateway

- Project #32. Intersection Improvement: Eureka Way and Walnut Avenue.
- Project #58. Replace Existing Traffic Signals, SR 273 (Multiple Locations). Replace existing traffic signals at 25 intersections.
- Project #60. Bridge Rehabilitation: SR 299 (at Bridge No.06-0035, west of California Street). Replace 3,115 linear feet of metal beam guardrail (MBGR) with Midwest Guardrail System (MGS) with steel posts and install four bridge transition anchor blocks on Redding OH Bridge No. 06-0035.
- Project #87. New Sidewalk: Eureka Way (Buenaventura Boulevard to east of Overhill Drive). Sidewalk, 1.23 miles.
- Project #141. Class II Bike Lane: Eureka Way/SR 299 (Buenaventura Boulevard to Court Street). Complete Streets Elements. Subject to Caltrans Process Bike Lane.
- Project #78. Class IV Bikeway: California Street (Division Street to Yuba Street).
- Project #79. Class IV Bikeway: California Street (Yuba Street to Placer Street).

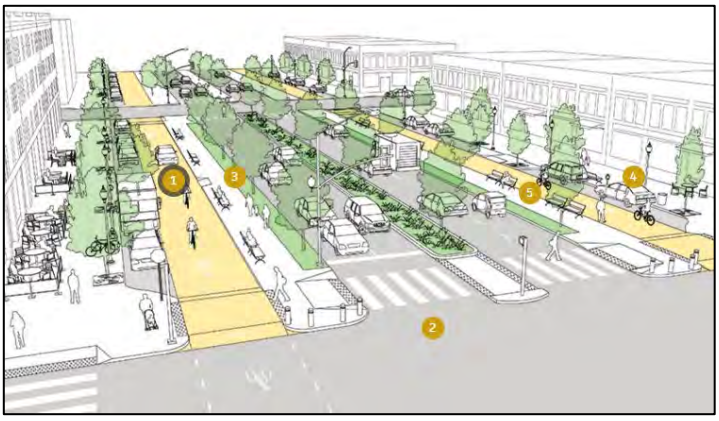
## 4.2 Other Project Ideas

In addition to the existing planned projects (i.e., projects documented in publicly available plans), other potential project ideas have been discussed amongst project stakeholders.

One potential project idea (in the Eastern Downtown Redding Gateway) is the SR 44 Boulevard, from approximately the Sacramento River to Continental Street. As noted in the National Association of City Transportation Officials (NACTO) *Urban Street Design Guide*:

> *Boulevards separate very large streets into parallel urban realms, buffering the commercial or residential street edge from the high speed throughway by means of multi-way operations and frontage roads…The frontage road, especially in a residential context, benefits from traffic calming at intersections and midblock as well as pedestrian-scale lighting and street trees. These enhancements preserve safe speeds for bicyclists and pedestrians, and encourage recreational and commercial activity.*

The SR 44 Boulevard could slow SR 44 traffic prior to entering Downtown Redding, with potential active transportation and land use benefits.



*Source: NACTO Urban Street Design Guide*

Another potential project idea (in the Southern Downtown Redding Gateway) is a pedestrian and/or bicycle connection on Parkview Avenue, from SR 273 to California Street. The project is envisioned to be constructed on an undeveloped parcel immediately west of SR 273/Parkview Avenue. In this area, the California Street residential neighborhood is separated from city services along Parkview Avenue, including South City Park, Redding Library, and Redding City Hall. In the area, sidewalk gaps are prevalent, as well as limited and/or non-direct pedestrian crossings at SR 273 intersections (e.g., SR 273/Cypress Avenue and SR 273/Angelo Street). The connection could promote active transportation mobility and connectivity.

*Source: Google Earth*

# 5. List of Alternatives

To determine the alternatives for each Downtown Redding Gateway, the following traffic calming measures, consistent with state and federal highway documents, were considered.

## 5.1 Roadway Cross-section

### Road Diets and Number of Lanes

Road diets reduce the number of travel lanes to reduce driver speeds and improve safety. A typical road diet converts four lane roadways into a two-lane road with a center turn lane. By reducing the perceived roadways width, a road diet may reduce speeds by one to two miles per hour, according to the Caltrans Traffic Calming Guide. Providing separation between opposing directions of traffic reduces the risk of head-on collisions. Center turn lanes provide a dedicated space for turning vehicles separate from the driving lane, reducing the risk of rear end and head on collisions with turning drivers. Road diets also make space for other transportation infrastructure, such as bicycle or transit lanes, and can reduce the level of stress for bicyclists.

According to the Caltrans Traffic Calming Guide, road diets have minimal impact on emergency response times, though they should be assessed if the road diet is located along an emergency response route.

### Raised Median Islands

Raised median islands can be used as a traffic calming measure – installing a raised curb adjacent to vehicle traffic narrows the perceived road width and slows drivers. Raised median islands also provide an opportunity for trees and landscaping. When located at intersections, raised median allow pedestrians to cross one lane of traffic at a time, shortening crossing distances and improving safety.

Raised median islands may be implemented on their own or as a part of a road diet in junction with a center turn lane. The Caltrans Traffic Calming Guide cites that raised median islands can reduce speeds up to 8 mph and are appropriate on minor arterials, collectors, and local roads. The impacts of raised median islands on emergency response but may be reviewed for impacts on evacuation routes.

### Traffic Lane Width

Travel lane width contributes to a roadway's operating speed. Reducing travel lane width can be an effective method for reducing driver speeds by reducing the perceived roadway width of the roadway. Travel lane widths may be reduced alone or as a part of a road diet; the Caltrans Traffic Calming Design Guide states that road diets or lane narrowing can reduce vehicle speeds between one and two miles per hour.

Caltrans DIB-94 provides appropriate lane widths for varying place types and operating speeds, shown below.

| Place Type | Lane Type | Suggested Minimum Lane Widths by Proposed Operating Speed | | | | | |
|---|---|---|---|---|---|---|---|
| | | 20 mph | 25 mph | 30 mph | 35 mph | 40 mph | 45 mph |
| Urban Area – City Center | Through | 10.5 ft | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft |
| | L/R Turn | 10.5 ft | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft |
| | TWLTL | 10.5 ft | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft |
| Urban Area – Urban Community | Through | 10.5 ft | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft |
| | L/R Turn | 10.5 ft | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft |
| | TWLTL | 10.5 ft | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft |
| Suburban Area | Through | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 11-12 ft | 11-12 ft |
| | L/R Turn | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 11-12 ft | 11-12 ft |
| | TWLTL | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft | 11-12 ft |
| Rural Main Street | Through | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft | 11-12 ft | 11-12 ft |
| | L/R Turn | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5-11 ft | 11-12 ft | 11-12 ft |
| | TWLTL | 10.5 ft | 10.5 ft | 10.5 ft | 10.5-11 ft | 10.5 ft | 10.5 ft |

Note: Cells shaded in gray are outside the range of proposed operating speeds recommended

***Source: Caltrans DIB-94***

### Mid-Block Crossings

Mid-block crossings provide designated crossing locations where intersections are infrequent or where additional pedestrian access is needed at key destinations, like shopping centers, libraries, and transit stops. Flashing beacons, high visibility crosswalks, advanced stop bars and yield markings should be considered to alert drivers who may not anticipate an upcoming midblock crossing. Traffic calming measures such as curb extensions and raised crosswalks may also be used to slow approach drivers.

## 5.2 Intersections

### Bulb-outs

Bulb-outs, or curb extensions, are effective at improving intersection safety and slow driver speeds. Where on-street parking is present, bulb-outs can extend the sidewalk into the roadway, shortening crossing distances for pedestrians, improving pedestrian visibility to drivers and bicyclists, and allowing pedestrians an improved view of on-coming traffic. By narrowing the roadway width and increase turn radii, blub-outs slow oncoming traffic.

The Caltrans Traffic Calming Guide states that bulb-outs reduce speeds by 1 to 3 mph, reducing turning speeds more significantly. Bulb-outs are appropriate along minor arterials, collectors, and local roadways with posted speeds of 35 mph or less.

***Source: GHD***

***Source: Caltrans Traffic Calming Guide***

## Roundabouts

Roundabouts are circular, yield control intersections comprised of a center island, a circulatory roadway, and splitter islands on each approach. Roundabouts have fewer potential conflict points and slow driver speeds, leading to a reduction in fatal and severe injury collisions compared to stop controlled and signalized intersections. Roundabouts may also be implemented to alleviate congestion.

Roundabouts can effectively lower driver speeds and should be designed with a maximum entry speed of 25 mph (30 mph for a multi lane roundabout). Roundabout placement is generally flexible. Roundabouts can be appropriate at any urban operating speed, traffic volume (up to 60,000 ADT), and on emergency, transit, and access routes.

## High-Visibility Crosswalks

High visibility crosswalks use parallel ladder markings to improve visibility compared to standard transverse crosswalks. High-visibility crosswalks are recommended at mid-block crossings and uncontrolled intersections and are appropriate at stop controlled or signalized intersections.

***Source: Caltrans Main Street Guide***

## 5.3 Signals, Beacons, and Signs

### Traffic Signals

Traffic signals control the flow of traffic through intersections. When coordinated, traffic signals have the potential to reduce travel time and delays. According to the Caltrans Main Street Guide, traffic signals can be used to reduce unsafe speeding by aligning green signal timing with traffic flow moving at the speed limit.

### Leading Pedestrian Intervals

Leading Pedestrian Intervals (LPIs) alter signal timing to reduce the risk of right hook collisions with pedestrians. LPIs show walk signal several seconds before drivers are given the green light, allowing pedestrians to travel further into the intersection where they are more visible to drivers and bicyclists.

### Vehicle Speed Feedback Signs

Vehicle Speed Feedback Signs (SFS) provide real-time feedback of driver speeds. Placed below a speed limit sign, SFS remind motorists of the posted speed limit and encourage slower driving speeds.

SFS effectively reduce driver speeds by 2 to 7 mph. SFS are appropriate on most roadway classifications, including principal arterials, minor arterials, collectors, and local roads. However, SFS can only provide speed feedback for one vehicle at a time and are therefore more effective on roadways with one lane of traffic in each direction and gaps between drivers. According to the Caltrans Traffic Calming Guide, SFS can be effective when “appropriately complemented with police enforcement.”

# 6. Signalized Intersection Analysis

This section evaluates the operational feasibility of traffic signals at Downtown Redding Gateways.

Traffic signals (i.e., new and modified) were considered in the Southern Downtown Redding Gateway at the following three consecutive intersections: SR 273/Cypress Avenue, SR 273/Parkview Avenue, and SR 273/California Street. Two alternatives were considered, as described in this section.

## 6.1 Target Level of Service (LOS)

City of Redding Level of Service (LOS) thresholds will be applied to all intersections for which the feasibility of signalized intersections is analyzed. For the purposes of the signalized intersection feasibility analysis, study intersections will be analyzed at a threshold of LOS D in accordance with City of Redding Guidelines. LOS criteria are presented below in Table 1.

***Table 1 Intersection Level of Service Criteria***

| LOS | Type of Flow | Delay | Maneuverability | Stopped Delay/Vehicle (seconds) | |
|---|---|---|---|---|---|
| | | | | Signalized/ Roundabout | Side-Street/All Way Stop |
| A | Stable Flow | Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all. | Turning movements are easily made, and nearly all drivers find freedom of operation. | <10.0 | <10.0 |
| B | Stable Flow | Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay. | Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles. | >10.0 and <20.0 | >10.0 and <15.0 |
| C | Stable Flow | Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping. | Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted | >20.0 and <35.0 | >15.0 and <25.0 |
| D | Approaching Unstable Flow | The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. | Maneuverability is severely limited during short periods due to temporary back-ups. | >35.0 and <55.0 | >25.0 and <35.0 |

| | | | | | |
|---|---|---|---|---|---|
| | | Individual cycle failures are noticeable. | | | |
| E | Unstable Flow | Generally considered to be the limit of acceptable delay. Indicative or poor progression, long cycle lengths, and high volume-to-capacity ratio. Individual cycle failures are frequent occurrences. | There are typically long queues of vehicles waiting upstream of the intersection. | >55.0 and <80.0 | >35.0 and <50.0 |
| F | Forced Flow | Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors. | Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions. | >80.0 | >50.0 |

## 6.2 Alternative 1

### 6.2.1 Proposed Intersection Geometry

Alternative 1 evaluated one lane in each direction (plus turn lanes). At the SR 273/Cypress Avenue intersection, the SB SR 273 slip lane was removed. Additionally, at the SR 273/California Street intersection, the Angelo Avenue leg was removed. The intersection geometry is shown in

Figure 2 to Figure 4.

*Figure 2* *Alternative 1 – SR 273/Cypress Avenue Intersection Geometry*

*Figure 3* *Alternative 1 – SR 273/Parkview Avenue Intersection Geometry*

*Figure 4* *Alternative 1 – SR 273/California Street Intersection Geometry*

### 6.2.2 Cumulative Condition Traffic Operations

To assess the feasibility of Alternative 1 improvements, cumulative volumes were determined using the ShastaSim Travel Deman Model to compare 2020 volumes to 2040 along each roadway segment.

Table 3 presents 95$^{th}$ percentile queues for the study intersection under cumulative volume conditions for Alternative 1. The queue exceeds storage for the SR 273 and Cypress Avenue intersection for northbound right during AM peak hours and eastbound left during PM peak hours. SR 273 and Parkview Avenue queues also exceed storage for the northbound right during AM peak hours and southbound left for PM peak hours.

Table 3 presents intersection operations under cumulative volumes conditions for Alternative 1 improvements. As shown below. all three study intersections operate under within acceptable level of service.

*Table 2 Alternative 1 – Cumulative LOS*

| # | Intersection | Control Type[1,2] | Target LOS | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|---|
| | | | | Delay | LOS | Delay | LOS |
| 45 | SR 273/Cypress Ave | Signal | D | 33.6 | C | 39.3 | D |
| 49 | SR 273/Parkview Ave | Signal | D | 12.5 | B | 11.9 | B |
| 50 | SR 273/California St | Signal | D | 9.7 | A | 8.2 | A |

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDBT = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds

Table 3 presents 95$^{th}$ percentile queues for the study intersection under cumulative volume conditions for Alternative 1. The queue exceeds storage for the SR 273 and Cypress Avenue intersection for northbound right during AM peak hours and eastbound left during PM peak hours. SR 273 and Parkview Avenue queues also exceed storage for the northbound right during AM peak hours and southbound left for PM peak hours.

*Table 3* *Alternative 1 – Cumulative 95th Percentile Queues*

| Int. # | Intersection/Approach | Control Type | Cumulative 95th Percentile Queue (ft) | | Available Storage |
|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | |
| *45* | *SR 273/Cypress Ave* | | | | |
| | EB Left | Signal | 25 | ***110*** | 80 |
| | EB Thru | | 245 | 350 | |
| | EB Right | | 105 | 170 | |
| | WB Left | | 180 | 400 | |
| | WB Right | | 200 | 255 | |
| | NB Thru | | 630 | 430 | |
| | NB Right | | ***385*** | 235 | 300 |
| *49* | *SR 273/Parkview Ave* | | | | |
| | WB Left | | 100 | 120 | 150 |
| | WB Right | | 55 | 55 | |
| | NB Thru | | 440 | 265 | |
| | NB Right | | ***220*** | 35 | 200 |
| | SB Left | | 80 | ***105*** | 100 |
| | SB Thru | | 120 | 295 | |
| *50* | *SR 273/California St* | | | | |
| | EB Left | Signal | 55 | 50 | |
| | EB Right | | 45 | 45 | 75 |
| | NB Left | | 45 | 45 | |
| | NB Thru | | 300 | 100 | |
| | SB Thru | | 140 | 170 | |
| | SB Right | | 35 | 35 | 200 |

Note: **Bold** text indicates queues that exceed available storage

## 6.3 Alternative 2

### 6.3.1 Proposed Intersection Geometry

Alternative 2 evaluated one SB lane and two northbound (NB) lanes (plus turn lanes). Similar to Alternative 1, the SB SR 273 slip lane was removed, and the Angelo Avenue leg was removed.

The intersection geometry for Alternative 2 is shown in Figure 5 to Figure 7.

*Figure 5 Alternative 2 – SR 273/Cypress Avenue Intersection Geometry*

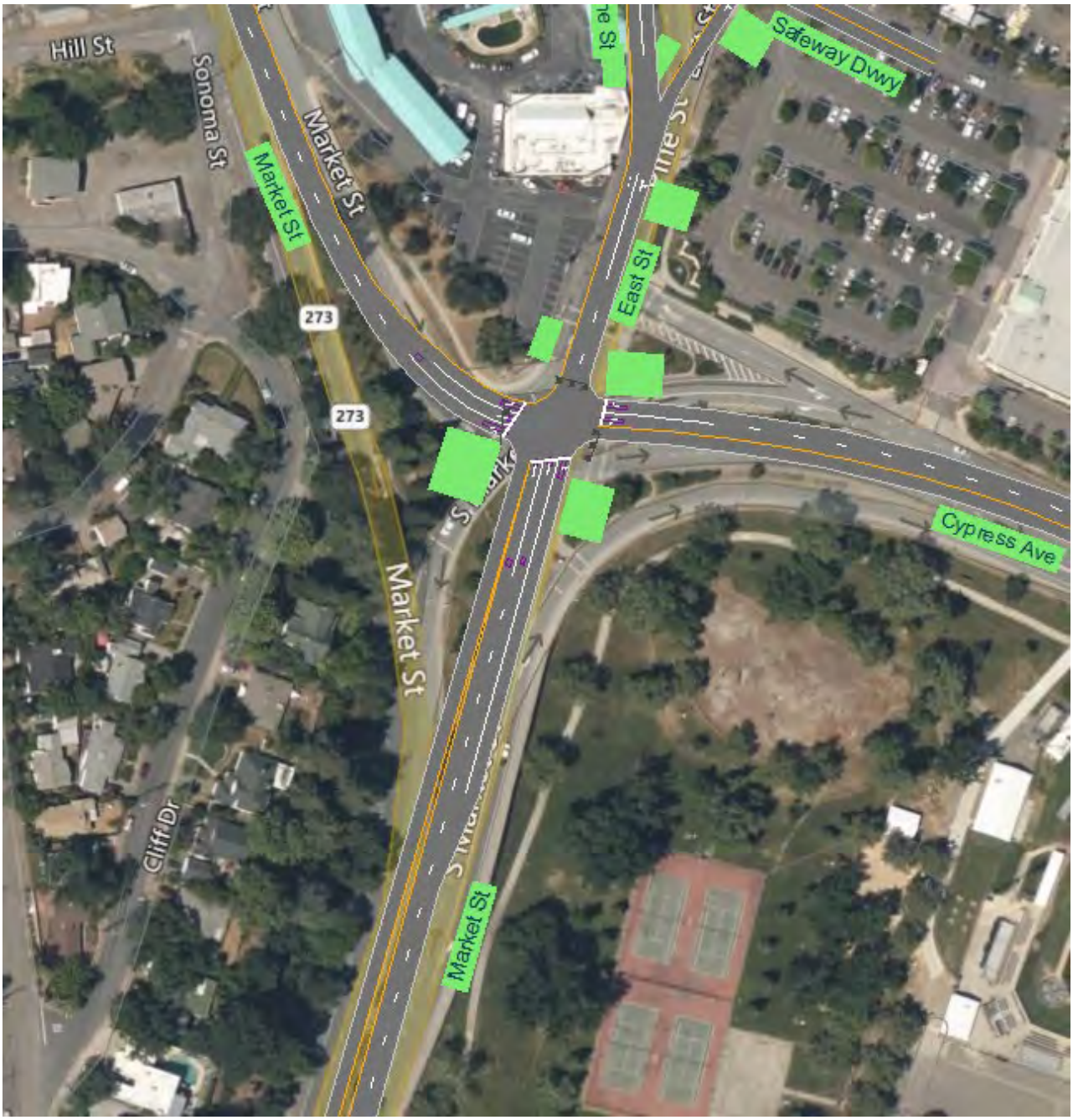
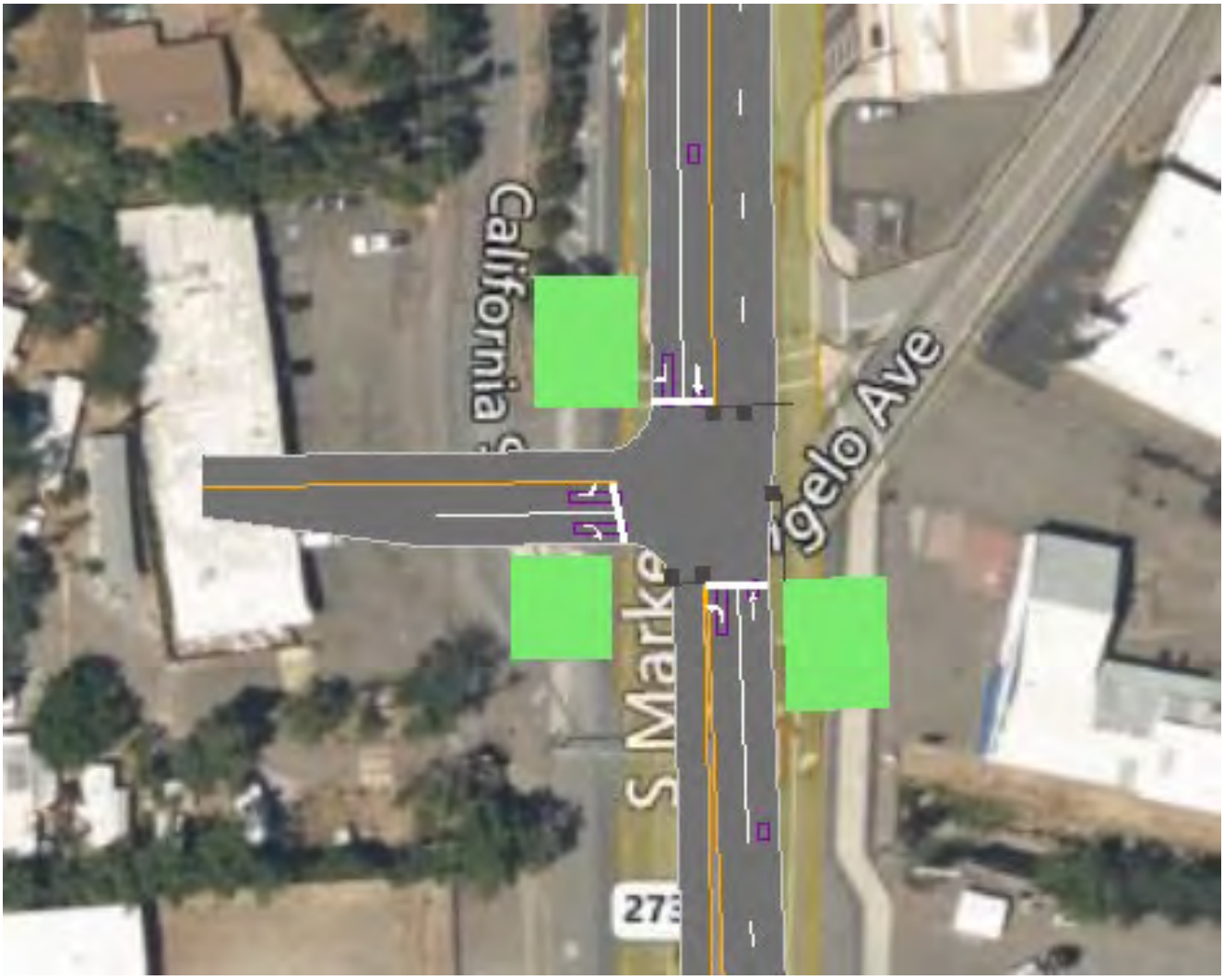


*Figure 6* *Alternative 2 – SR 273/Parkview Avenue Intersection Geometry*

*Figure 7* *Alternative 2 – SR 273/California Street Intersection Geometry*



### 6.3.2 Cumulative Condition Traffic Operations

To assess the feasibility of Alternative 1 improvements, cumulative volumes were determined using the ShastaSim Travel Demand Model to compare 2020 volumes to 2040 along each roadway segment.

Table 4 presents intersection operations under cumulative volumes conditions for Alternative 2 improvements. As shown below, all three study intersections operate under within acceptable level of service.

*Table 4 Alternative 2 – Cumulative LOS*

| # | Intersection | Control Type[1,2] | Target LOS | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|---|
| | | | | Delay | LOS | Delay | LOS |
| 45 | SR 273/Cypress Ave | Signal | D | 21.2 | C | 27.2 | C |
| 49 | SR 273/Parkview Ave | Signal | D | 6.5 | A | 9.5 | A |
| 50 | SR 273/California St | Signal | D | 9.7 | A | 8.2 | A |

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDBT = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds

Table 5 presents 95$^{th}$ percentile queues under cumulative volume conditions for Alternative 2 improvements. The queue exceeds the available storage for the SR 273 and Cypress Avenue for the eastbound left for the PM peak hours and for SR 273 and Parkview Avenue southbound left for PM peak hours, similarly to Alternative 1. The queue storage deficiencies found in AM peak hours for Alternative 1 are not present for Alternative 2.

*Table 5* *Alternative 2 – Cumulative 95th Percentile Queues*

| Int. # | Intersection/Approach | Control Type | Cumulative 95th Percentile Queue (ft) | | Available Storage |
|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | |
| ***45*** | ***SR 273/Cypress Ave*** | | | | |
| | EB Left | Signal | 45 | *115* | 80 |
| | EB Thru | | 230 | 285 | |
| | EB Right | | 90 | 190 | |
| | WB Left | | 155 | 295 | |
| | WB Right | | 180 | 170 | |
| | NB Thru | | 195 | 185 | |
| | NB Right | | 85 | 110 | 300 |
| ***49*** | ***SR 273/Parkview Ave*** | | | | |
| | WB Left | Signal | 95 | 115 | 150 |
| | WB Right | | 45 | 45 | |
| | NB Thru | | 110 | 120 | |
| | NB Right | | 65 | 40 | 200 |
| | SB Left | | 75 | *105* | 100 |
| | SB Thru | | 115 | 270 | |
| ***50*** | ***SR 273/California St*** | | | | |
| | EB Left | Signal | 50 | 50 | |
| | EB Right | | 45 | 50 | 75 |
| | NB Left | | 50 | 40 | |
| | NB Thru | | 245 | 110 | |
| | SB Thru | | 145 | 160 | |
| | SB Right | | 35 | 25 | 200 |

Note: **Bold** text indicates queues that exceed available storage

# 7. Roundabout Analysis

Roundabouts can lower driver speeds and help to create a sense of place. As such, roundabouts should be considered at appropriate Downtown Redding Gateways.

This section evaluates the operational feasibility of roundabouts.

## 7.1 Introduction

The roundabout analysis was conducted using SIDRA, a traffic modelling software that employs traffic counts and anticipated growth rate to produce intersection LOS. Intersection LOS criteria were used to determine the feasibility of the roundabouts.

For the Downtown Redding Gateways, four roundabouts were evaluated:

– SR 273/Benton Drive
– SR 273/Arboretum Drive
– SR 273/Quartz Hill Road
– SR 273/Cypress Avenue

Additionally, beyond the Downtown Redding Gateways, 12 roundabouts were evaluated:

– SR 273/Grange Street
– SR 273/Buenaventura Boulevard
– SR 273/Kenyon Drive
– SR 273/Branstetter Lane
– SR 273/Whitehouse Drive
– SR 273/Happy Valley Road
– SR 273/Latona Road
– SR 273/Ox Yoke Road
– SR 273/North Street
– SR 273/South Street
– SR 273/Factory Outlets Drive
– SR 273/Pleasant Hills Drive

## 7.2 Assumptions

The roundabout analysis included the following assumptions:

– For Existing and Opening Year Conditions, existing Peak Hour Factor (PHF) is used.
– For Opening and Design Year Conditions, PHF is 0.89 and 0.92, respectively.
– Peak hour heavy vehicle percentages for the study intersection are estimated from the existing traffic counts with a minimum heavy vehicle percentage of 1 percent.
– Flow scale used for future conditions is 1.3 to test roundabout feasibility with a 30 percent growth in traffic volumes. (Note: the 30 percent growth represents stress testing, not traffic growth forecast.)

## 7.3 Target LOS

To determine the target LOS, the Traffic Impact Analysis Guidelines for the City of Redding, which outline LOS standards consistent with the City of Redding General Plan, were considered, including the following:

- LOS D for streets within the State highway system and interchanges
- Caltrans strives to maintain a target LOS at the transition between LOS C and LOS D on State highway facilities

Additionally, use of SR 273 as an evacuation route also was considered. For the roundabout analysis, the target LOS used was LOS C. For more information regarding intersection level of service criteria, refer to City of Redding Level of Service (LOS) thresholds will be applied to all intersections for which the feasibility of signalized intersections is analyzed. For the purposes of the signalized intersection feasibility analysis, study intersections will be analyzed at a threshold of LOS D in accordance with City of Redding Guidelines. LOS criteria are presented below in Table 1.

Table 1.

## 7.4 Downtown Gateway Roundabout Analysis

### 7.4.1 Proposed Roundabout Geometry

Roundabout geometry for each location is shown below. All roundabouts are single lane or hybrid roundabouts with turn pockets or slip lanes when necessary to accommodate for higher traffic volumes.

#### Benton Drive

Figure 8 illustrates the proposed Benton Drive roundabout geometry, a single lane roundabout with a 145-foot right turn pocket on the SR 273 SB leg to accommodate for high right turn volumes.

#### Arboretum Drive

Figure 9 illustrates the proposed Arboretum Drive roundabout geometry, a single lane roundabout.

#### Quartz Hill Road

Figure 10 illustrates the proposed roundabout geometry for Quartz Hill, a single lane roundabout with a 145-foot right turn pocket on the eastbound (EB) leg of Quartz Hill to accommodate for high right-turn volumes.

#### Cypress Avenue

Figure 11 illustrates the proposed roundabout geometry for Cypress Avenue. The roundabout has a single lane configuration and includes two slip lanes on the EB leg of Market Street, and the westbound (WB) left of Cypress Avenue, as well as a 145-foot right-turn pocket on the NB leg of SR 273 to accommodate for high right-turn volumes. The roundabout maintains Pine Street as a one way and does not include an approach on the SB leg. The design also maintains the existing four lanes on Cypress Avenue.

*Figure 8* *Benton Drive Roundabout Geometry*

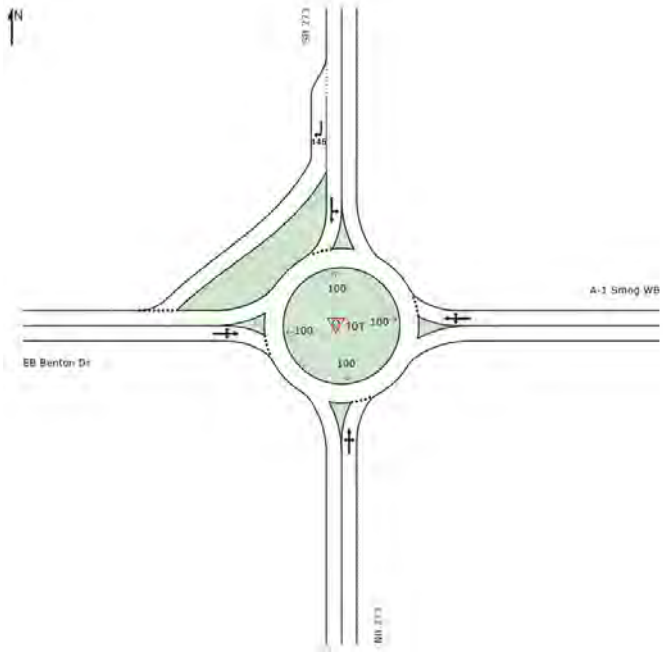



*Figure 9* *Arboretum Drive Roundabout Geometry*

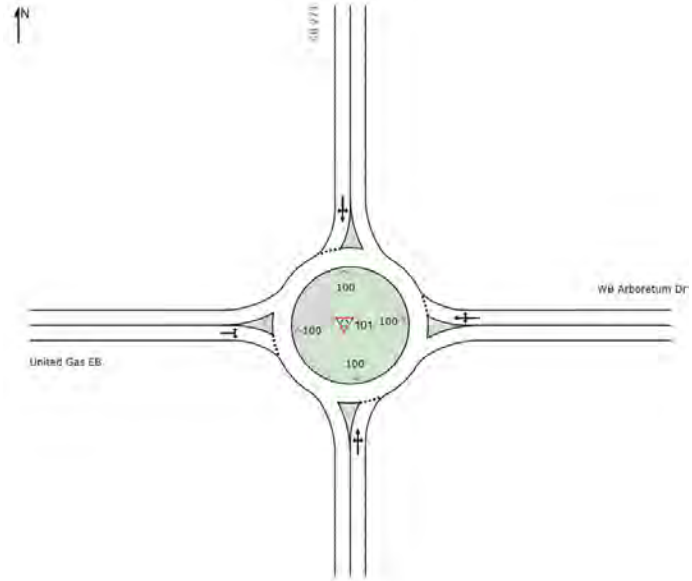


*Figure 10* *Quartz Hill Road Roundabout Geometry*

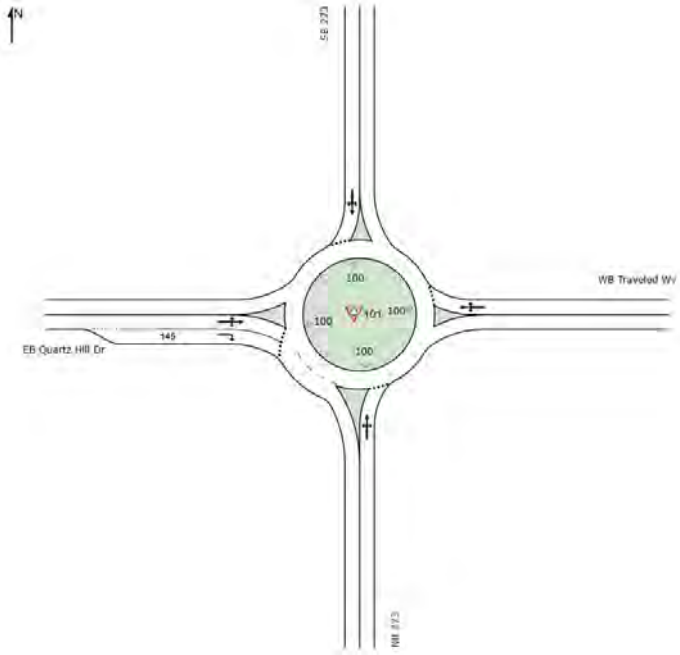
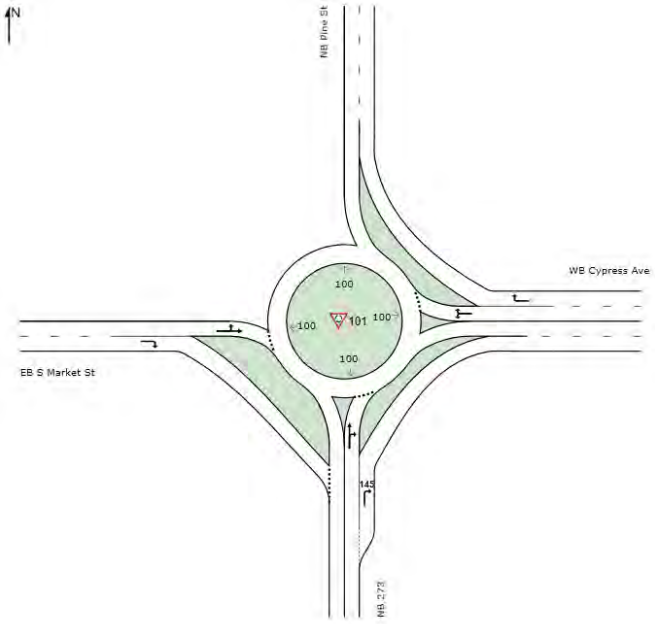



*Figure 11* *Cypress Avenue Roundabout Geometry*



## 7.4.2 Cumulative Traffic Operations

Table 6 shows intersection operations for the future conditions with the proposed roundabouts. The analysis utilizes a Flow Scale constant of 1.3, assuming a 30% increase in traffic volumes. All intersections operate above the target LOS except for Benton Drive, which operates at an LOS D during PM peak hours.

*Table 6 Downtown Gateway Roundabouts – Cumulative LOS*

| # | Intersection | Control | Target LOS | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|---|
| | | | | Delay | LOS | Delay | LOS |
| 4 | SR 273/Benton Drive | Roundabout | C | 31 | C | 43 | **D** |
| 6 | SR 273/Arboretum Drive | Roundabout | C | 4 | A | 4 | A |
| 8 | SR 273/Quartz Hill Road | Roundabout | C | 12 | B | 8 | A |
| 45 | East Street/Cypress Avenue | Roundabout | C | 7 | A | 9 | A |

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDBT = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds
6. At SR 273/Arboretum Drive, additional counts needed to understand the impacts of eastbound and westbound traffic

Table 7 presents the 95$^{th}$ percentile queues for the downtown gateways in cumulative traffic volume conditions. The queues exceed available storage for the SR 273 and Benton Drive intersection for the eastbound through in AM peak hours and northbound through in PM peak hours.

*Table 7* *Downtown Gateway Roundabouts – Cumulative 95th Percentile Queues*

| # | Intersection/Approach | Control Type | Cumulative 95th Percentile Queue (ft) | | Available Storage |
|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | |
| 4 | SR 273/Benton Drive | | | | |
| | Northbound Left/Thru/Right | Roundabout | 652 | **1838** | 1270 |
| | Westbound Left/Thru/Right | | 4 | 12 | 100 |
| | Southbound Left/Thru | | 253 | 86 | 400 |
| | Southbound Right | | 94 | 62 | 145 |
| | Eastbound Left/Thru/Right | | **1035** | 144 | 500 |
| 6 | SR 273/Arboretum Dr | | | | |
| | Northbound Left/Thru/Right | Roundabout | 172 | 167 | 835 |
| | Westbound Left/Thru/Right | | 1 | 25 | 412 |
| | Southbound Left/Thru/Right | | 236 | 83 | 1270 |
| | Eastbound Left/Thru/Right | | 1 | 12 | 100 |
| 8 | SR 273/Quartz Hill Rd | | | | |
| | Northbound Left/Thru/Right | Roundabout | 389 | 546 | |
| | Westbound Left/Thru/Right | | 23 | 50 | |
| | Southbound Left/Thru/Right | | 493 | 235 | |
| | Eastbound Left/Thru/Right | | 279 | 47 | |
| | Eastbound Right | | 29 | 7 | 145 |
| 45 | SR 273/Cypress Ave | | | | |
| | Northbound Left/Thru | Roundabout | 292 | 239 | 800 |
| | Northbound Right | | 0 | 0 | 145 |
| | Westbound Left/Right | | 89 | 211 | |
| | Westbound Right | | 0 | 0 | |
| | Eastbound Left/Thru | | 70 | 119 | 985 |
| | Eastbound Right | | 44 | 98 | 145 |

Note: **Bold** text indicates queues that exceed available storage

## Benton Drive

Table 8 and Table 9 provide LOS for all legs of the Benton Drive roundabout. As shown, the EB Benton Drive approach operates at an LOS F during AM peak hours, and the NB SR 273 approach operates at an LOS F during PM peak hours.

*Table 8 Benton Drive – AM LOS Lane Summary*

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DEMAND FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB 273 | | | | | | | | | | | | | |
| Lane 1[9] | 913 | 3.0 | 963 | 0.948 | 100 | 23.7 | LOS C | 25.5 | 652.3 | Full | 1270 | 0.0 | 0.0 |
| Approach | 913 | 3.0 | | 0.948 | | 23.7 | LOS C | 25.5 | 652.3 | | | | |
| East: A-1 Smog WB | | | | | | | | | | | | | |
| Lane 1[9] | 6 | 3.0 | 282 | 0.020 | 100 | 18.6 | LOS B | 0.2 | 3.8 | Full | 100 | 0.0 | 0.0 |
| Approach | 6 | 3.0 | | 0.020 | | 18.6 | LOS B | 0.2 | 3.8 | | | | |
| North: SB 273 | | | | | | | | | | | | | |
| Lane 1[9] | 1133 | 3.0 | 1589 | 0.713 | 100 | 4.6 | LOS A | 9.9 | 253.3 | Full | 400 | 0.0 | 0.0 |
| Lane 2 | 536 | 3.0 | 1244 | 0.431 | 100 | 4.7 | LOS A | 3.7 | 94.2 | Short | 145 | 0.0 | NA |
| Approach | 1669 | 3.0 | | 0.713 | | 4.6 | LOS A | 9.9 | 253.3 | | | | |
| West: EB Benton Dr | | | | | | | | | | | | | |
| Lane 1[9] | 478 | 3.0 | 413 | 1.156 | 100 | 133.9 | LOS F | 40.4 | 1035.5 | Full | 500 | 0.0 | 34.5 |
| Approach | 478 | 3.0 | | 1.156 | | 133.9 | LOS F | 40.4 | 1035.5 | | | | |
| Intersection | 3065 | 3.0 | | 1.156 | | 30.5 | LOS C | 40.4 | 1035.5 | | | | |

*Table 9 Benton Drive – PM LOS Lane Summary*

| Lane Use and Performance | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DEMAND FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] ft | Lane Config | Lane Length ft | Cap. Adj. % | Prob. Block. % |
| South: NB 273 | | | | | | | | | | | | | |
| Lane 1[9] | 1112 | 1.0 | 960 | 1.159 | 100 | 89.7 | LOS F | 72.9 | 1838.2 | Full | 1270 | 0.0 | 17.3 |
| Approach | 1112 | 1.0 | | 1.159 | | 89.7 | LOS F | 72.9 | 1838.2 | | | | |
| East: A-1 Smog WB | | | | | | | | | | | | | |
| Lane 1[9] | 15 | 1.0 | 217 | 0.070 | 100 | 25.5 | LOS C | 0.5 | 13.2 | Full | 100 | 0.0 | 0.0 |
| Approach | 15 | 1.0 | | 0.070 | | 25.5 | LOS C | 0.5 | 13.2 | | | | |
| North: SB 273 | | | | | | | | | | | | | |
| Lane 1[9] | 618 | 1.0 | 1585 | 0.390 | 100 | 4.2 | LOS A | 3.4 | 85.7 | Full | 400 | 0.0 | 0.0 |
| Lane 2 | 422 | 1.0 | 1327 | 0.318 | 100 | 4.5 | LOS A | 2.5 | 61.7 | Short | 145 | 0.0 | NA |
| Approach | 1040 | 1.0 | | 0.390 | | 4.3 | LOS A | 3.4 | 85.7 | | | | |
| West: EB Benton Dr | | | | | | | | | | | | | |
| Lane 1[9] | 477 | 1.0 | 799 | 0.597 | 100 | 16.9 | LOS B | 5.7 | 144.2 | Full | 500 | 0.0 | 0.0 |
| Approach | 477 | 1.0 | | 0.597 | | 16.9 | LOS B | 5.7 | 144.2 | | | | |
| Intersection | 2644 | 1.0 | | 1.159 | | 42.6 | LOS D | 72.9 | 1838.2 | | | | |

### Two-Lane Roundabout Alternative

To address the LOS deficiency produced by the Benton Drive hybrid roundabout concept, a two-lane roundabout is proposed. As shown in

Figure 12, the two-lane roundabout includes a right turn and right exit pocket on the south leg and maintains the existing two travel lanes in each direction on the north leg. East and west legs include one left/through/right lane in each direction.

*Figure 12* *Benton Drive Alternative Two-Lane Roundabout*

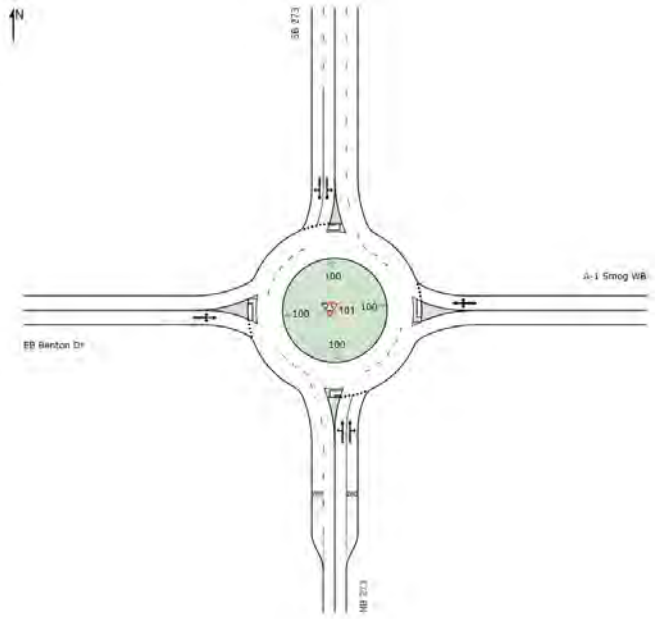


Table 10 provides LOS for cumulative traffic volumes. LOS is acceptable during both AM and PM peak hour conditions with the two-lane roundabout alternative.

*Table 10 Benton Drive Two-Lane Roundabout – Cumulative LOS*

| # | | | Intersection | Control | Target LOS | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Delay | LOS | Delay | LOS |
| 4 | | | SR 273/Benton Drive | Signal | C | 22 | C | 10 | A |

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDBT = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds

Table 11 presents 95$^{th}$ percentile queues for the two-lane roundabout. EB Benton Drive queues exceed the available storage during AM peak hours.

*Table 11 Benton Drive Two-Lane Roundabout – Cumulative 95$^{th}$ Percentile Queues*

| # | Intersection/Approach | Control Type | Cumulative 95th Percentile Queue (ft) | | Available Storage |
|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | |
| 4 | **SR 273/Benton Drive** | | | | |
| | Northbound Left/Thru | Roundabout | 97 | 274 | 1270 |
| | Northbound Thru/Right | | 106 | 67 | 200 |
| | Westbound Left/Thru/Right | | 3 | 14 | 100 |
| | Southbound Left/Thru | | 266 | 91 | 400 |
| | Southbound Thru/Right | | 101 | 67 | 400 |
| | Eastbound Left/Thru/Right | | **862** | 121 | 500 |

Note: **Bold** text indicates queues that exceed available storage

## 7.5 Additional Roundabout Analysis

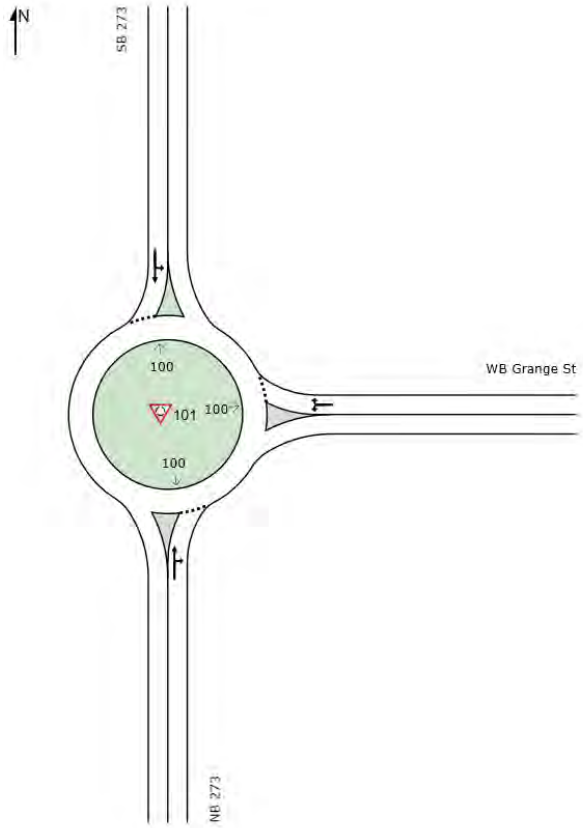
### 7.5.1 Proposed Roundabout Geometry

Roundabout geometry for each location is shown below. All roundabouts are single lane or hybrid roundabouts with turn pockets or slip lanes when necessary to accommodate for higher traffic volumes.

#### Grange Street

Figure 13 illustrates the proposed Grange Street roundabout geometry, a single lane roundabout without a west leg.

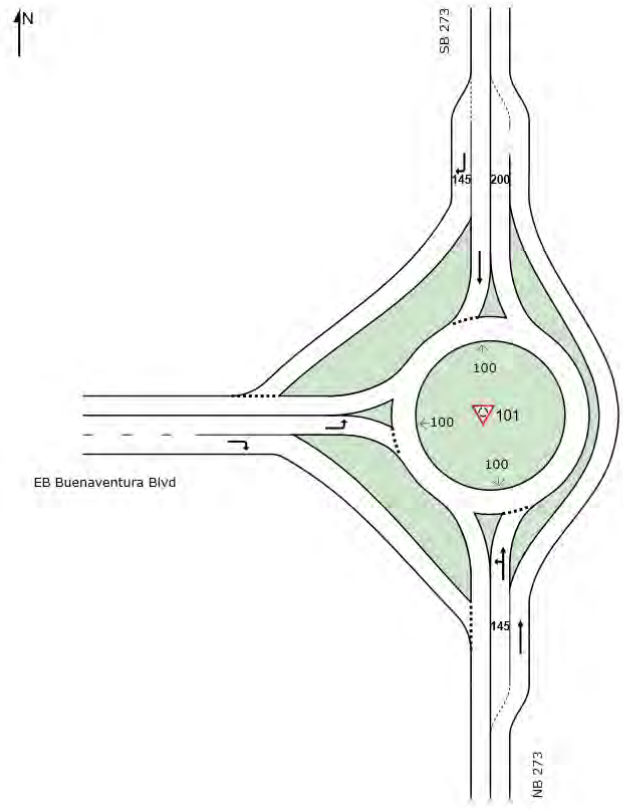
*Figure 13 Grange Street Proposed Roundabout Geometry*



## Buenaventura Boulevard

Figure 14 illustrates the proposed roundabout geometry for Buenaventura Boulevard. The NB leg of SR 273 includes a through and right turn lane, as well as a separate through lane that circumvents the roundabout. The SB leg of SR 273 includes a through lane and a 145-foot right turn pocket and a slip lane. The EB le of Buenaventura Boulevard includes two approach lanes, a through lane and a right turn slip lane. There is no WB leg.

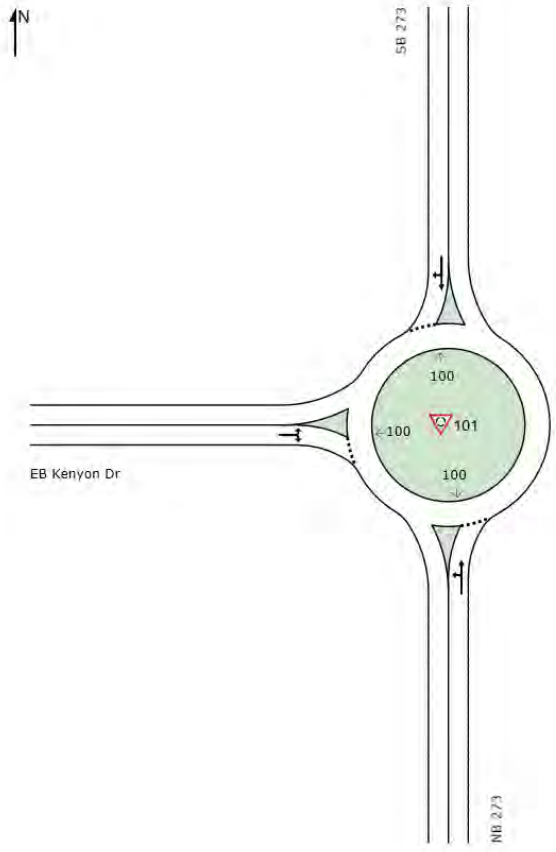
***Figure 14 Buenaventura Boulevard Proposed Roundabout Geometry***



## Kenyon Drive

Figure 15 illustrates the proposed roundabout geometry for Kenyon Drive, a three-lane, single lane roundabout without a west leg. Sixty-five feet west of the intersection, Kenyon Drive is intersected by Westside Road. Further analysis of the EB leg of Kenyon Drive should be considered.

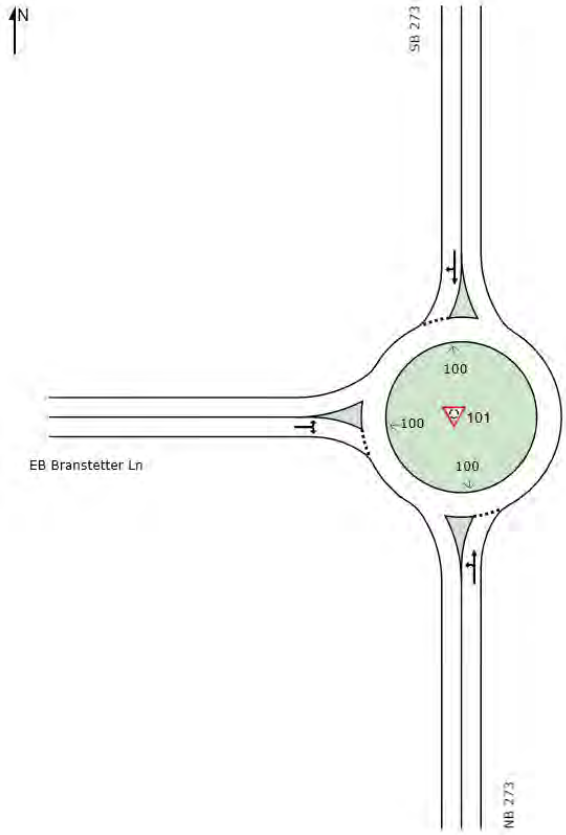
*Figure 15 Kenyon Drive Proposed Roundabout Geometry*



## Branstetter Lane

Figure 16 illustrates the proposed roundabout geometry for Branstetter Lane, and three-leg single lane roundabout without an east leg. Sixty-five feet west of the intersection, Branstetter Lane is intersected by Westside Road. Further analysis of the EB leg of Branstetter Lane should be considered.

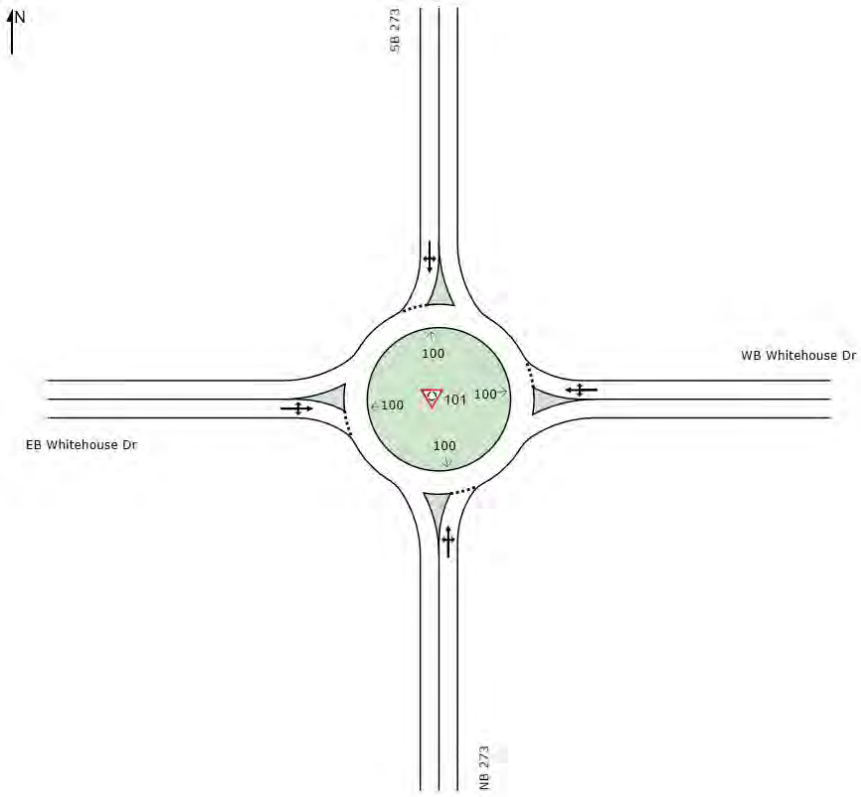
*Figure 16 Branstetter Lane Proposed Roundabout Geometry*



## Whitehouse Drive

Figure 17 illustrates the proposed roundabout geometry for Whitehouse Drive, a four-leg, single lane roundabout.

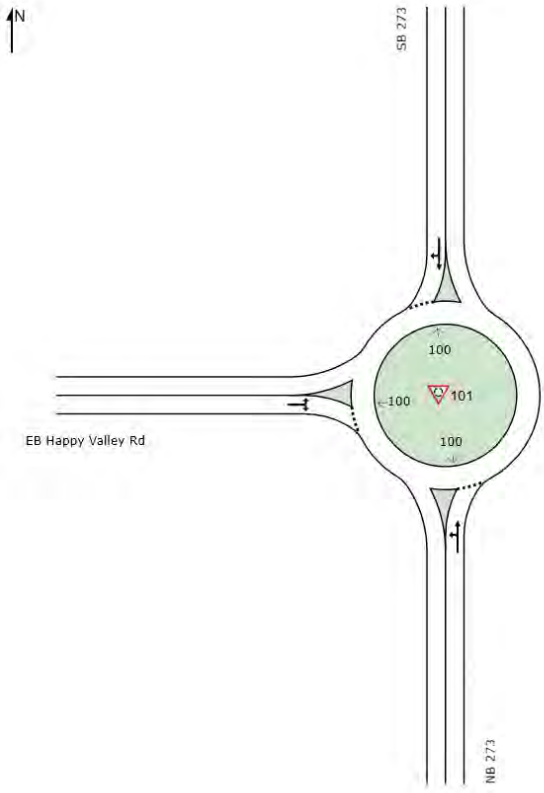
*Figure 17 Whitehouse Drive Proposed Roundabout Geometry*



## Happy Valley Road

Figure 18 illustrates the proposed roundabout geometry for Happy Valley Road, a three-leg, single lane roundabout without an east leg.

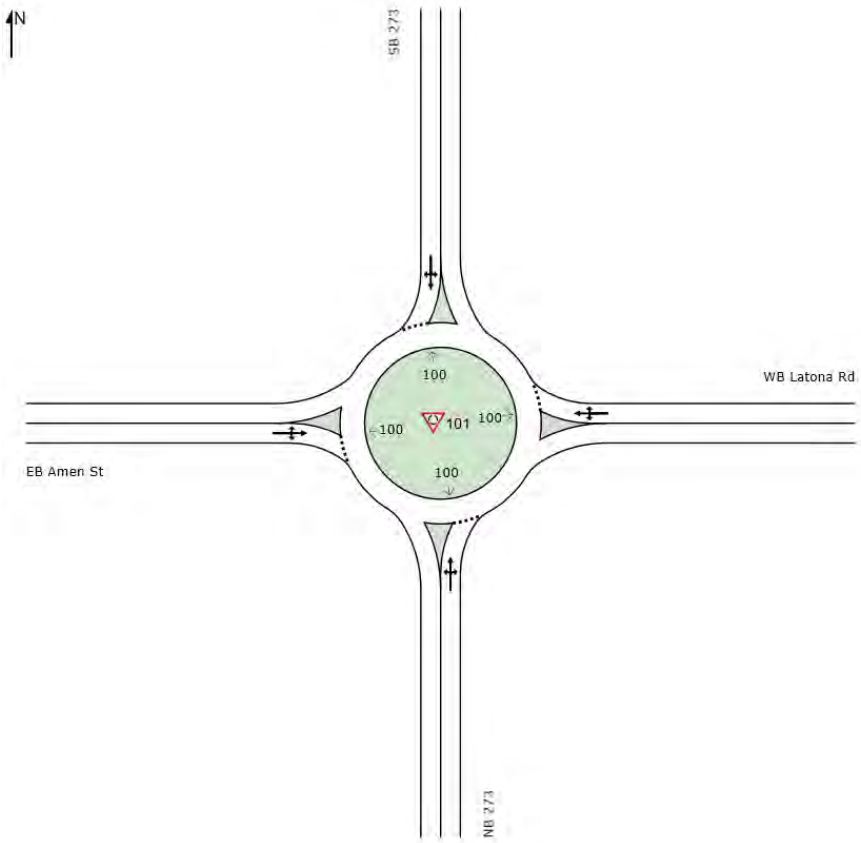
*Figure 18 Happy Valley Road Proposed Roundabout Geometry*



## Latona Road

Figure 19 illustrates the proposed roundabout geometry for Latona Road, a four-way, single lane roundabout.

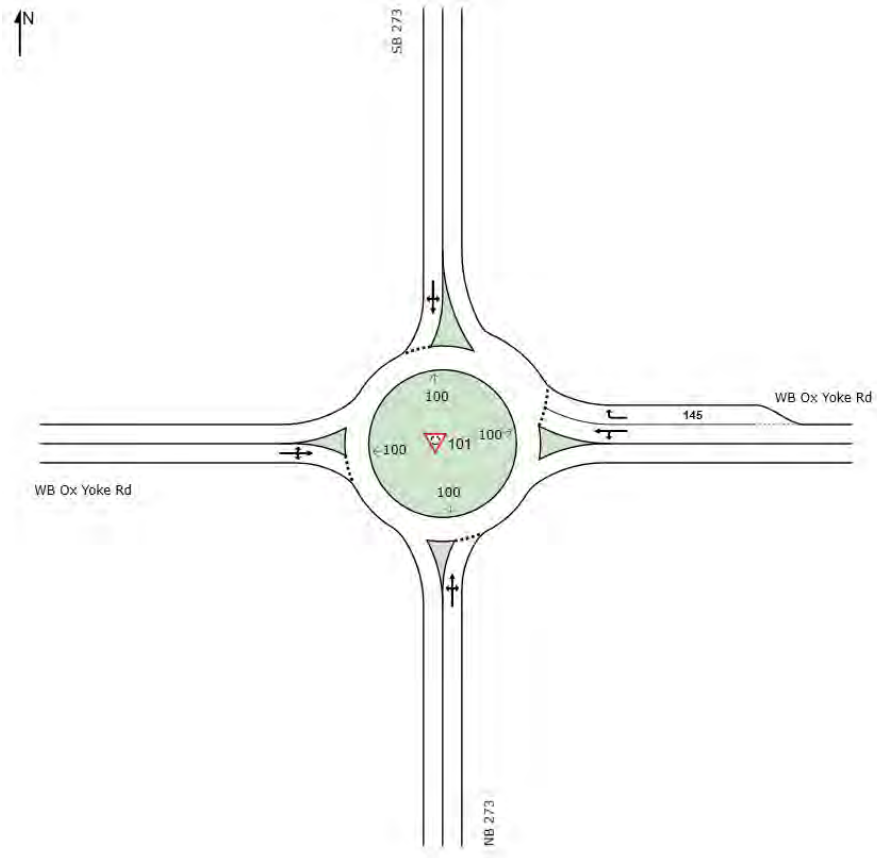
*Figure 19 Latona Road Proposed Roundabout Geometry*



## Ox Yoke Road

Figure 20 illustrates the propose roundabout geometry for Ox Yoke Road. A four-way, single lane roundabout. The roundabout includes a 145-foot right turn pocket on the WB leg of Ox Yoke Road to accommodate for high right-turn volumes.

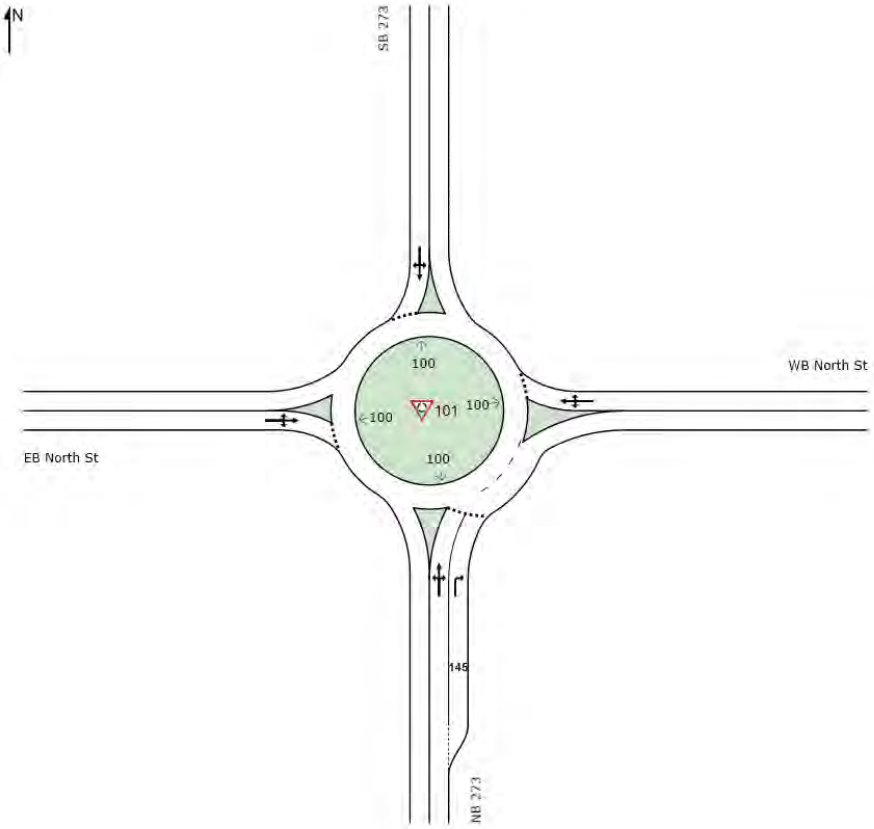
***Figure 20 Ox Yoke Road Proposed Roundabout Geometry***



## North Street

Figure 21 illustrates the proposed roundabout geometry for North Street, a four-way single lane roundabout. The roundabout includes a 145-foot right turn pocket on the NB leg of SR 273 to accommodate for high right-turn volumes.

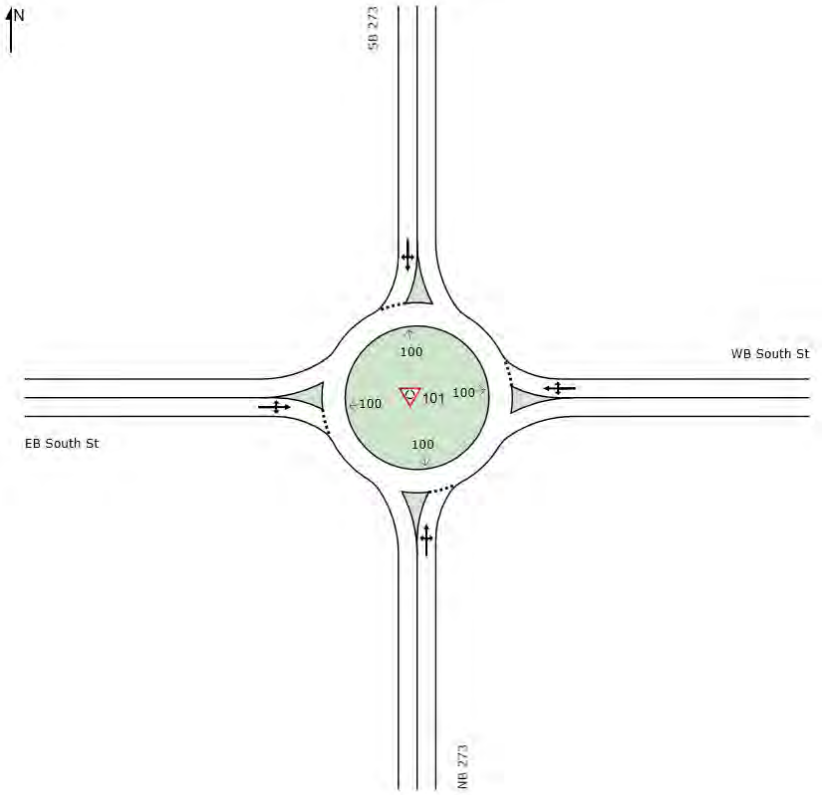
*Figure 21 North Street Proposed Roundabout Geometry*



## South Street

Figure 22 illustrates the proposed roundabout geometry for South Street, a four-way, single lane roundabout.

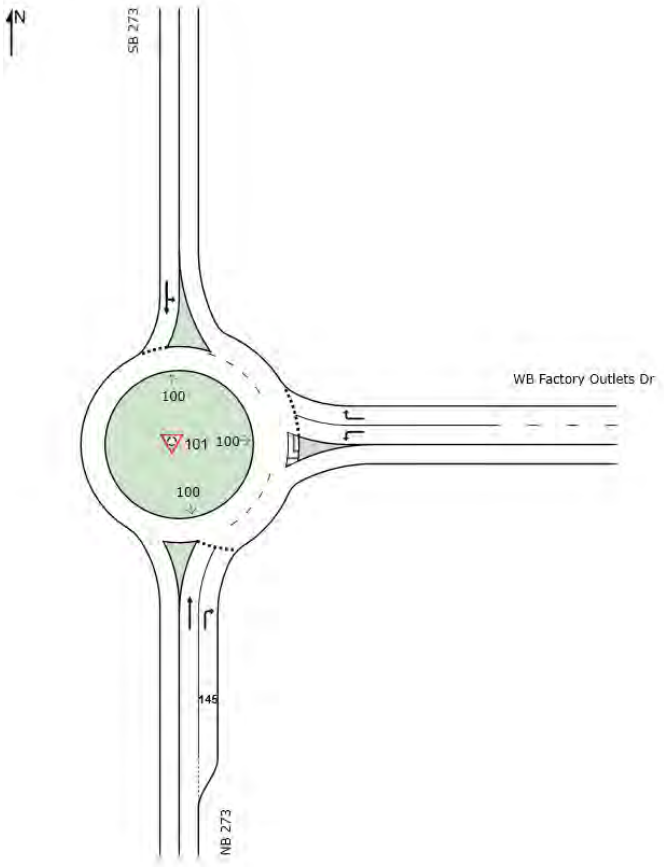
*Figure 22 South Street Proposed Roundabout Geometry*



## Factory Outlets Drive

Figure 23 illustrates the proposed roundabout geometry for Factory Outlets Drive, a three-way, hybrid roundabout. The NB leg of SR 273 includes a 145-foot turn pocket to accommodate for heavy right-turn volumes. The WB leg of Factory Outlets Drive includes two approach lanes that permit right and left turning movements, to accommodate for high traffic volumes exiting the outlets and I-5, while reducing the number of lanes.

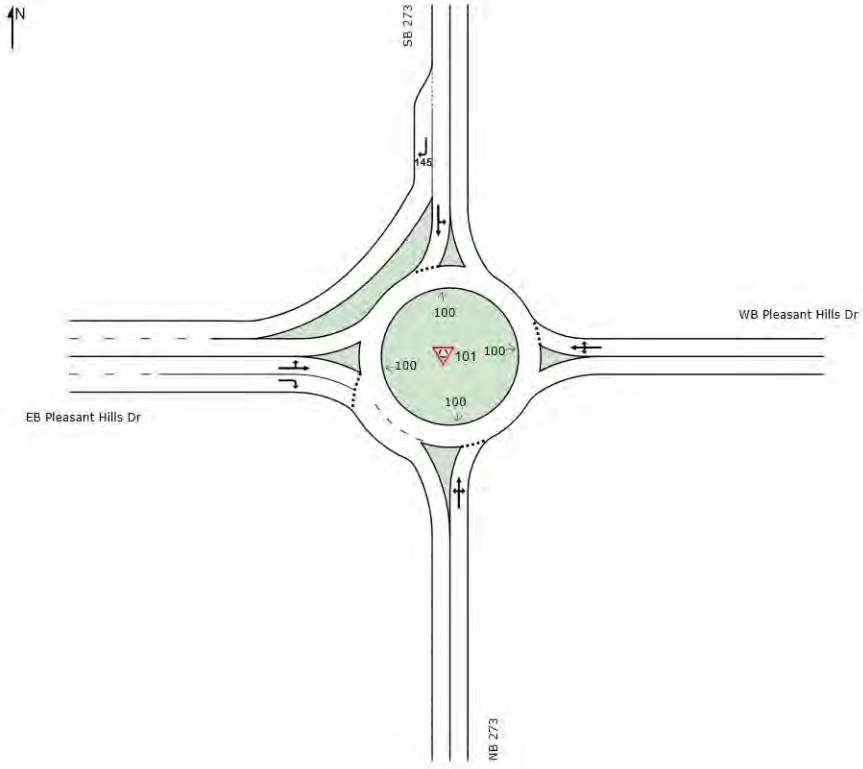
*Figure 23 Factory Outlets Drive Proposed Roundabout Geometry*



## Pleasant Hills Drive

Figure 24 illustrates the proposed roundabout geometry for Pleasant Hills Drive. The SB leg of SR 273 includes a 145-foot right turn pocket and slip lane to accommodate for high right-turn traffic volumes. The design maintains the existing number of lanes approaching and existing the intersection, providing a right-turn pocket to accommodate for heavy right-turn traffic volumes.

*Figure 24 Pleasant Hills Drive Proposed Roundabout Geometry*



## 7.5.2 Cumulative Traffic Operations

Table 12 presents intersection operations for the proposed roundabouts under a 30% traffic volume increase. This analysis was prepared concurrently with the traffic analysis, prior to a growth rate being established. Therefore, a conservative 30% growth estimate was applied to assess sensitivity to future development and population growth. A shown below, all roundabouts operate acceptably above the target LOS.

***Table 12 Additional Roundabouts – Cumulative LOS***

| # | Intersection | Control Type | Target LOS | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|---|
| | | | | Delay | LOS | Delay | LOS |
| 51 | SR 273/Grange St | Roundabout | C | 5.6 | A | 4.2 | A |
| 55 | SR 273/Buenaventura Blvd | Roundabout | C | 10.8 | A | 7.4 | A |
| 57 | SR 273/Kenyon Dr | Roundabout | C | 5.5 | A | 23.1 | B |
| 58 | SR 273/Branstetter Ln | Roundabout | C | 3.9 | A | 4.2 | A |
| 65 | SR 273/Whitehouse Dr | Roundabout | C | 5.2 | A | 4.5 | A |
| 66 | SR 273/Happy Valley Rd | Roundabout | C | 5.5 | A | 5.6 | A |
| 67 | SR 273/Latona Rd | Roundabout | C | 4.7 | A | 4.5 | A |
| 69 | SR 273/Ox Yoke Rd | Roundabout | C | 8.5 | A | 7 | A |
| 72 | SR 273/North St | Roundabout | C | 7.9 | A | 7.4 | A |
| 73 | SR 273/South St | Roundabout | C | 9.5 | A | 9 | A |
| 76 | SR 273/Factory Outlets Dr | Roundabout | C | 7.5 | A | 5.9 | A |
| 77 | SR 273/Pleasant Hills Dr | Roundabout | C | 6.9 | A | 7.5 | A |

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDBT = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT
3. Warrant = Based on California MUTCD Warrant 3
4. **Bold** = Unacceptable Conditions
5. OVR = Delay over 300 seconds

Table 13 provides 95$^{th}$ percentile queues for the additional roundabouts under cumulative volume conditions. The following queues exceed available storage:

- SR 273 and Kenyon Drive: eastbound left/right during PM peak hours
- SR 273 and North Street
- SR 273 and Soth Street

*Table 13 Additional Roundabouts – Cumulative 95th Percentile Queues*

| # | Intersection/Approach | Control Type | Cumulative 95th Percentile Queue (ft) | | Available Storage |
|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | |
| 51 | **SR 273/Grange St** | | | | |
| | Northbound Thru/Right | Roundabout | 464 | 171 | 1530 |
| | Westbound Left/Right | | 74 | 27 | |
| | Southbound Left/Thru | | 138 | 386 | 156 |
| 55 | **SR 273/Buenaventura Blvd** | | | | |
| | Northbound Left/Thru | Roundabout | 302 | 83 | 145 |
| | Northbound Thru | | 96 | 0 | 1300 |
| | Southbound Thru | | 171 | 19 | |
| | Southbound Right | | 68 | 69 | 145 |
| | Eastbound Left | | 62 | 66 | 430 |
| | Eastbound Right | | 110 | 0 | 430 |
| 57 | **SR 273/Kenyon Dr** | | | | |
| | Northbound Left/Thru | Roundabout | 940 | 164 | |
| | Southbound Thru/Right | | 131 | 586 | |
| | Eastbound Left/Right | | 27 | **150** | 75 |
| 58 | **Sr 273/Branstetter Ln** | | | | |
| | Northbound Left/Thru | Roundabout | 679 | 157 | |
| | Southbound Thru/Right | | 93 | 485 | |
| | Eastbound Left/Right | | 7 | 26 | 65 |
| 65 | **SR 273/Whitehouse Dr** | | | | |
| | Northbound Left/Thru/Right | Roundabout | 106 | 76 | |
| | Westbound Left/Thru/Right | | 15 | 14 | 96 |
| | Southbound Left/Thru/Right | | 80 | 125 | |
| | Eastbound Left/Thru/Right | | 8 | 4 | 815 |
| 66 | **SR 273/Happy Valley Rd** | | | | |
| | Northbound Left/Thru | Roundabout | 116 | 100 | |
| | Southbound Thru/Right | | 78 | 129 | |
| | Eastbound Left/Right | | 71 | 37 | 124 |

| | | | | | |
|---|---|---|---|---|---|
| 67 | **SR 273/Latona Rd** | | | | |
| | Northbound Left/Thru/Right | Roundabout | 109 | 87 | |
| | Westbound Left/Thru/Right | | 15 | 14 | 75 |
| | Southbound Left/Thru/Right | | 142 | 121 | 655 |
| | Eastbound Left/Thru/Right | | 1 | 2 | 300 |
| 69 | **SR 273/Ox Yoke Rd** | | | | |
| | Northbound Left/Thru/Right | Roundabout | 188 | 82 | |
| | Westbound Left/Thru | | 9 | 16 | 350 |
| | Westbound Right | | 113 | 72 | 145 |
| | Southbound Left/Thru/Right | | 201 | 185 | 785 |
| | Eastbound Left/Thru/Right | | 1 | 2 | 130 |
| 72 | **SR 273/North St** | | | | |
| | Northbound Left/Thru/Right | Roundabout | 87 | 58 | 1140 |
| | Northbound Right | | 12 | 9 | 145 |
| | Westbound Left/Thru/Right | | 105 | 83 | 130 |
| | Southbound Left/Thru/Right | | 154 | 144 | 1240 |
| | Eastbound Left/Thru/Right | | **90** | **60** | 35 |
| 73 | **SR 273/South St** | | | | |
| | Northbound Left/Thru/Right | Roundabout | 224 | 107 | 1280 |
| | Westbound Left/Thru/Right | | 76 | 79 | 116 |
| | Southbound Left/Thru/Right | | 129 | 210 | 1140 |
| | Eastbound Left/Thru/Right | | **134** | **128** | 15 |
| 76 | **SR 273/Factory Outlets Dr** | | | | |
| | Northbound Thru | Roundabout | 44 | 57 | 736 |
| | Northbound Right | | 34 | 43 | 145 |
| | Westbound Left | | 37 | 85 | |
| | Westbound Right | | 32 | 51 | 550 |
| | Southbound Left/Thru | | 130 | 371 | 640 |

| | | | | | |
|---|---|---|---|---|---|
| 77 | **SR 273/Pleasant Hills Dr** | | | | |
| | Northbound Left/Thru/Right | Roundabout | 48 | 72 | |
| | Westbound Left/Thru/Right | | 3 | 39 | 60 |
| | Southbound Left/Thru | | 33 | 52 | 732 |
| | Southbound Right | | 0 | 0 | 145 |
| | Eastbound Left/Thru | | 46 | 88 | 425 |
| | Eastbound Right | | 12 | 37 | 425 |

Note: **Bold** text indicates queues that exceed available storage

# 8. Evaluation of Alternatives

This section provides a planning-level evaluation of projects to calm traffic, increase safety, and promote non-vehicular modes of travel in Downtown Redding Gateways. For some projects, the evaluation includes the analyses presented in Section 6 and Section 7 of this TM.

## 8.1 Northern Downtown Redding Gateway

### Roundabouts

As detailed in Section 7 of this TM, roundabouts were assessed and deemed feasible at the following intersections: SR 273/Benton Drive, SR 273/Arboretum Drive, and SR 273/Quartz Hill Road. At SR 273/Benton Drive, a hybrid roundabout was initially assessed but failed to obtain an acceptable LOS; therefore, a two-lane roundabout was assessed. At SR 273/Arboretum Drive, traffic counts are needed to better understand the traffic impacts of Turtle Bay Elementary School on the proposed roundabout.

The roundabouts perform at or better than the target LOS C, consistent with the City of Redding LOS standards. The proposed roundabouts are compatible with a road diet, which, in this portion of the corridor, would allow opportunity to reallocate the roadway right-of-way to other uses, such as bicycle facilities or angled parking, which could further serve to slow vehicle speeds and create a sense of place.

## 8.2 Eastern Downtown Redding Gateway

### SR 44 Boulevard

On SR 44, a boulevard, from the Sacramento River to Continental Street was assessed.

#### *FHWA Responsibility*

Part 2, Chapter 8, Section 7, Article 8 of the Caltrans PDPM discusses Federal Highway Administration (FHWA) Coordination related to the project development process, including where project actions are stewarded/assumed by Caltrans and where project actions are retained by the FHWA. Article 8 notes the following:

> The main factor for determining if the responsibility for project actions is assumed by Caltrans or retained by FHWA is whether or not a project is on the National Highway System [NHS]…FHWA retains their responsibility for project actions for projects on the Interstate System that have been determined to be in a high risk category.

The NHS consists of roadways important to the nation's economy, defense, and mobility. The NHS includes the following subsystems of roadways: Interstate, Other Principal Arterial, Strategic Highway Network (STRAHNET), Major Strategic Highway Network Connectors, and Intermodal Connectors. Requests for adding and deleting a segment from the NHS requires formal submission to the FHWA.

STRAHNET includes routes and connectors to major US Department of Defense (DOD) installations or seaports important for national defense mobility. In addition to the general guidelines/guidance for NHS modification submittals, STRAHNET changes require added coordination with the DOD Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA). The FHWA coordinates with the SDDCTEA to approve all STRAHNET changes.[1]

As classified by the FHWA, the SR 299/SR 44 corridor (from Interstate 5 to Highway 101) is part of STRAHNET (i.e., "Non-Interstate STRAHNET Route").[2]

[1] https://www.fhwa.dot.gov/planning/national_highway_system/update/index.cfm
[2] https://www.fhwa.dot.gov/planning/national_highway_system/

#### *State Responsibility*

The regulations for modifying (i.e., adding, deleting, or relocating) routes and intermodal connectors on the NHS are located in 23 CFR 470, Federal-aid Highway Systems, and in Appendix D to Subpart A, "Guidance Criteria for Evaluating Requests for Modifications to the NHS."

Requests for adding and deleting a segment from the NHS requires formal submission to the FHWA. States are responsible for submitting requests. For modification proposals originating with Metropolitan Planning Organizations (MPO), the MPO would transmit the request and approval documentation through the State. All requests should be put in writing to the FHWA Division Office.

#### *Summary*

In accordance with the above, the state and/or MPO should coordinate with the FHWA for any and all potential STRAHNET changes, including for projects or project actions where FHWA responsibility is retained. At this time, as coordination has not occurred, the SR 44 Boulevard is not considered feasible.

## 8.3 Southern Downtown Redding Gateway

### Signalized Intersections

As detailed in Section 6 of this TM, two signalization and lane configuration alternatives were developed for the following intersections: SR 273/Cypress Avenue, SR 273/Parkview Avenue, and SR 273/California Street. The signal warrant was met for both peak hours. The signals perform at or better than the target LOS C, consistent with the City of Redding LOS standards.

Although both alternatives are feasible, Alternative 2 is preferred, as it has better LOS and queues, with less of a road diet required.

#### *Conceptual Layout*

Exhibits 1 to 3 illustrate the signal and lane configuration for Alternative 2.

As shown in Exhibit 1, at SR 273/Cypress Avenue, the intersection has been reconfigured to a four-way perpendicular intersection that includes the removal of the following: the WB Cypress Avenue to NB SR 273 two right turn lanes and the NB SR 273 to EB Cypress Avenue free right lane. Crosswalks have been designed on all legs, including adding crosswalks on the south and west sides. Also, on the east side, three crosswalks have been replaced with one crosswalk. Along SB 273, a two-way Class I facility has been designed. Also, NB SR 273 through the intersection, a Class II facility has been designed.

As shown in Exhibit 2, at SR 273/Parkview Avenue, a new signal has been designed in addition to lane reconfigurations for all approaches. As part of the reconfigurations, the WB Parkview Avenue to NB SR 273 free right lane was removed. Along NB and SB 273, continuation of the bike facilities described has been continued. Also, EB and WB Parkview Avenue, Class II facilities have been designed. For crosswalks, a crosswalk was added on the north side and the crosswalk was improved on the east side (i.e., from two crosswalks to one crosswalk).

As shown in Exhibit 3, at SR 273/California Street, the intersection has been reconfigured to a three-way perpendicular intersection that includes two new curb ramps/bulb-out in addition to lane reconfigurations for all approaches (i.e., pushing traffic lanes to the far right/east). To close the Angelo Avenue at SR 273, a cul-de-sac was initially considered but determined to be infeasible based on City of Redding Street Standards. Instead, bollards were used to close vehicular access to/from Angelo Avenue, allowing pedestrian, bicyclist, and emergency access only. In the City of Redding, bollards are used to close vehicular access to/from Riverside Drive (e.g., at N. Court Street/Riverside Drive); as such, the use of bollards is assumed to be feasible. SB SR 273, the two-way Class I facility terminates prior to intersection; after the intersection, a Class II facility commences. NB SR 273 through the intersection, a Class II facility has been designed.

CITY OF REDDING
DOWNTOWN REDDING GATEWAYS

SR 273 & CYPRESS AVENUE

SIGNAL - ALTERNATIVE 2

Project No. **12560002**
Date **NOVEMBER 2024**

**EXHIBIT 1**

Filename: \\ghdnetjghd\US\Sacramento - 2200 21st\Projects\561\12560002\Digital_Design\ACAD\Figures\12560002_SR273 and Cypress Ave-Alt 1.dwg
Plot Date: 19 November 2024 1:43 PM

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0 10' 20' 40'

GHD

CITY OF REDDING
DOWNTOWN REDDING GATEWAYS

SR 273 & PARKVIEW AVENUE

SIGNAL - ALTERNATIVE 2

Project No. **12560002**
Date **NOVEMBER 2024**

**EXHIBIT 2**

Filename: \\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\12560002\Digital_Design\ACAD\Figures\12560002_SR273 and Cypress Ave-Alt 1.dwg
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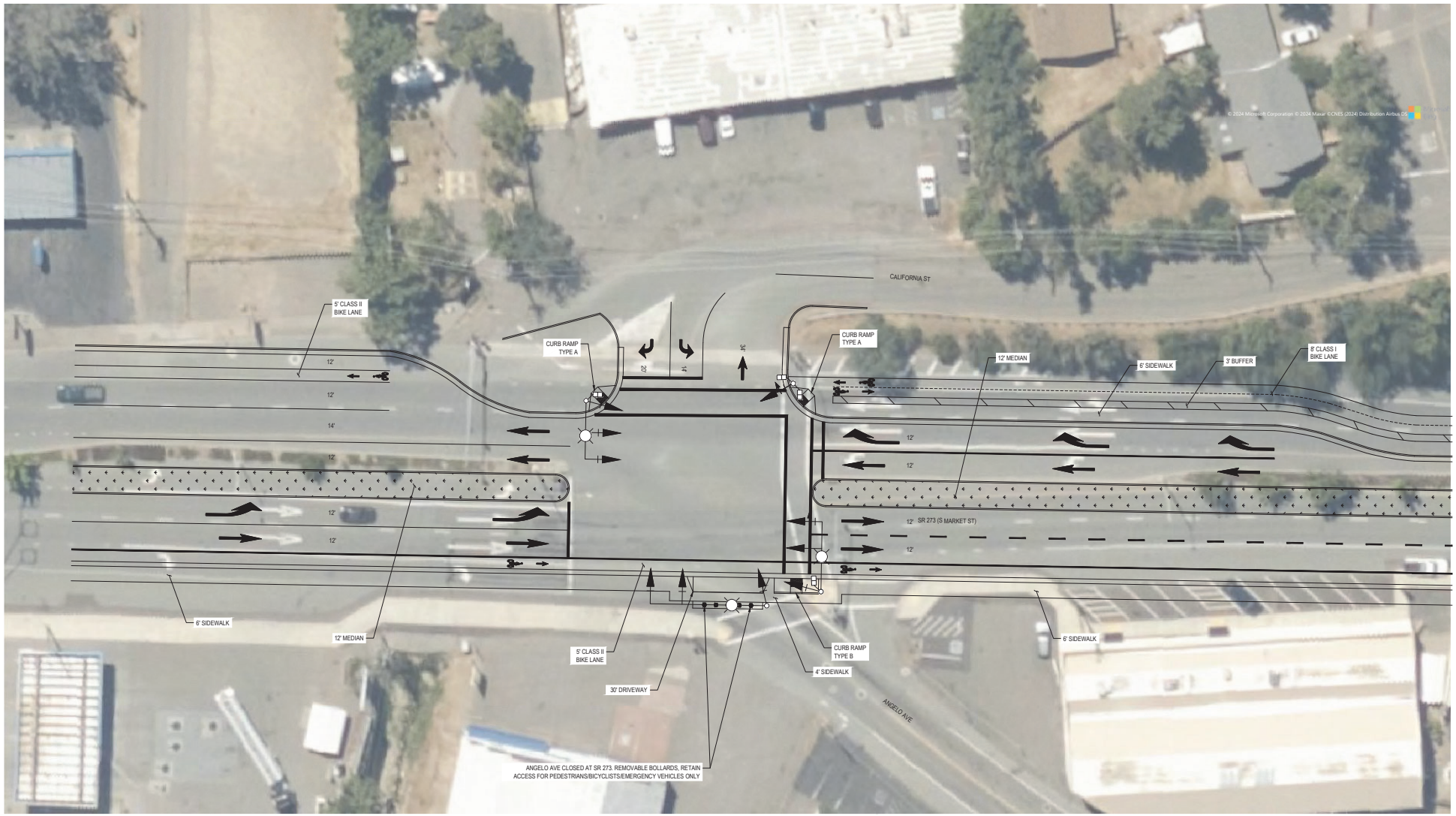


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GHD

CITY OF REDDING
DOWNTOWN REDDING GATEWAYS

SR 273 & ANGELO AVENUE

SIGNAL - ALTERNATIVE 2

Project No. 12560002
Date NOVEMBER 2024

**EXHIBIT 3**

Filename: \\ghdnetghd\US\Sacramento - 2200 21st\Projects\561\12560002\Digital_Design\ACAD\Figures\12560002_SR273 and Cypress Ave-Alt 1.dwg
Plot Date: 19 November 2024 1:48 PM

## Roundabout

At SR 273/Cypress Avenue, a roundabout was assessed and deemed feasible, as detailed in Section 7 of this TM. The roundabout operates at an acceptable LOS in compliance with City of Redding LOS standards. The proposed roundabout is compatible with a road diet, as mentioned above.

Although both a roundabout and a signal are feasible, a signal is preferred, as it standardizes and simplifies operations. As noted in Section 7.4.1, the SR 273/Cypress Avenue roundabout includes slip lanes and turn pockets to accommodate high traffic volumes. Additionally, the SR 273/Cypress Avenue roundabout must consider the one-way legs of the existing SR 273 one-way couplet (i.e., NB Pine Street and SB Market Street).

## Pedestrian/Bicycle Connection

A pedestrian/bicycle connection on Parkview Avenue, from SR 273 to California Street, was assessed.

### *Conceptual Layout*

As shown in Figure 25, a pedestrian/bicycle connection can be accommodated and is feasible. To meet the grade difference between SR 273 and California Street (approximately 23 feet), a 30-foot wide switchback structure was used.  As shown in the figure, a 5-foot-wide pathway with allowances for walls and handrails is possible.

*Figure 25* *Pedestrian/Bicycle Connection:  Parkview Avenue*

## 8.4 Western Downtown Redding Gateway

### Enhanced Crosswalks

Enhanced crosswalks were assessed at the following intersections: SR 273/SR 299 and SR 273 (California Street)/Placer Street.

#### *Crosswalk Needs*

On August 28-29, 2024, a project walk audit was conducted. At the SR 273/SR 299 intersection, the following was observed:

– Large vehicle turning radii from EB SR 299 to SB SR 273, taking two lanes on SR 273
– No crosswalk on the north side of the intersection

At the SR 273/SR 299 intersection, high-visibility crosswalks were discussed. As noted in Caltrans Main Street:

> Crosswalk Visibility Enhancements are listed as an FHWA Proven Safety Countermeasure: Three main crosswalk visibility enhancements help make crosswalks and the pedestrians, bicyclists, wheelchair and other mobility device users, and transit users using them more visible to drivers. These include high-visibility crosswalks, lighting, and signing and pavement markings. These enhancements can also assist users in deciding where to cross. Agencies can implement these features as standalone or combination enhancements to indicate the preferred location for users to cross.

#### *Enhanced Crosswalk Considerations and Approvals*

As noted in Caltrans DIB-94, potential locations to consider a new or enhanced crosswalk include at "a roundabout or traffic signal where engineering judgement indicates crosswalks are needed to delineate pedestrian paths through these intersections," as well as at crossing gaps or needs identified in the District Active Transportation Plan, District Roadway Safety Infrastructure Plan, local plans, and by community engagement (e.g., consultation with law enforcement agencies, local agencies, local communities including senior and school communities, and transit agencies). Caltrans DIB-94 also notes that the District Pedestrian and Bicyclist Traffic Safety Engineer provides approval of crosswalk markings or enhancements.

#### *Summary*

In accordance with Caltrans DIB-94, the District Pedestrian and Bicyclist Traffic Safety Engineer shall approve crosswalk marking or enhancements. In the Western Downtown Redding Gateway, this could include high-visibility crosswalks at SR 273/SR 299 (east, west, and south sides) and SR 273 (California Street)/Placer Street (all sides). Additionally, this could include a potential new crosswalk at SR 273/SR 299 (north side), should Caltrans determine need of the crosswalk. Also, at SR 273 (California St)/Placer Street, green colored pavement for bicycle facilities (to accommodate Project #78 and #79) also could be considered. Except for the new crosswalk at SR 273/SR 299 (north side), which may require Caltrans study and/or approval, the crosswalk improvements discussed are considered feasible.

## 8.5 Additional Roundabouts

South of the Southern Downtown Redding Gateway, the feasibility of an additional 12 roundabouts was assessed at the following intersections: SR 273/Grange Street, SR 23/Buenaventura Boulevard, SR 273/Kenyon Drive, SR 273/Branstetter Lane, SR 273/Whitehouse Drive, SR 273/Happy Valley Road, SR 273/Latona Road, SR 273/Ox Yoke Road, SR 273/North Street, SR 273/South Street, SR 273/Factory Outlets Drive, and SR 273/Pleasant Hills Drive. All roundabouts are feasible and perform at or better than the target LOS C, consistent with the City of Redding LOS standards. The proposed roundabouts are compatible with a road diet, as mentioned above.

The feasibility of the proposed intersection improvements is based off traffic counts only, but future design should consider SR 273 right-of-way limits and Union Pacific (UP) Railroad design requirements. Between Buenaventura Boulevard and S. Bonnyview Road, Westside Road runs parallel to SR 273 on the west side of the corridor, potentially impacting available vehicle storage at Kenyon Drive and Branstetter Lane, as shown in Table 13. Similarly, between Buenaventura Boulevard and South Street, the UP Railroad runs parallel to SR 273 on the east side of the corridor, potentially impacting available vehicle storage at Laton Road, Ox Yoke Road, North Street, and South Street.

# 9. Summary

As evaluated this TM, which provides a planning-level feasibility analysis, projects to calm traffic, increase safety, and promote non-vehicular modes of travel in Downtown Redding Gateways could be accommodated.

The corridor performance improvements of the potential projects are described below.

## Corridor Performance Improvements

In the Northern Downtown Redding Gateway (Segment 2), along Miracle Mile, roundabouts could slow speeds, which could improve safety (e.g., reduce collisions and fatalities).

In the Western Downtown Redding Gateway (Segment 3), crosswalk improvements, including high-visibility crosswalks and green colored pavement for bicycle facilities, could improve mobility and connectivity and safety (e.g., reduce collisions and fatalities).

In the Southern Downtown Redding Gateway (Segments 3/4), a modified signal and lane configuration at SR 273/Cypress Avenue, a new signal and lane configuration at SR 273/Parkview Avenue, a pedestrian/bicycle connection on Parkview Avenue (from SR 273 to California Street), and a modified signal and lane configuration (e.g., closure of vehicular access to/from Angleo Avenue) could improve mobility and connectivity and safety (e.g., reduce collisions and fatalities). Also, operations and reliability could be improved, as active transportation facilities would be provided, allowing possibilities for two new additional modes of travel (i.e., walking and bicycling) to and through the gateway.

– Mobility & Connectivity. Pedestrian mobility and connectivity would be improved by adding pedestrian facilities, where pedestrian facilities currently do not exist. Bicycle and pedestrian level of traffic stress would be reduced, as safer and separated facilities would be provided. Also, walking and bicycling mode share could increase with the availability of walking and bicycling facilities (e.g., where such facilities currently do not exist).
– Operations and Reliability. With a potential walking and bicycling mode share shift (i.e., from vehicles to walking or bicycling), vehicle miles traveled and vehicular congestion would decrease.
– Safety. With safer and separated walking and bicycling facilities, bicycle and pedestrian collisions and fatalities could be reduced.

*Table 14 Feasibility Study #3 Corridor Performance Improvements*

| Performance Measure | Segment | | |
|---|---|---|---|
| | 2 | 3 | 4 |
| Mobility & Connectivity | | X | X |
| Operations & Reliability | | | X |
| Safety | X | X | X |

# Technical Memorandum

**October 18, 2024**

| | | | |
|---|---|---|---|
| **To** | Michael Kuker, SRTA;<br>Laurent Beauregard, SRTA | **Contact No.** | |
| **Copy to** | Natalie Kinney, Caltrans;<br>Aaron Casas, Caltrans;<br>Christina Prosperi, Caltrans;<br>Sergio Amezquita, Caltrans; | **Email** | Todd.tregenza@ghd.com |
| **From** | Todd Tregenza, GHD | **Project. No.** | 12560002 |
| **Project Name** | Envision 273 Comprehensive Multimodal Corridor Plan | | |
| **Subject** | Task 6 Technical Memorandum: Feasibility Study #4 (Class I/IV from Redding to Anderson) | | |

## 1. Introduction

The Task 6 Technical Memorandums (TMs) will evaluate potential projects that may support corridor solutions, as described in the Task 5 TM.

Each Task 6 TM presents the feasibility of a potential project or group of projects. Task 6 includes six feasibility studies (FSs):

1. One-way Couplet Reversion
2. Cypress Avenue Roundabout
3. Downtown Redding Gateways
4. Class I/IV from Redding to Anderson
5. Shasta County (SR 273/Whitehouse Drive) Grade Crossing Relocation
6. Redding (SR 273/Breslauer Way) Grade Crossing Relocation

This TM presents *FS #4: Class I/IV from Redding to Anderson*.

The TMs will be combined or summarized in the draft/final report, as appropriate.

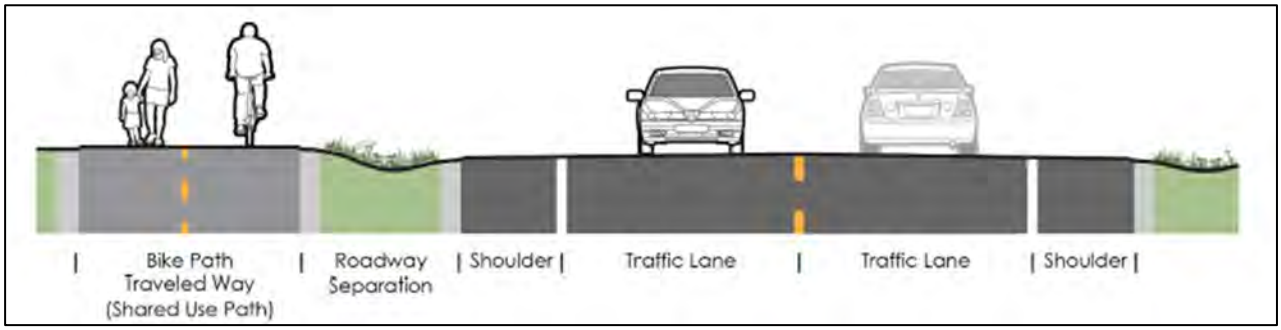
# 2. Scope

This TM evaluates the feasibility of a Class I or Class IV facility along the entire length of the corridor, from Redding to Anderson. Where a Class IV facility is considered, a sidewalk also will be considered.

As shown in Figure 1, a Class I facility is shared amongst bicyclists, pedestrians, and others. It is located outside and adjacent to the roadway and it includes both horizontal and vertical separation from motor vehicle traffic. A Class I facility is known by many names, including a shared use path, multi-use path, and bike path.

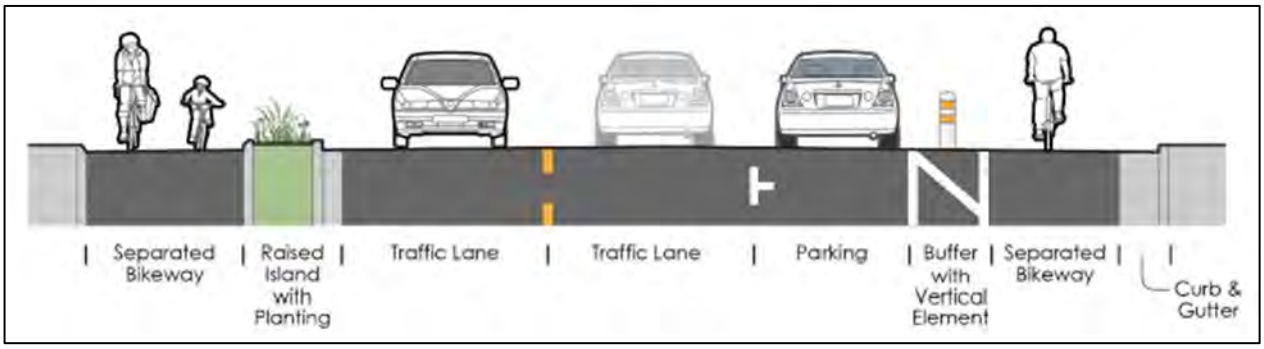
As shown in Figure 2, a Class IV facility is an exclusive facility for bicyclists. It is located within the roadway, and it includes vertical separation from motor vehicle traffic. Vertical separation can include curbs, raised islands with planting, on-street parking, and flex posts. A Class IV facility is known by many names, including a separated bikeway and cycle track.

***Figure 1 Class I Facility***




Source: Caltrans DIB-94

***Figure 2 Class IV Facility***




Source: Caltrans DIB-94

# 3. Existing Conditions

## Caltrans Right-of-Way

To the extent possible, potential projects should be located within the California Department of Transportation (Caltrans) right-of-way (ROW). State Route (SR) 273 is within the Caltrans ROW.

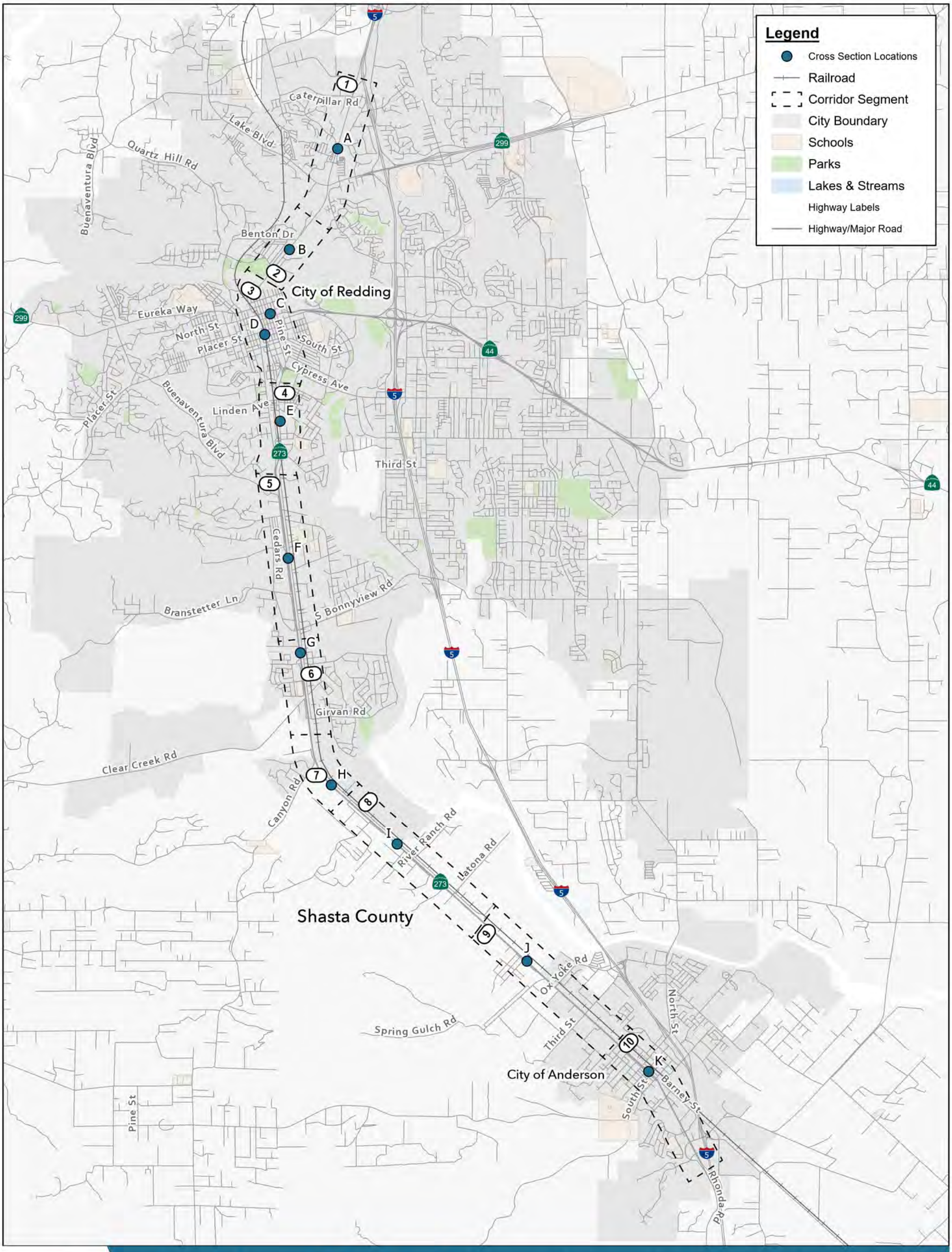
To better understand the Caltrans ROW, representative cross sections were established for the entire length of the corridor (i.e., Segment ID 1 to 10), as described in Table 1 and shown in As detailed in Table 2, the total width of the Caltrans ROW ranges from 77 feet (Cross Section ID C) to 214 feet (Cross Section ID A). In seven of the eleven representative cross sections, there exists unpaved areas outside of the roadway, specifically in the southbound direction, where potential projects could be located.

Figure 3. For Segment ID 3 (Downtown Redding), two representative cross sections were established consistent with the SR 273 one-way couplet (i.e., northbound Pine Street and southbound California Street).

***Table 1 Representative Cross Sections***

| Segment ID | Cross Section ID | Cross Section Location |
|---|---|---|
| 1 | A | N Market Street (SR 273), 0.5 miles north of Lake Boulevard |
| 2 | B | N Market Street (SR 273) between Arboretum Drive and Benton Drive |
| 3 | C | Pine Street (SR 273 NB) between Tehama Street (SR 44 EB) and Shasta Street (SR 44 WB) |
| 3 | D | California Street (SR 273 SB) between Yuba Street and Sacramento Street |
| 4 | E | S Market Street (SR 273) between Grange Street and Ellis Street |
| 5 | F | S Market Street (SR 273) between Kenyon Drive and N Bonnyview Road |
| 6 | G | S Market Street (SR 273), 650 feet north of Westwood Avenue |
| 7 | H | S Market Street (SR 273), 1,000 feet north of Metz Road |
| 8 | I | S Market Street (SR 273), 1,500 feet north of River Ranch Road |
| 9 | J | S Market Street (SR 273), 2,500 feet north of Ox Yoke Road |
| 10 | K | SR 273 between North and South Streets |

As detailed in Table 2, the total width of the Caltrans ROW ranges from 77 feet (Cross Section ID C) to 214 feet (Cross Section ID A). In seven of the eleven representative cross sections, there exists unpaved areas outside of the roadway, specifically in the southbound direction, where potential projects could be located.




# Envision 273: SR 273 Multimodal Corridor Plan

## REPRESENTATIVE CROSS SECTION LOCATIONS

Paper Size ANSI B

0 2,000 4,000 6,000

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Project No. **12560002**
Revision No. **-**
Date **October 2024**

**FIGURE 3**

N:\US\Azure\East\US\12560002\GIS\Maps\Working\12560002_Class_I_IV_Feasibility\12560002_Class_I_IV_Feasibility.aprx - 12560002_003_Representative Cross Section Locations
Print date: 18 Oct 2024 - 12:28

Data source: City of Redding GIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS. Created by: ppeel

*Table 2* *Caltrans Right-of-Way by Representative Cross Section*

| Segment ID | Cross Section ID | Caltrans Right-of-Way | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Outside Roadway | | Within Roadway | | | | | | | | | | | | | | | Outside Roadway | | Total (Ft) |
| | | SB Other (Ft) | SB Sidewalk (Ft) | SB Other (Ft) | SB Right Shoulder [1] (Ft) | SB Parking [1] (Ft) | SB Bike Lane [1] (Ft) | SB Travel Lane 3 (Ft) | SB Travel Lane 2 (Ft) | SB Travel Lane 1 (Ft) | Median, including Turn Lanes and Left Shoulders [1] (Ft) | NB Travel Lane 1 (Ft) | NB Travel Lane 2 (Ft) | NB Travel Lane 3 (Ft) | NB Bike Lane [1] (Ft) | NB Parking [1] (Ft) | NB Right Shoulder [1] (Ft) | NB Other (Ft) | NB Sidewalk (Ft) | NB Other (Ft) [2] | |
| 1 | A | 58 ](unpaved area) | - | - | 12 | - | - | - | 12 | 12 | 38 (28 ft median, 5 ft left shoulder on NB and SB) | 12 | 12 | | - | - | 10 | - | - | 48 (unpaved area) | 214 |
| 2 | B | - | 11 | - | - | 8 | 5 | 12 | 12 | 12 | 30 (26 ft median, 2 ft left shoulder on NB and SB) | 12 | 12 | 12 | 5 | 8 | - | - | 12 | - | 151 |
| 3 | C | - | 10 | - | - | 8 | - | - | - | - | - | 11 | 11 | 11 | 5 | 8 | - | - | 13 | - | 77 |
| 3 | D | - | 12 | - | - | 12 (parking lane or turn lane) | 6 | 12 | 12 | 14 (turn lane or parking lane) | - | - | - | - | - | - | - | - | 12 | - | 80 |
| 4 | E | - | 6 | - | - | - | 7 | - | 12 | 12 | 20 (16 ft median, 2 ft left shoulder on NB and SB) | 12 | 12 | - | 8 | - | - | - | 6 | - | 95 |
| 5 | F | 36 (unpaved area) | - | - | 2 | - | - | - | 12 | 12 | 24 (22 ft median, 2 ft left shoulder on NB and SB) | 12 | 12 | - | - | - | 6 | - | - | - | 118 |
| 6 | G | 33 (unpaved area) | - | - | 8 | - | - | - | 12 | 12 | 28 (24 ft median, 2 ft left shoulder on NB and SB) | 12 | 12 | - | - | - | 8 | - | - | - | 125 |
| 7 | H | 20 (unpaved area) | - | - | 8 | - | - | - | 12 | 12 | 26 (22 ft median, 2 ft left shoulder on NB and SB) | 12 | 12 | - | - | - | 8 | - | - | - | 110 |
| 8 | I | 15 (unpaved area) | - | - | 12 | - | - | - | 12 | 12 | 30 (24 ft median, 3 ft left shoulder on NB and SB) | 12 | 12 | - | - | - | 5 | - | - | - | 103 |
| 9 | J | 20 (unpaved area) | - | - | 6 | - | - | - | 12 | 12 | 32 (24 ft median, 4 ft left shoulder on NB and SB) | 12 | 12 | - | - | - | 6 | - | - | - | 112 |
| 10 | K | 30 (unpaved area) | - | - | 8 | - | - | - | 12 | 12 | 20 ft median | 12 | 12 | - | - | - | 8 | - | - | - | 114 |

[1] See Caltrans Highway Design Manual, Chapter 300 – Geometric Cross Section. For shoulder widths, see Table 302.1 (Boldface Standards for Paved Shoulder Widths on Highways) in Topic 302 – Highway Shoulder Standards. For Class II widths, see section 301.2 of Topic 301 – Traveled Way Standards. Where Class II facilities are present, these may be included as part of the required shoulder width. Where on-street parking is allowed and a Class II facility is present, minimum shoulder width shall be 8 feet where on-street parking is provided plus the minimum required width for the bike lane.
[2] Where the railroad exists adjacent to the northbound travel lanes, 50 feet from the rail line is included in the railroad easement/ROW and is thus not included in the ROW estimates reported here.

## Planned Projects

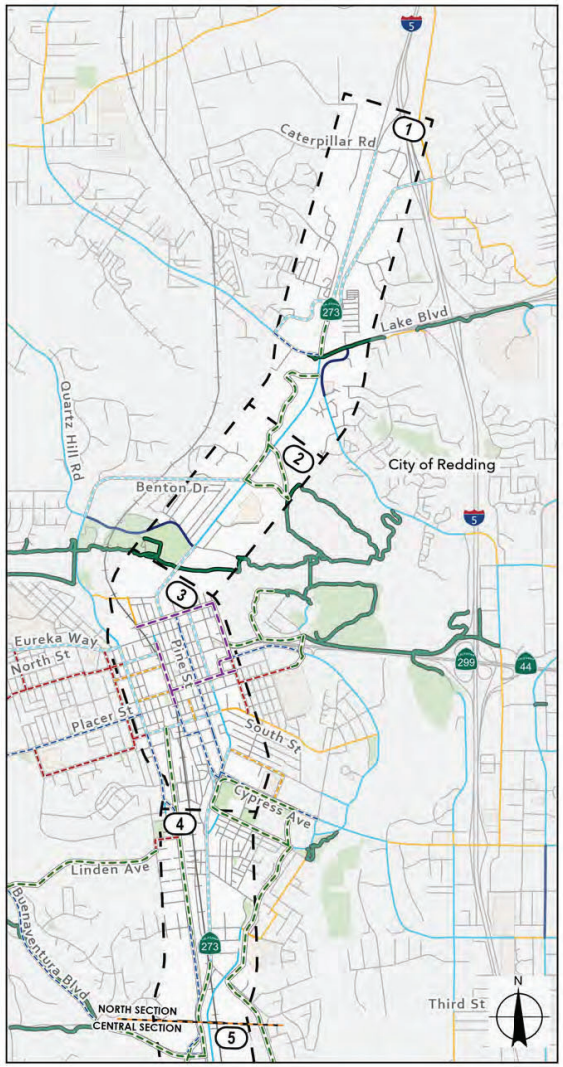
As detailed in the Task 5 TM, there are a number of existing planned projects in or adjacent to the corridor, including a number of bikeways. As shown in Figure 4, these bikeways include Class I and Class IV facilities.

For areas of the corridor with limited to no available Caltrans ROW (see Table 2 of this TM), a Class I or Class IV facility may be considered consistent with Caltrans existing planned projects (i.e., projects that expand or modify the Caltrans ROW). Examples include the following (see Table 2 of the Task 5 TM):

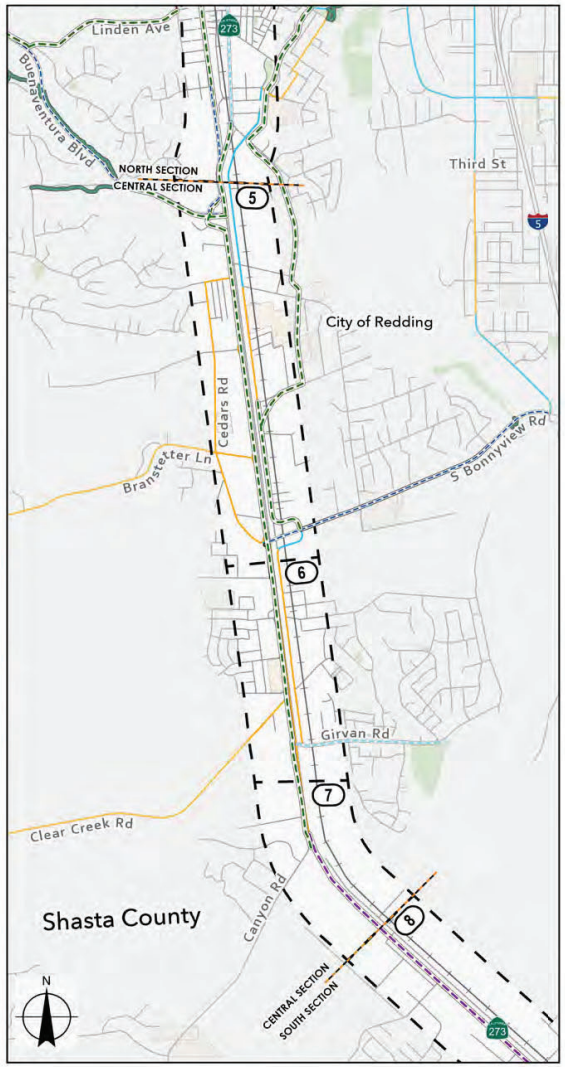
- **Project #114, Multiuse Path: SR 273 (Buenaventura Boulevard to Wyndham Lane)**. Requires repurposing a southbound traffic lane—from a traffic lane to a multiuse path (Class I facility).
- **Project #104, Class I Bike Path: SR 273 (Lake Boulevard to Northpoint Drive)**. Requires cutting into the median and shifting the highway geometry and/or adding retaining walls.

Additionally, a Class I or Class IV facility may be considered consistent with City of Redding or City of Anderson existing planned projects (e.g., on frontage roads, such as Westside Road), with opportunities for partnership and potential project modification evaluated.

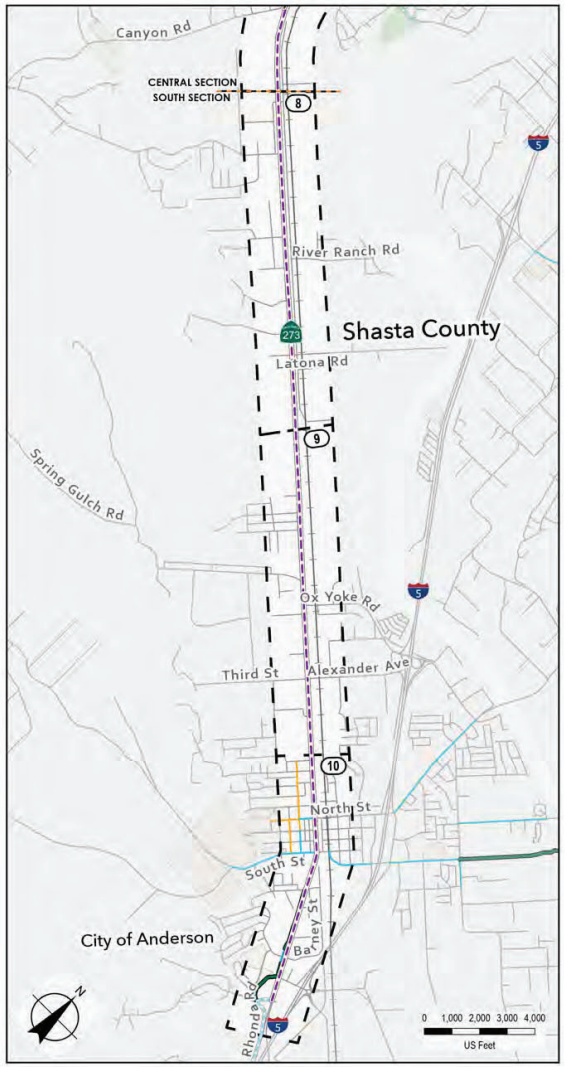
## NORTH SECTION




## CENTRAL SECTION




## SOUTH SECTION




**Legend**

**Planned Bikeway Projects**

*Separated Facilities*
- Class I Shared Use Path
- Class IV Separated Bikeway

*On Street Facilities*
- Class II Buffered Bike Lane
- Class II Bike Lane
- Class III Bike Route
- Class III Bike Blvd

**Existing Bikeways**

*Separated Facilities*
- Class I Shared Use Path
- Pilot Class IV Separated Bikeway

*On Street Facilities*
- Class II Buffered Bicycle Lane
- Class II Bicycle Lane
- Class III Bike Route
- Railroad
- Corridor Segment
- Schools
- Parks
- Lakes & Streams

## LOCATOR MAP

ENVISION 273 MULTIMODAL CORRIDOR PLAN

# Envision 273: SR 273 Multimodal Corridor Plan

## PLANNED BIKEWAY PROJECTS

Paper Size ANSI B

0 875 1,750 2,625 3,500

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD | Caltrans | Shasta Regional Transportation Agency

Project No. 12560002
Revision No. -
Date October 2024

**FIGURE 4**

N:\US\Azure\East\US\12560002\GIS\Maps\Working\12560002_Class_I_IV_Feasibility\12560002_Class_I_IV_Feasibility.aprx - 12560002_004_Corridor Planned Bikeway Projects
Print date: 18 Oct 2021 - 12:29

Data source: City of Redding GIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, City of Redding GIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS. Created by: jgreur

# 4. Guidance

For guidance regarding Class I and Class IV facilities, *Caltrans Design Information Bulletin - 94 Complete Streets: Contextual Design Guidance* (DIB-94) was referenced, as noted in this section.

## Bicycle Facility Type

Section 5.1 (Bicycle Facilities) of Caltrans DIB-94 notes that bicycle facility selection is an important step in creating a connected, convenient, and comfortable bicycle network. Factors to consider include:

- Place type, including Urban Areas, Suburban Areas, and Rural Areas.
- Environment, including unique climate conditions like snow or heat, topography, and landscape.
- Equity, community desires, and identity.
- Physical constraints, including ROW width.
- Average daily traffic (ADT), speed, and volume of users.
- Maintenance considerations.
- Barriers, such as railroads and waterways.

Section 5.1 (Bicycle Facilities) of Caltrans DIB-94 notes that bicycle facility selection should begin by identifying opportunities to provide the most physical separation for bicyclists, with Class I and IV being the first considerations to maximize the benefit of horizonal and vertical separation, whenever feasible. Where constraints do not allow Class I and IV, Class II buffered bike lanes then Class II bike lanes should be considered (in order of priority).

Figure 5-A of Caltrans DIB-94 recommends bicycle facilities by ADT and miles per hour (MPH). Generally, Caltrans DIB-94 recommends Class I or IV where roadways are both at/over 7,000 ADT and at/over 40 MPH.

Caltrans DIB-94 place types (PTs) provide project context and insight into land use, density, and transportation options and issues. PTs help to identify types of modal users, intensity of use, and modal priority for the State Highway System (SHS). The three PTs are Urban Area, Suburban Area, and Rural Area.

Section 5.1.2 (Class I Bike Path) of Caltrans DIB-94 provides Contextual Guidance and Considerations for Class I, noting that, in Urban Areas, Class I may not be a feasible option due to constrained space. Additionally, separated bicycle and pedestrian facilities (e.g., Class IV) are generally more desirable in urban settings because of higher volumes of users.

Section 5.1.5 (Class IV Separated Bikeway) of Caltrans DIB-94 provides Contextual Guidance and Considerations for Class IV. For Urban Areas, this section notes the following:

> *Urban environments generally have lower vehicle speeds yet much higher traffic volumes which makes selecting a Class IV separated bikeway very desirable. On-street parking is commonly allowed in Urban Area place types. In these locations, the parking lane may be used as the vertical separator between the traffic lane and bikeway. Selecting vertical elements with more separation will provide a higher level of perceived safety and comfort thereby encouraging bicyclists of all competencies to utilize the bikeway. If a particular Urban Area already has or is expected to have high volumes of pedestrians and/or commuters, providing this type of Class IV separated bikeway may potentially help relieve congested pedestrian traffic.*

Section 3.2.2 (Modal Priority in Rural Areas) of Caltrans DIB-94 notes the following:

> *Rural Areas can be particularly challenging locations to incorporate Complete Streets facilities… Along these corridors, consider providing a bicycle and pedestrian facility separate from the roadway and shoulder. Often, this will consist of a Class I bikeway along one side of the highway.*

## Bicycle Facility Design

Section 5.0 (Roadway Cross Section Development) of Caltrans DIB-94 provides guidance for the design of roadways that serve all users, with standards that are reflective of a constrained highway environment. Caltrans DIB-94 provides standard Class I and Class IV widths, as summarized in Table 3.

*Table 3 Caltrans DIB-94 Class I and Class IV Widths*

| Bicycle Facility Type | Bicycle Facility Placement | Bicycle Facility Width | | |
|---|---|---|---|---|
| | | Minimum (ft) | Preferred (ft) | Practical Maximum (ft) |
| **Class I** | One Way | 6-7 | 7 | 8 |
| | Two Way | 10-12 | 10-12 | 12-15 |
| | On structures between railings and in tunnels (one or two way) | 10-14 | 10-14 | 15 |
| | At sidewalk level | 12-16 | 12-16 | 20 |
| **Class IV (One Way) *** | Between curbs if a raised island is the separation | 6-9 | 7-9 | 10 |
| | Between curb and buffer | 5-8 | 6-8 | 9** |
| | Between curb and parking buffer | 5-8 | 6-8 | 9** |
| | Between edge of pavement and buffer, curb, or parking buffer | 4-7 | 5-7 | 8** |
| | Between through traffic lane and right turn lane | 4-7 | 5-7 | 8 |
| **Class IV (Two Way) *** | Between curb | 10-14 | 12-14 | 16 |
| | Between curb and buffer | 9-12 | 10-12 | 14** |
| | Between curb and parking buffer | 9-14 | 10-14 | 16** |
| | Between edge of pavement and buffer, curb, or parking buffer | 8-11 | 9-11 | 14** |

Source: Caltrans DIB-94

* Widths are exclusive of the gutter.

** If additional pavement width is available, consider a wider traveled way for high bicycle volumes (above 400 in the peak hour) or wider buffer or parking separation width for average bicycle volumes (below 400 in the peak hour).

Note: For horizontal buffer and vertical separation guidance, refer to Caltrans DIB-89.

# 5. Alternatives

To determine whether a Class I or Class IV facility should be evaluated, a three-step alternatives development process was used, as described below.

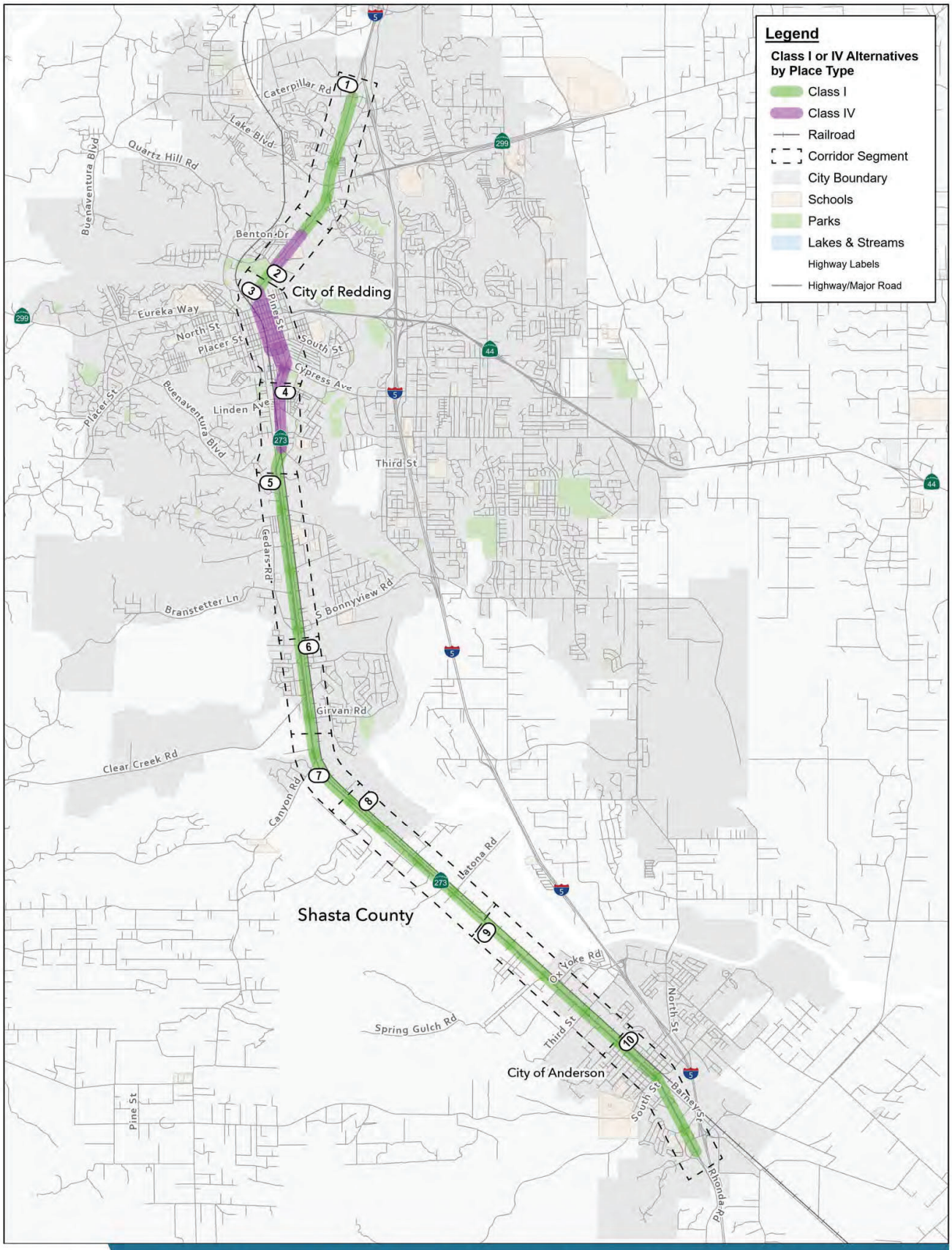
– Step 1. Applying Caltrans DIB-94 (see Section 4), corridor PTs were overlayed on corridor segments, with Class IV selected for Urban Areas and Suburban Areas and Class I selected for Rural Areas. Bridges are not PTs, but can be considered transitional areas; therefore, Class I was selected for bridges. Corridor PTs are presented in the *Existing Conditions Report* and detailed in Table 4.
– Step 2. Caltrans existing planned projects (see Table 2 of the Task 5 TM) were considered, adjusting bicycle facility type, as appropriate. *Note: For PT IDs 5 and 6 (Downtown Redding), where the SR 273 one-way couplets exist, Class IV is planned for Southbound SR 273/California Street and Class II is planned for Northbound SR 273/Pine Street.*
– Step 3. Physical constraints and barriers were considered, adjusting bicycle facility type, as appropriate. Mostly, the portion of the corridor immediately adjacent to the railroad (i.e., Segment IDs 4 to 10) was considered. In this area, due to the railroad easement/ROW, very limited Caltrans ROW exists outside of the roadway adjacent to the northbound travel lanes. PT IDs 10-12 were adjusted from Class IV to Class I, establishing consistency with adjacent PTs. Also, a small portion of PT ID 12 features an existing Class I.

The Class I and IV alternatives selected for evaluation are listed in Table 4 (see Step 3 column) and shown in Figure 5.

*Table 4 Alternatives Development Process*

| Segment ID | Place Type (PT) | | | DIB-94 PT Designation | Alternative | | |
|---|---|---|---|---|---|---|---|
| | PT ID | From | To | | Step 1 | Step 2 | Step 3 |
| 1 | 1 | Caterpillar Rd | Twin View Blvd | Rural Area | Class I | ***Class II*** | ***Class I*** |
| 1 | 2 | Twin View Blvd | s/o Lake Blvd | Suburban Area | Class IV | ***Class I*** | Class I |
| 1/2 | 3 | s/o Lake Blvd | Sulphur Creek Rd | Rural Area | Class I | | Class I |
| 2 | 4 | Sulphur Creek Rd | Quartz Hill Rd | Suburban Area | Class IV | | Class IV |
| 2/3 | - | Quartz Hill Rd | Riverside Dr | N/A (Bridge) | Class I | | Class I |
| 3 | 5 | Riverside Dr | Gold St | Urban Area | Class IV | ***Class IV; Class II*** | ***Class IV*** |
| 3 | 6 | Gold St | Cypress Ave | Urban Area | Class IV | ***Class IV; Class II*** | ***Class IV*** |
| 3/4 | 7 | Cypress Ave | California St/ Angelo Ave | Suburban Area | Class IV | | Class IV |
| 4 | 8 | California St/ Angelo Ave | Wyndham Ln | Suburban Area | Class IV | | Class IV |
| 4/5 | 9 | Wyndham Ln | Breslauer Way | Rural Area | Class I | Class I | Class I |
| 5 | 10 | Breslauer Way | N Bonnyview Rd | Suburban Area | Class IV | | ***Class I*** |
| 5 | 11 | N Bonnyview Rd | Bonnyview Rd | Suburban Area | Class IV | | ***Class I*** |
| 6 | 12 | Bonnyview Rd | Girvan Rd | Suburban Area | Class IV | | ***Class I*** |
| 6/7 | - | Girvan Rd | n/o Canyon Rd | N/A (Bridge) | Class I | | Class I |
| 7 | 13 | n/o Canyon Rd | n/o Happy Valley Rd | Rural Area | Class I | | Class I |
| 8 | 14 | n/o Happy Valley Rd | Latona Rd | Rural Area | Class I | | Class I |
| 8 | 15 | Latona Rd | Rona Ln | Rural Area | Class I | | Class I |
| 9 | 16 | Rona Ln | Briggs St | Rural Area | Class I | | Class I |
| 10 | 17 | Briggs St | South St | Rural Area | Class I | | Class I |
| 10 | 18 | South St | Pinon Ave | Rural Area | Class I | | Class I |
| 10 | 19 | Pinon Ave | Pleasant Hills Dr | Rural Area | Class I | | Class I |

Notes:
- Italic bold text indicates modified facility type (i.e., modified from prior step(s)).




# Envision 273: SR 273 Multimodal Corridor Plan

## CLASS I OR IV ALTERNATIVES BY PLACE TYPE

Paper Size ANSI B

0 2,000 4,000 6,000

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

Project No. 12560002
Revision No. -
Date October 2024

FIGURE 5

N:\US\Azure\East\US\12560002\GIS\Maps\Working\12560002_Class_I_IV_Feasibility\12560002_Class_I_IV_Feasibility.aprx - 12560002_005_Class I or IV Alternatives by Place Type
Print date: 18 Oct 2024 - 12:29

Data source: City of Redding GIS; California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS. Created by: pgeel.

# 6. Evaluation of Alternatives

This section provides a planning-level evaluation of the Class I and IV alternatives.

The evaluation assesses the feasibility of adding the Class I or IV facilities, within the Caltrans ROW (i.e., at the representative cross section locations), following Caltrans guidance (e.g., bicycle facility widths), as described in previous sections of this TM.

*The cross sections presented in this TM illustrate our understanding of the available Caltrans ROW. It is assumed that further study would entail more detailed analysis (e.g., confirmation of the Caltrans ROW).*

## Segment 1

### *Cross Section ID A*

The Caltrans Downtown Redding CAPM Project Initiation Report (PIR) proposes a Class II Buffered Bike Lane from Northpoint Drive to Caterpillar Drive. The PIR notes that this would require additional minor concrete/sidewalk repair for widening the existing highway and installing buffered striping for bike lanes.

Alternatively, as shown in Figure 6, an 8-foot Class I facility could be accommodated within the existing Caltrans ROW on the west side of the roadway. However, the existing Boulder Creek culvert (near Sweetgum Trail/Redwood Boulevard), as well as other grade issues, would require accommodation and additional study/design. The Class I facility could be accommodated within the landscaped area on either side of the roadway; however, for consistency with Caltrans existing planned projects (i.e., Project #104, Class I from Lake Boulevard to Northpoint Drive), west side of the roadway is presented.

## Segment 2

### *Cross Section ID B*

As shown in Figure 7, an 8-foot directional Class IV facility could be accommodated within the existing Caltrans ROW on each side of the roadway. To accommodate these facilities, the through lanes would need to be reduced from three to two lanes per direction. In each direction, parking lanes would remain, doubling as shoulders to satisfy shoulder requirements for state highways, and sidewalks would remain. The wide median would remain, contributing to a pedestrian-scale environment that is comfortable for users of all ages and abilities.

This cross section is considered feasible between Benton Drive and Quartz Hill Road. South of Quartz Hill Road, the cross section begins to narrow as the roadway approaches the N. Market Street bridge over the Sacramento River.

## Segment 3

### *Cross Section ID C*

The Caltrans Downtown Redding CAPM PIR proposes a Class II Buffered Bike Lane on Pine Street from Cypress Avenue to Eureka Way. The PIR notes that this would be accommodated by removing a lane or eliminating on-street parking.

Figure 8 shows the Class II facility, accommodated by removing an 11-foot lane. Alternatively, a directional Class IV facility could be accommodated by removing both a lane and on-street parking. Along this portion of the corridor, SR 273 is a one-way couplet, with Pine Street being one-way northbound.

### *Cross Section ID D*

At the time this TM, construction of a bi-directional Class IV facility on California Street from Division Street to Yuba Street is expected Fall 2024. The 2018 City of Reddig Active Transportation Plan (ATP) proposes to

extend the Class IV facility on California Street from Yuba Street to Placer Street. The 2018 City of Redding ATP also proposes a Class II Buffered Bike Lane on California Street from Placer Street to Cypress Avenue. For continuity, a bi-directional Class IV facility was evaluated for Cross Section ID D.

As shown in Figure 9, a 10-foot bi-directional Class IV facility could be accommodated within the existing Caltrans ROW. This would require removing on-street parking on the west side of the roadway. Along this portion of the corridor, SR 273 is a one-way couplet, with California Street being one-way southbound.

## Segment 4

### *Cross Section ID E*

As shown in Figure 10, a 7-foot directional Class IV facility, as well as a sidewalk, could be accommodated within the existing Caltrans ROW on each side of the roadway. This would require reducing lane widths from 12 feet to 11 feet and the median width from 16 feet to 14 feet.

## Segment 5

### *Cross Section ID F*

As shown in Figure 11, a 10-foot Class I facility could be accommodated within the existing Caltrans ROW on the west side of the roadway (i.e., to avoid the railroad easement/ROW on the east side of the roadway). As noted in Table 2, within the Caltrans ROW, available space exists outside of the roadway (approximately 36 feet). As the potential project could be accommodated within this available space, roadway width or geometry changes were not evaluated. However, as shown in the figure, by using the available space outside of the roadway, the southbound shoulder could be increased from existing 2 feet to 8 feet.

This cross section is considered feasible for Segment 5. However, at several locations along the segment, there are culverts or bridges over waterways, including at Canyon Creek, Oregon Gulch, Anderson-Cottonwood Canal, and Olney Creek. Implementation of a Class I facility at these locations would require additional study/design, including potential coordination with the City of Redding for utilization of available space east of Westside Road and accommodation of culverts, bridges, and other grade issues.

## Segment 6

### *Cross Section ID G*

As shown in Figure 12, a 10-foot Class I facility could be accommodated within the existing Caltrans ROW on the west side of the roadway (i.e., to avoid the railroad easement/ROW on the east side of the roadway). As noted in Table 2, within the Caltrans ROW, available space exists outside of the roadway (approximately 33 feet). As the potential project could be accommodated within this available space, roadway width or geometry changes were not evaluated.

This cross section is considered feasible for Segment 6. Implementation of a Class I facility at these locations would require additional study/design, including potential coordination with the City of Redding for utilization of available space east of Westside Road and accommodation of culverts, bridges, and other grade issues.

## Segment 7

### *Cross Section ID H*

As shown in Figure 13, a 10-foot Class I facility could be accommodated within the existing Caltrans ROW on the west side of the roadway (i.e., to avoid the railroad easement/ROW on the east side of the roadway). As noted in Table 2, within the Caltrans ROW, available space exists outside of the roadway (approximately 20 feet) and in the median (approximately 22 feet). To accommodate the Class I facility, the median would be reduced from 22 feet to 18 feet.

Although this cross section is considered feasible for the majority of Segment 7, immediately north of Cross Section ID H, there are bridges over waterways (e.g., Clear Creek) and constrained sloped areas (e.g., approximately 620 feet south of Canyon Road) that would require roadway widening to accommodate a Class I facility.

## Segment 8

### *Cross Section ID I*

As shown in Figure 14, a 10-foot Class I facility could be accommodated within the existing Caltrans ROW on the west side of the roadway (i.e., to avoid the railroad easement/ROW on the east side of the roadway). As noted in Table 2, available space exists outside the roadway (approximately 15 feet) and in the median (approximately 24 feet). To accommodate the Class I facility, the median would be reduced from 24 feet to 14 feet. Also, shoulders would be modified in both directions of travel (to 8 feet), from existing 5 feet in northbound direction and 12 feet in southbound direction.

## Segment 9

### *Cross Section ID J*

As shown in Figure 15, a 10-foot Class I facility could be accommodated within the existing Caltrans ROW on the west side of the roadway (i.e., to avoid the railroad easement/ROW on the east side of the roadway). As noted in Table 2, available space exists outside the roadway (approximately 20 feet) and in the median (approximately 24 feet). To accommodate the Class I facility, the median would be reduced from 24 feet to 20 feet. Also, shoulders would be modified in both directions of travel (to 8 feet), from existing 6 feet in northbound direction and 6 feet in southbound direction.

## Segment 10

### *Cross Section ID K*

As shown in Figure 16, a 10-foot Class I facility could be accommodated within the existing Caltrans ROW on the west side of the roadway (i.e., to avoid the railroad easement/ROW on the east side of the roadway). As noted in Table 2, available space exists outside the roadway (approximately 30 feet) and in the median (approximately 20 feet). To accommodate the Class I facility, the median would be reduced from 20 feet to 16 feet. Also, shoulders would be modified in both directions of travel (to 8 feet), from existing 6 feet in northbound direction and 6 feet in southbound direction.

*Figure 6* *Cross Section ID A*

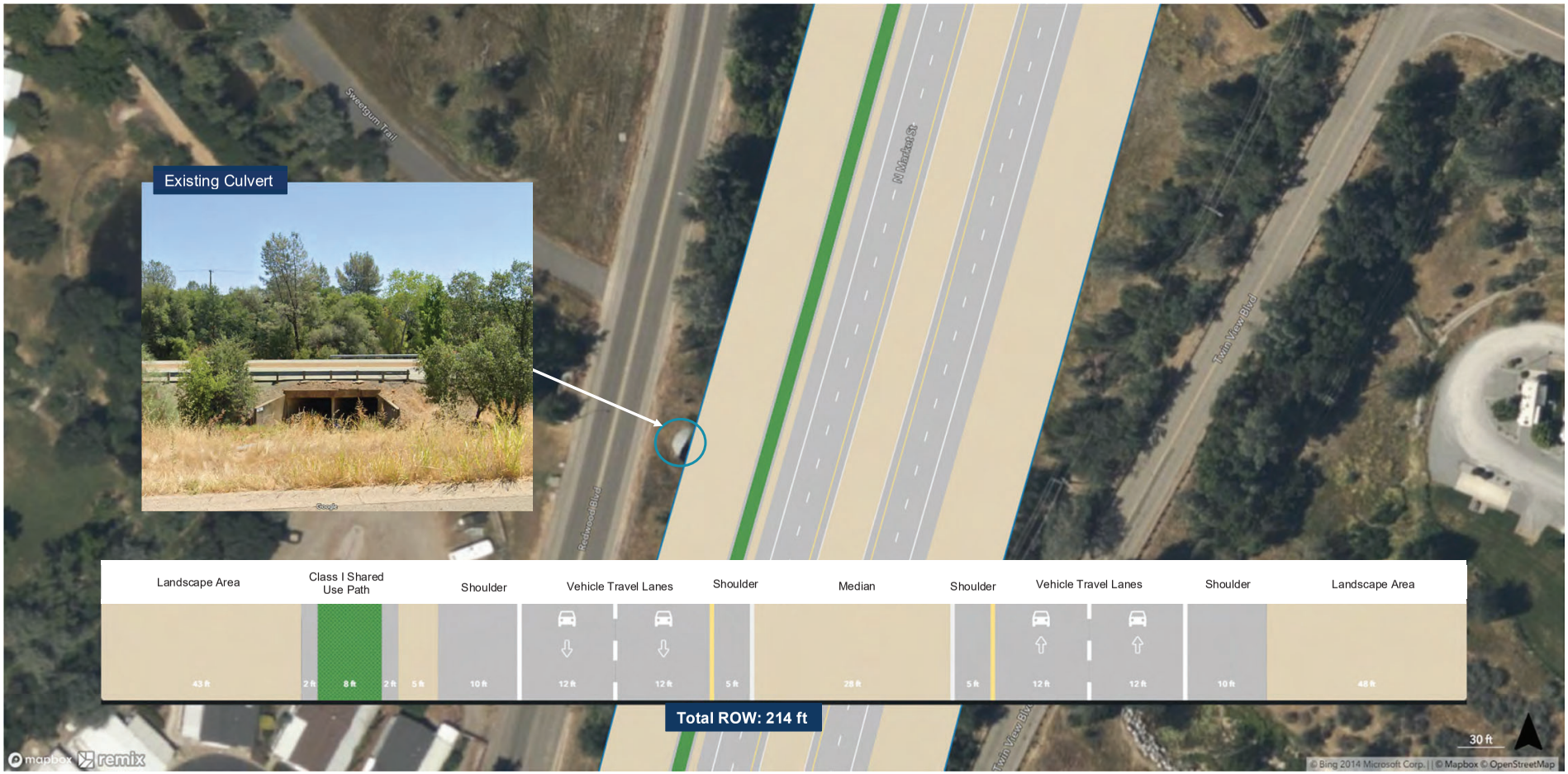


*Figure 7* *Cross Section ID B*

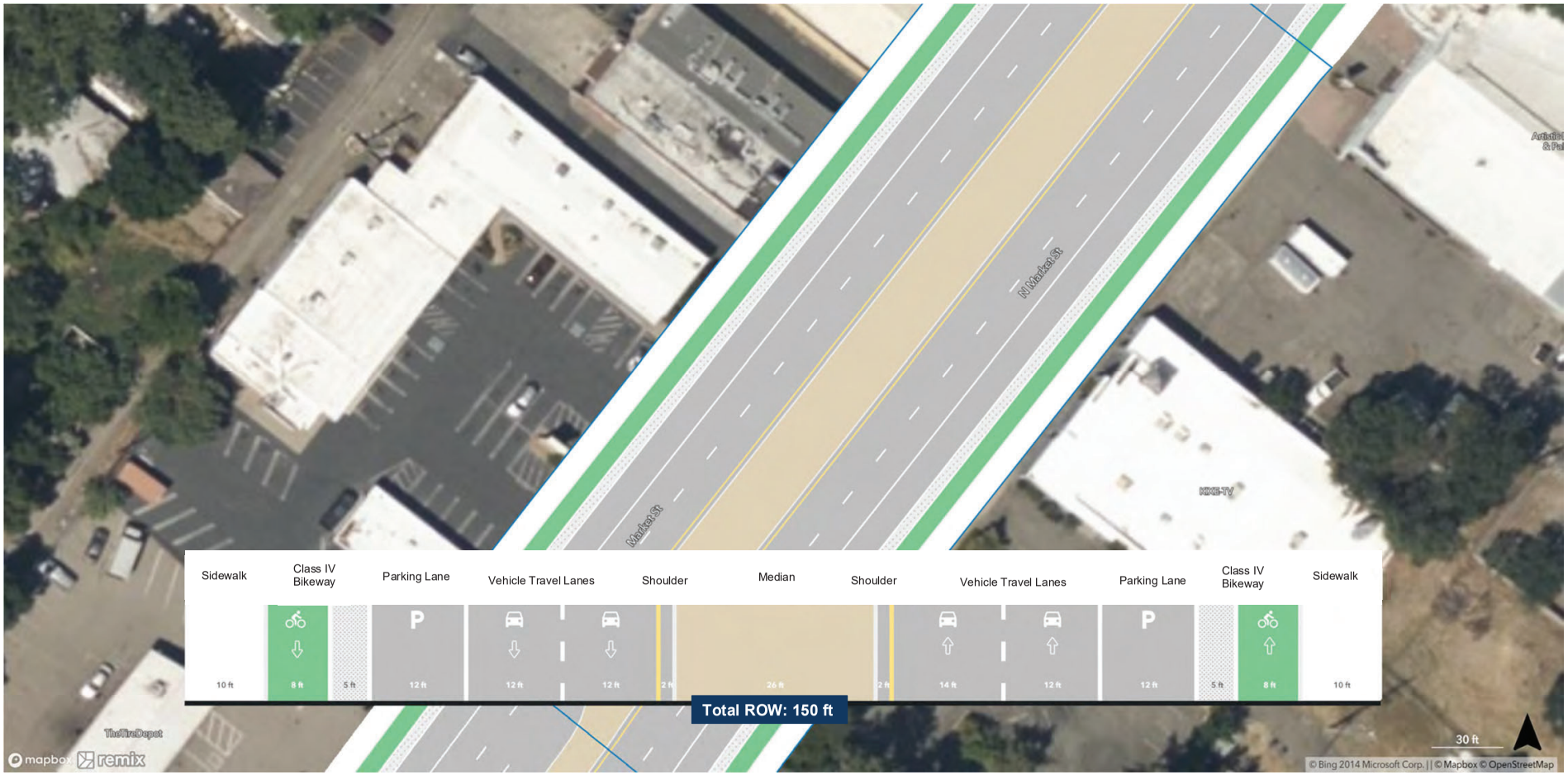


*Figure 8* *Cross Section ID C*

*Figure 9* *Cross Section ID D*

*Figure 10* *Cross Section ID E*

*Figure 11* *Cross Section ID F*

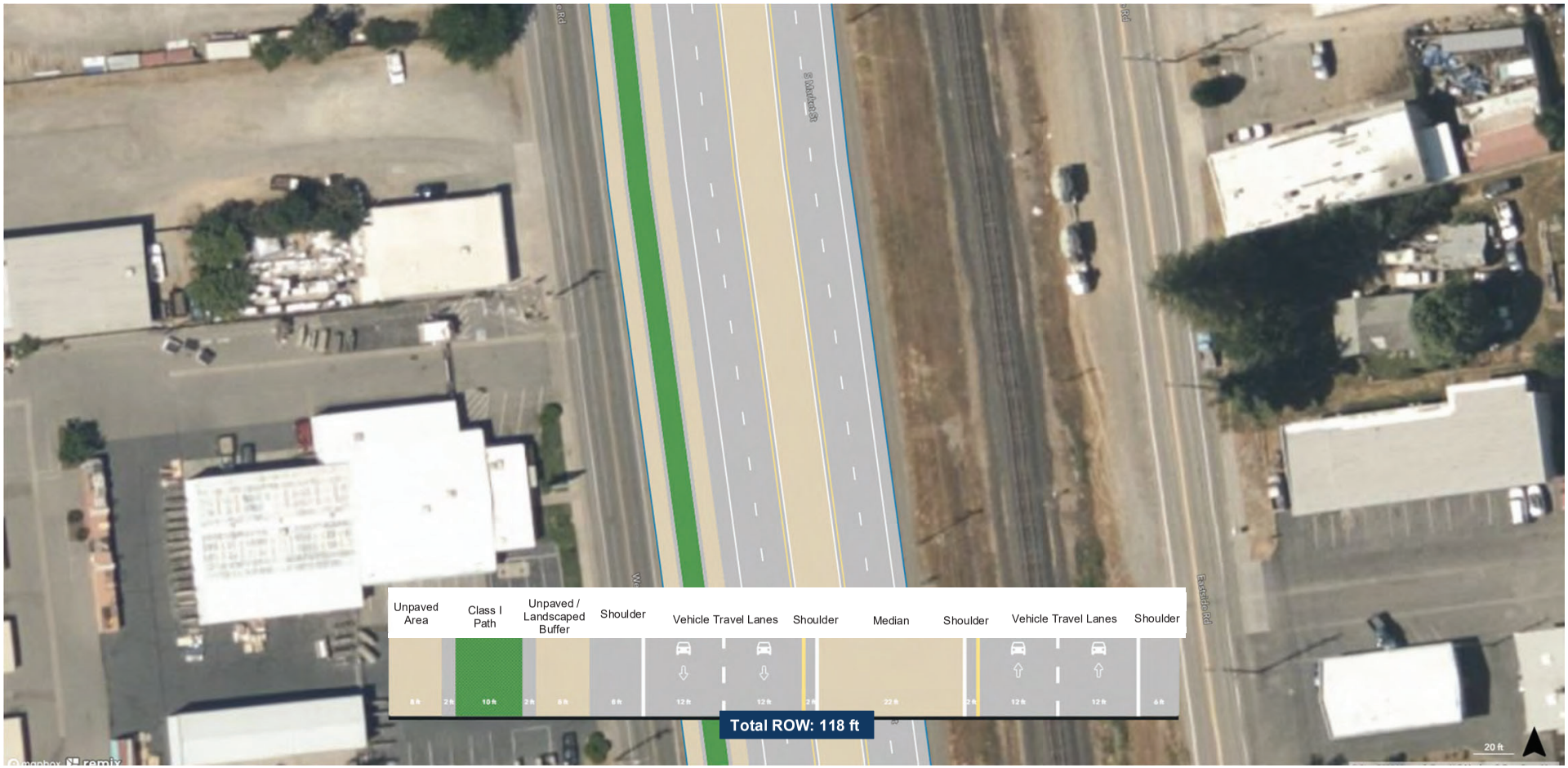


*Figure 12* *Cross Section ID G*

*Figure 13* *Cross Section ID H*

*Figure 14* *Cross Section ID I*

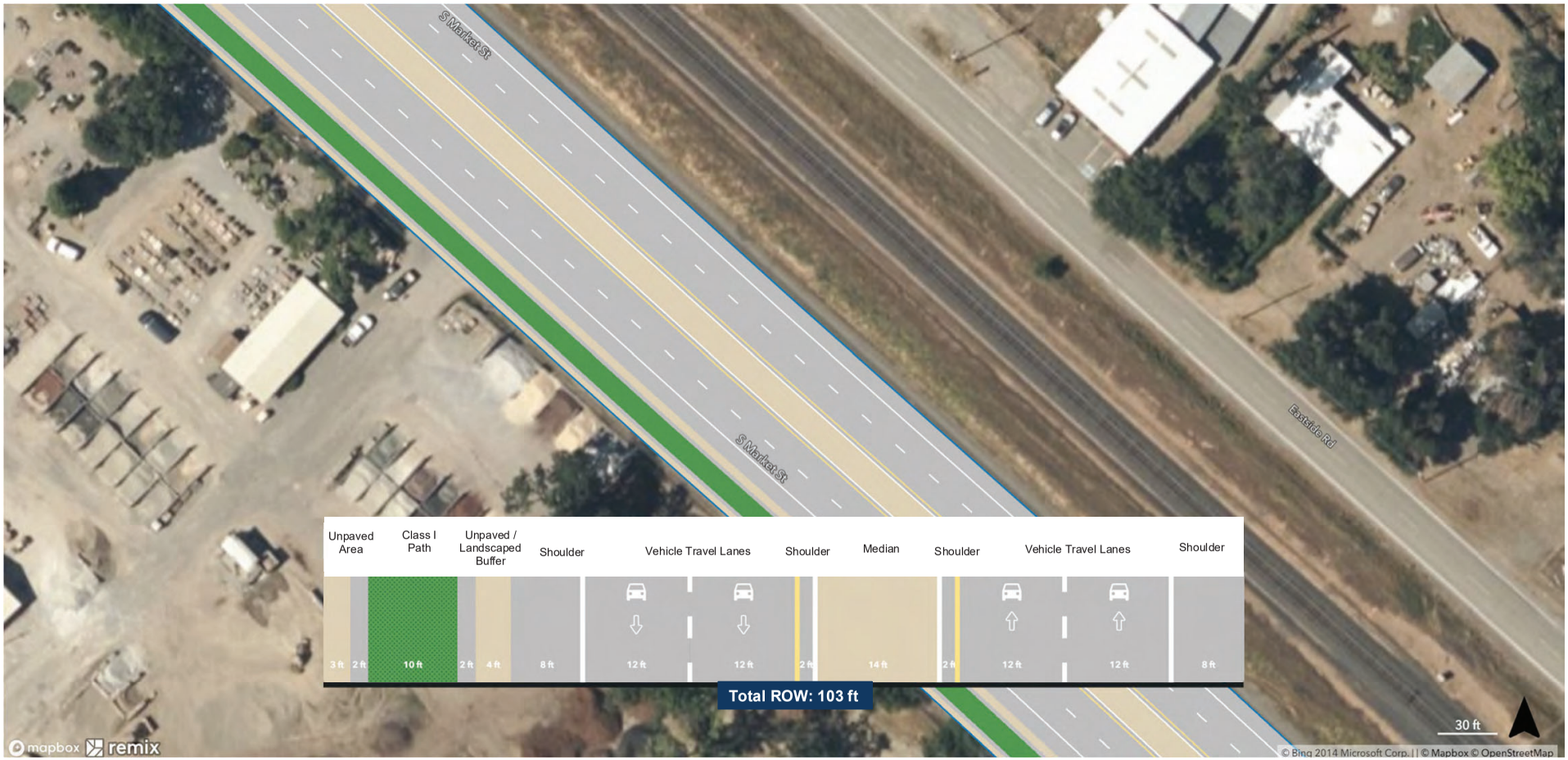


*Figure 15* *Cross Section ID J*

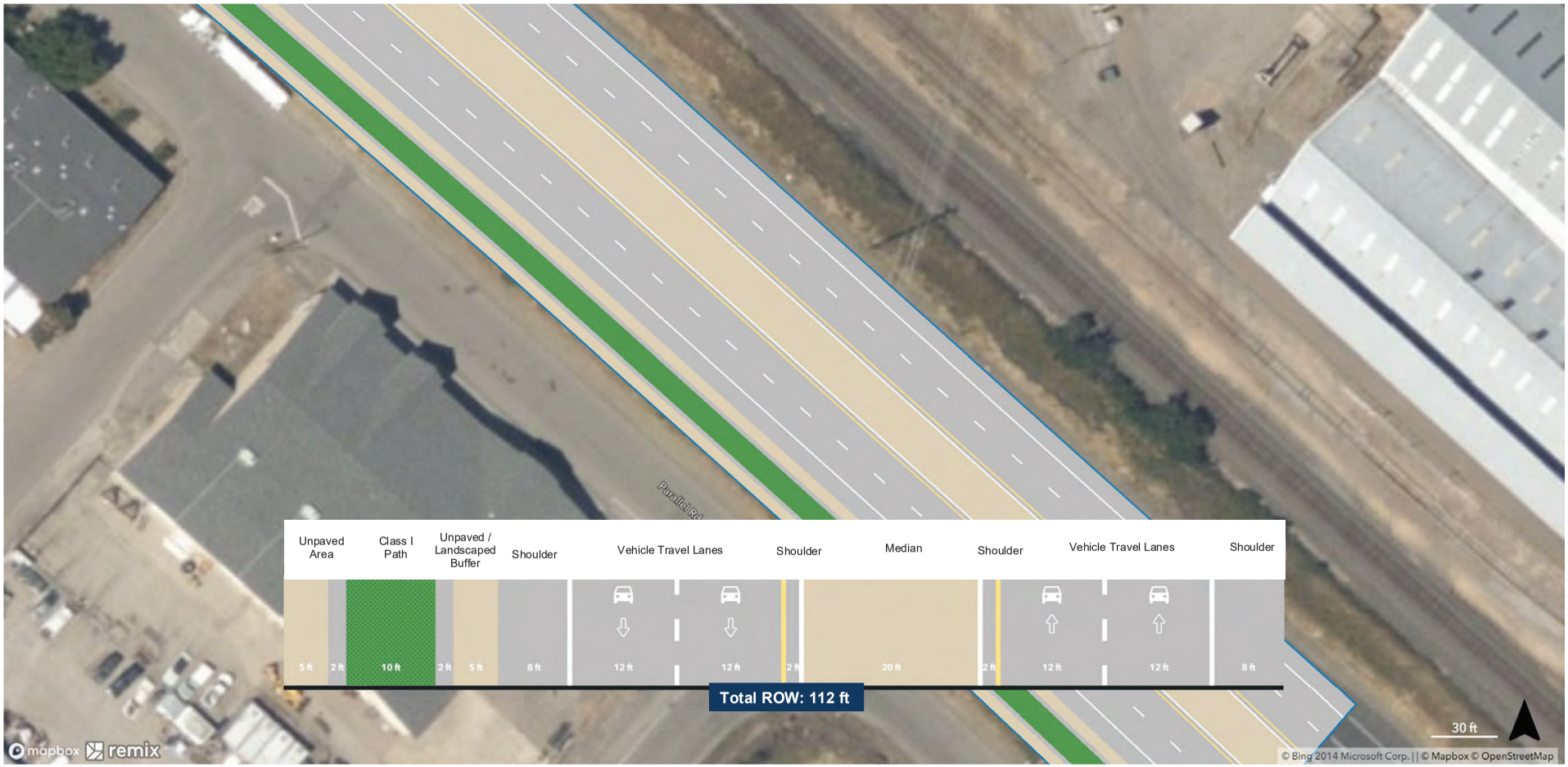
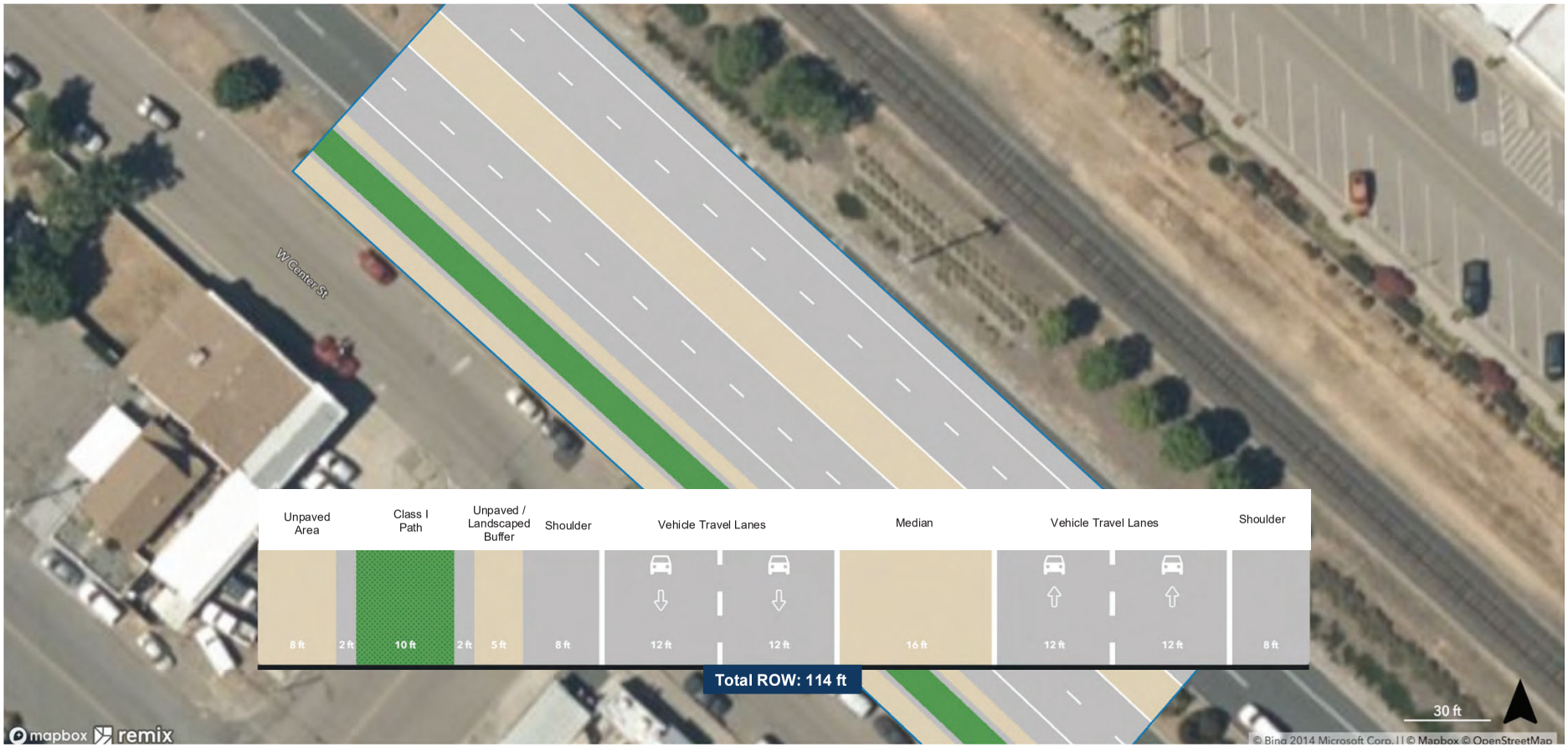


*Figure 16* *Cross Section ID K*



# 7. Summary

As evaluated this TM, which provides a planning-level feasibility analysis, Class I and IV facilities could be accommodated along the entire length of the corridor within the Caltrans ROW. Whereas Class IV facilities are best suited for the urbanized areas of the City of Redding, Class I facilities are best suited for other areas of the corridor. As noted in Table 2 of this TM, in six of ten corridor segments, available space exists outside of the roadway (i.e., 15 to 58 feet on the west side of the roadway), where potential projects could be located.

This TM evaluated representative cross section locations. Further study/design is needed to confirm ROW, address bridges and culverts, grade issues, and other issues.

## Corridor Performance Improvements

It is anticipated that Class I/Class IV projects along the entire length of the corridor (Segments 1 to 10) would improve all performance measure categories, as indicated in Table 5 and summarized below.

– Mobility & Connectivity. Pedestrian mobility and connectivity would be improved by adding pedestrian facilities (i.e., Class I or sidewalks), where pedestrian facilities currently do not exist. Bicycle and pedestrian level of traffic stress would be reduced, as safer and separated facilities would be provided. Also, walking and bicycling mode share could increase with the availability of walking and bicycling facilities (e.g., where such facilities currently do not exist).
– Operations and Reliability. With a potential walking and bicycling mode share shift (i.e., from vehicles to walking or bicycling), vehicle miles traveled and vehicular congestion would decrease.
– Safety. With safer and separated walking and bicycling facilities, bicycle and pedestrian collisions could be reduced.

*Table 5 FS #4 Corridor Performance Improvements*

| Performance Measure | Segment | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Mobility & Connectivity | X | X | X | X | X | X | X | X | X | X |
| Operations & Reliability | X | X | X | X | X | X | X | X | X | X |
| Safety | X | X | X | X | X | X | X | X | X | X |

# Technical Memorandum

**November 7, 2024**

| | | | |
|---|---|---|---|
| **To** | Michael Kuker, SRTA;<br>Laurent Beauregard, SRTA | **Contact No.** | |
| **Copy to** | Natalie Kinney, Caltrans;<br>Aaron Casas, Caltrans;<br>Christina Prosperi, Caltrans;<br>Sergio Amezquita, Caltrans; | **Email** | Todd.tregenza@ghd.com |
| **From** | Todd Tregenza, GHD | **Project No.** | 12560002 |
| **Project Name** | Envision 273 Comprehensive Multimodal Corridor Plan | | |
| **Subject** | Task 6 Technical Memorandum: Feasibility Study #5 (Shasta County (SR 273/Whitehouse Drive) Grade Crossing Relocation) | | |

## 1. Introduction

The Task 6 Technical Memorandums (TMs) will evaluate potential projects that may support corridor solutions, as described in the Task 5 TM.

Each Task 6 TM presents the feasibility of a potential project or group of projects. Task 6 includes six feasibility studies (FSs):

1. One-way Couplet Reversion
2. Cypress Avenue Roundabout
3. Downtown Redding Gateways
4. Class I/IV from Redding to Anderson
5. Shasta County (SR 273/Whitehouse Drive) Grade Crossing Relocation
6. Redding (SR 273/Breslauer Way) Grade Crossing Relocation

This TM presents *FS #5: Shasta County (SR 273/Whitehouse Drive) Grade Crossing Relocation.*

The TMs will be combined or summarized in the draft/final report, as appropriate.

# 2. Scope

This TM evaluates the feasibility of relocating a grade crossing in Shasta County, from Whitehouse Drive (existing at-grade crossing) to Happy Valley Road (proposed new at-grade crossing).

As shown in Figure 1, the existing at-grade crossing is located immediately east of the State Route (SR) 273/Whitehouse Drive Intersection and immediately west of the Eastside Road/Whitehouse Drive Intersection. There are four parallel transportation facilities in the vicinity of the existing at-grade crossing—Whitehouse Drive, SR 273, the Union Pacific (UP) Railroad, and Eastside Road—all within a constrained area (approximately 400 feet). Additionally, the Anderson-Cottonwood Irrigation District (ACID) Canal is located between Whitehouse Drive and SR 273. At the existing at-grade crossing, there are no pedestrian facilities (i.e., sidewalks) and no bicycle facilities.

The grade crossing relocation could promote safety and reduce crash rates, including pedestrian/bicyclist fatalities due to vehicle and train collisions.

***Figure 1 Existing At-Grade Crossing: Whitehouse Drive***

# 3. Guidance

For projects involving UP Railroad property, the *2021 Union Pacific Railroad Public Projects Manual* (Manual) was referenced, as noted in this section.

## Disclaimers

The Manual is intended to be used as reference only to instruct and guide communities, highway agencies, and other authorities, industries, or private entities, referred to as Applicants, in progressing their public projects prior to initiating contact with the UP Public Projects Team. A public project is defined as any roadway, bridge, commercial development, parallel corridor, or utility project that is owned or used by the public or by a private entity and that encroaches within UP Railroad property.

The Manual includes the following disclaimer:

> *This Union Pacific Railroad Public Projects Manual should not be considered an all-inclusive reference document; rather, it is intended to be a guidance document used as a general resource. Nothing identified in this Union Pacific Railroad Public Projects Manual can be taken as authority to construct on or near the Union Pacific Railroad property. This manual is provided for reference only and is subject to revision without notice.*

Additionally, the Manual notes that all new public projects shall be designed in accordance with the most current UP policies, requirements, and standards.

## Grade Crossings

Section 4 (Grade Crossings) of the Manual defines a grade crossing as any public or private roadway that is within UP Railroad property and crosses the UP Railroad track. The section describes various types of grade crossing projects, including crossing surface (planking) or pavement replacements, roadway widening or reconstruction, new grade crossings, temporary grade crossings grade crossing closures, and conversions from private crossings to public crossings.

For roadway widening or reconstruction, which may require geometric modifications, the Manual lists important items to consider when designing the grade crossing. One such item is as follows: “A major roadway reconfiguration or change in use will be reviewed as a new crossing by UP.”

For new crossings, the Manual states that UP, other railroads, the U.S. Department of Transportation (USDOT), and most states encourage communities to carefully consider all alternatives, including grade separations, as opposed to requests to create new at-grade crossings. The cost of grade separation projects should not outweigh the enhanced safety they would provide to the public. Every effort must be made to obtain alternative access using grade separations, parallel or other roads leading to existing crossings, and access from other directions. UP endorses the Federal Highway Administration (FHWA) goal of reducing the number of grade crossings per 23 Code of Federal Regulations 646.214(c) and the Manual on Uniform Traffic Control Devices (MUTCD) Section 8A.05. Proposals for establishing a new at-grade crossing shall identify three or more existing crossings for closure for each proposed new crossing. The crossings identified shall have the same characteristics as the proposed new at-grade crossing (i.e., similar average daily traffic / train counts, etc.). In addition, there may be specific engineering or rail operation considerations that would prevent the establishment of a new crossing. UP policy is not to permit private or public parallel roadways within the UP Railroad right-of-way (see Section 7 of the Manual). UP believes that the safest crossing is no crossing.

As noted in Section 4.4 of the Manual, UP endorses the USDOT/FHWA/Federal Railroad Administration (FRA) goal of reducing the number of at-grade crossings through consolidation, elimination, grade separation, and restriction of the number of new crossings installed. UP may participate in funding for crossing closures and consolidation.

## Sidewalks and Pathways

Section 6 (Sidewalks and Pathways) of the Manual discusses sidewalks and bicycle/pedestrian pathways.

For sidewalks, only sidewalk grade crossings immediately adjacent to an existing public highway-rail grade crossing equipped with an active grade crossing warning system will be considered. If a sidewalk is 25 feet or more away from the edge of travelled way of the roadway, it is considered a separate crossing. The Manual notes that warning device placement should be designed per the MUTCD, with the exception of sidewalks (as noted in Section 6.1 of the Manual). The Manual also provides design guidance in Appendix E (Guidance for Sidewalk Improvements).

For bicycle/pedestrian pathways, the Manual notes that UP does not allow new at-grade pathway grade crossings. Similar to sidewalks, the addition of a bicycle lane or separate pedestrian pathway should be reviewed for inclusion only if immediately adjacent to an existing public highway-rail grade crossing.

UP does not and will not permit any multi-use or recreational pathways to either cross the railroad tracks or be located within the UP Railroad right-of-way.

## Parallel Roadways

Section 7 (Parallel Corridor and Other Projects) of the Manual discusses Applicant projects on or adjacent to the UP Railroad, including parallel roadways. In the interest of public safety, parallel roadways shall be located off the UP Railroad right-of-way. Parallel roads involving intersections with existing or proposed roadways, where grade crossings are present, should be aligned to provide sufficient distance from the grade crossing for the largest vehicle (Design Vehicle) permitted to use the road. The Design Vehicle shall be able to stop between the railroad and the parallel road traffic control signs, markings, and other traffic control devices without interfering with railroad operations, obstructing or preventing the operation of traffic control devices, or obstructing the grade crossing in any manner.

## Grade Crossing Plan Sheet

Appendix F (Sample Grade Crossing Plan Sheet Rural) of the Manual provides a roadway grade crossing example, including crossing detail with dimensions of lanes, curb types, medians, sidewalk, right-of-way, track centers, warning devices, and other features.

# 4. Existing Conditions

This section presents the existing conditions of the existing and proposed new at-grade crossings, specifically, the traffic characteristics requested by the Manual.

## Average Daily Traffic

Table 1 lists the average daily traffic (ADT) and annual average daily traffic (AADT) for locations adjacent to the existing at-grade crossing (Whitehouse Drive) and the proposed new at-grade crossing (Happy Valley Road). Per Caltrans AADT data, the AADT north of SR 273/Happy Valley Road is 11,500 AADT. Per the traffic counts collected as part of the project, the PM peak hour volume for this corresponding segment is between 929 and 951, representing a roughly 8 percent peak-to-daily ratio.

Absent daily volume field data on the Whitehouse Drive and Happy Valley Road segments, this same peak-to-daily ratio was applied to estimate ADT. Being immediately adjacent to each other, the ADT at a relocated crossing at Happy Valley Road is assumed to be similar to the ADT at the existing crossing at Whitehouse Drive.

***Table 1 Crossings ADT***

| Location Description | PM Peak Hour | Caltrans AADT | Estimated ADT |
|---|---|---|---|
| SR 273, north of Happy Valley Road | 929 | 11,500 | |
| Whitehouse Drive, west of SR 273 | 42 | | 520 |
| Whitehouse Drive, east of SR 273 | 98 | | 1,213 |
| Happy Valley Road, west of SR 273 | 320 | | 4,060 |

Source: Caltrans 2020 AADT; Counts Unlimited 2023 Traffic Counts

As noted in Chapter 3 (Corridor Conditions) of the *Existing Conditions Technical Report*, in 2020, corridor traffic volumes range from just under 10,000 average daily traffic (ADT) at the southern and northern ends of the corridor to 17,800 ADT north of Downtown Redding (Segment 2) and 18,600 ADT near S. Bonnyview Road (Segment 6).

## Train Counts

Train counts are the same for the existing at-grade crossing (Whitehouse Drive) and the proposed new at-grade crossing (Happy Valley Road). The two crossings are approximately 1,900 feet (0.36 miles) apart, with no spur sidings to private property in between.

# 5. Alternative Assumptions

This section describes the assumptions used for the proposed new at-grade crossing at Happy Valley Road.

## UP Requirement: Crossing Closure Study

As noted in Section 4.3 of the Manual, UP expects communities to engage in a study to identify crossings for closure, exhausting all options (e.g., construction of new grade separated overpass crossing and use of roads leading to existing grade separated crossings, other grade crossings, and access from other directions) as opposed to requesting a new at-grade crossing.

This TM assumes that the Shasta Regional Transportation Agency (SRTA) and/or Caltrans will perform the required study, as well as other detailed analysis/design, prior to requesting any new at-grade crossing.

## UP Requirement: New Crossing Engineering Considerations

As noted in Section 4.3 of the Manual, there may be specific engineering or rail operation considerations that would prevent the establishment of a new crossing. This could include limited available public roadway right-of-way in the vicinity of the new at-grade crossing. This is an important consideration, as UP policy is not to permit private or public parallel roadways within the UP Railroad right-of-way.

Considering this UP requirement, the focused scope of this TM is to evaluate any planning-level engineering considerations that would render the proposed new at-grade crossing at Happy Valley Road infeasible.

## New Crossing Design Guidance

This TM presents a conceptual layout of the proposed new at-grade crossing at Happy Valley Road. Mostly, UP guidance listed in the Manual was referenced, including the following:

– Appendix E (Guidance for Sidewalk Improvements)
– Appendix F (Sample Grade Crossing Plan Sheet Rural)
– Accommodation of the largest vehicle (Design Vehicle) permitted (Section 7 of the Manual).

California Public Utilities Commission (CPUC) General Order No. 26-D (Regulations governing clearances on railroads and street railroads with reference to side and overhead structures, parallel tracks, crossing of public roads, highways, and streets) was referenced for the required railroad minimum side clearance.

Additionally, a typical 100-foot railroad right-of-way width was assumed. Based on aerial research, this width currently exists in the corridor at UP Railroad/Girvan Road (public sidewalk on the east to public sidewalk on the west) and at the proposed new at-grade crossing (roadway striping on the east to public sidewalk on the west).

On parallel roadways (i.e., SR 273 and Eastside Road) design was limited to Design Vehicle requirements (Section 7 of the Manual), where possible.

# 6. Alternative Evaluation

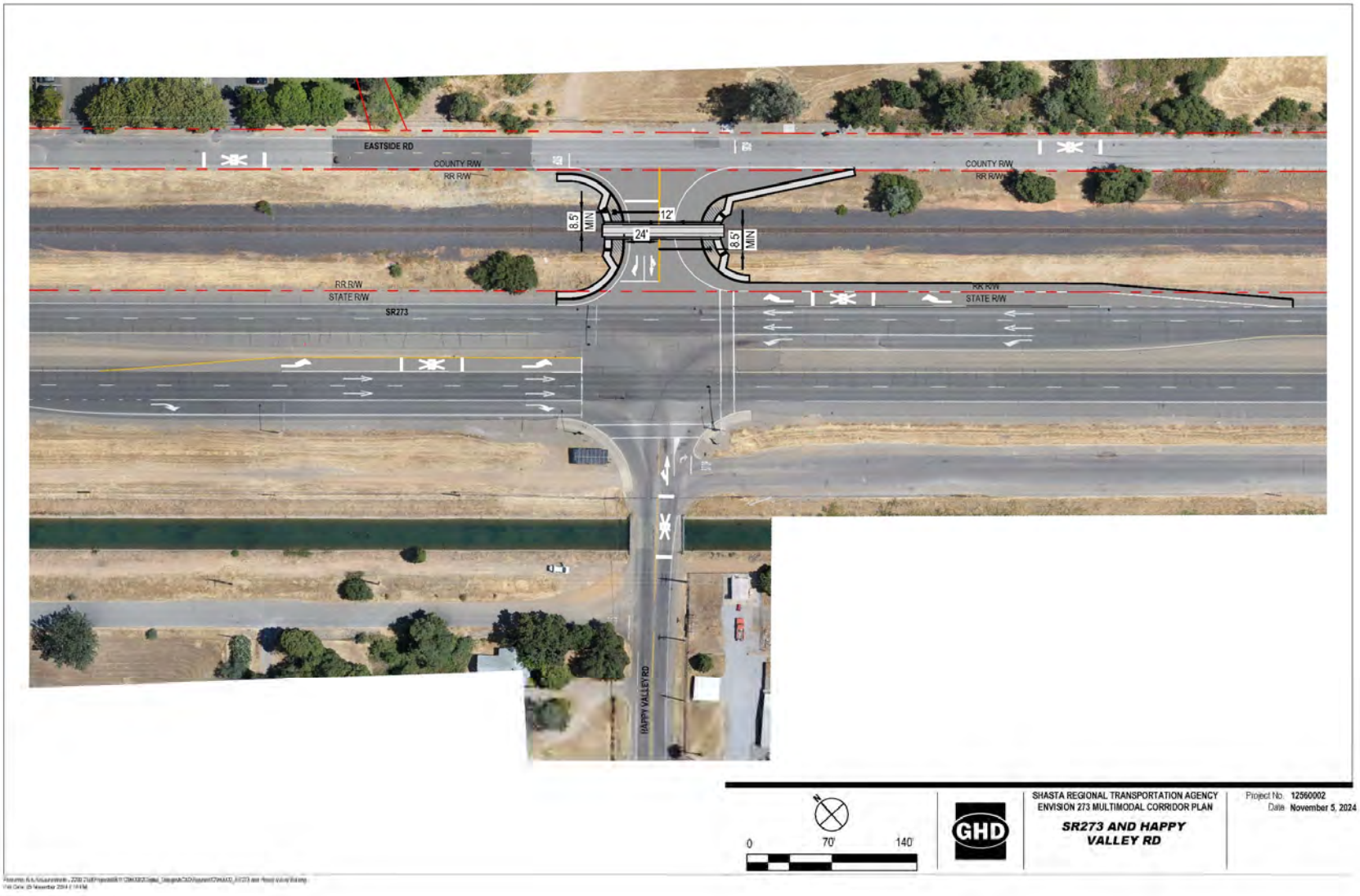
This section provides a planning-level evaluation of the proposed new at-grade crossing at Happy Valley Road. The evaluation includes the assumptions listed in Section 5 of this TM.

## Conceptual Layout

Figure 2 illustrates the proposed new at-grade crossing at Happy Valley Road. As shown, at the grade crossing, three 12-foot lanes (one eastbound and two westbound) can be accommodated, as well as sidewalks on both the north and the south (adjacent to and within 25 feet of the edge of travelled way of the new roadway). The required railroad minimum side clearance of 8.5-feet (from the railroad center line) also can be accommodated. However, at the proposed new at grade crossing, the Design Vehicle cannot be accommodated within the existing Eastside Road right-of-way without interfering with local roadway and railroad operations. As stated in Section 7 of the Manual, “the Design Vehicle shall be able to stop between the railroad and the parallel road traffic control signs, markings, and other traffic control devices without interfering with railroad operations, obstructing or preventing the operation of traffic control devices, or obstructing the grade crossing in any manner.” In this instance, a right turn lane (from Southbound Eastside Road to Westbound Happy Valley Road) and a left turn lane (from Northbound Eastside Road to Westbound Happy Valley Road) to store the Design Vehicle is needed.

For future study, the Eastside Road right-of-way limits should be clearly understood, as it appears there is no additional public roadway right-of-way on which to accommodate the Design Vehicle. This suggests that additional right-of-way would need to be acquired. As noted in the Manual, UP policy is not to permit private or public parallel roadways within the UP Railroad right-of-way. The inability to accommodate the Design Vehicle is a potential engineering constraint to be considered.

*Figure 2* *Proposed New At-Grade Crossing: Happy Valley Road*



# 7. Summary

To enhance grade crossing safety, UP endorses the USDOT/FHWA/FRA goal of reducing the number of at-grade crossings, through consolidation, elimination, grade separation, and restriction of the number of new crossings installed. UP believes the safest crossing is no crossing. UP insists that all other options—including new grade separated overpass crossings—be exhausted before applying for a new grade crossing.

At this time, other options/projects have yet to be exhausted. Therefore, from the perspective of UP and other federal transportation agencies, the new at-grade crossing at Happy Valley Road currently is infeasible, as it is not the preferred project to promote safety. As the project currently is infeasible, corridor performance improvements (i.e., in Segment 8, where the two crossings are located) were not assessed.

This TM recommends the completion of a corridor wide crossing closure study, where the full range of grade crossing options/projects can be explored, including new grade separated overpass crossings and the use of roads leading to existing grade separated crossings, other grade crossings, and access from other directions, as well as the Whitehouse Drive grade crossing closure. For any viable proposed new at-grade crossings, existing crossing closures (using the most recent UP ratio) should be identified. As noted in the Manual, UP may participate in funding for crossing closures and consolidation. Additionally, there exists the opportunity to pursue grant funds from federal transportation agencies for more costly projects, such as grade separated overpass crossings.

# Technical Memorandum

**November 7, 2024**

| | | | |
|---|---|---|---|
| **To** | Michael Kuker, SRTA;<br>Laurent Beauregard, SRTA | **Contact No.** | |
| **Copy to** | Natalie Kinney, Caltrans;<br>Aaron Casas, Caltrans;<br>Christina Prosperi, Caltrans;<br>Sergio Amezquita, Caltrans; | **Email** | Todd.tregenza@ghd.com |
| **From** | Todd Tregenza, GHD | **Project No.** | 12560002 |
| **Project Name** | Envision 273 Comprehensive Multimodal Corridor Plan | | |
| **Subject** | Task 6 Technical Memorandum: Feasibility Study #6 (Redding Grade (SR 273/Breslauer Way) Crossing Relocation) | | |

## 1. Introduction

The Task 6 Technical Memorandums (TMs) will evaluate potential projects that may support corridor solutions, as described in the Task 5 TM.

Each Task 6 TM presents the feasibility of a potential project or group of projects. Task 6 includes six feasibility studies (FSs):

1. One-way Couplet Reversion
2. Cypress Avenue Roundabout
3. Downtown Redding Gateways
4. Class I/IV from Redding to Anderson
5. Shasta County (SR 273/Whitehouse Drive) Grade Crossing Relocation
6. Redding (SR 273/Breslauer Way) Grade Crossing Relocation

This TM presents *FS #6: Redding (SR 273/Breslauer Way) Grade Crossing Relocation.*

The TMs will be combined or summarized in the draft/final report, as appropriate.

# 2. Scope

This TM evaluates the feasibility of relocating a grade crossing in the City of Redding, from Breslauer Way (existing at-grade crossing) to Buenaventura Boulevard (proposed new at-grade crossing).

As shown in Figure 1, the existing at-grade crossing is located immediately east of the State Route (SR) 273/Breslauer Way Intersection and immediately west of the Eastside Road/Breslauer Way Intersection. There are four parallel transportation facilities in the vicinity of the existing at-grade crossing—Westside Road, SR 273, the Union Pacific (UP) Railroad, and Eastside Road—all within a constrained area (approximately 300 feet). Additionally, at the existing at-grade crossing, there are no pedestrian facilities (i.e., sidewalks) and no bicycle facilities.

The grade crossing relocation could promote safety and reduce crash rates, including pedestrian/bicyclist fatalities due to vehicle and train collisions.

***Figure 1 Existing At-Grade Crossing: Breslauer Way***

# 3. Guidance

For projects involving UP Railroad property, the *2021 Union Pacific Railroad Public Projects Manual* (Manual) was referenced, as noted in this section.

## Disclaimers

The Manual is intended to be used as reference only to instruct and guide communities, highway agencies, and other authorities, industries, or private entities, referred to as Applicants, in progressing their public projects prior to initiating contact with the UP Public Projects Team. A public project is defined as any roadway, bridge, commercial development, parallel corridor, or utility project that is owned or used by the public or by a private entity and that encroaches within UP Railroad property.

The Manual includes the following disclaimer:

> *This Union Pacific Railroad Public Projects Manual should not be considered an all-inclusive reference document; rather, it is intended to be a guidance document used as a general resource. Nothing identified in this Union Pacific Railroad Public Projects Manual can be taken as authority to construct on or near the Union Pacific Railroad property. This manual is provided for reference only and is subject to revision without notice.*

Additionally, the Manual notes that all new public projects shall be designed in accordance with the most current UP policies, requirements, and standards.

## Grade Crossings

Section 4 (Grade Crossings) of the Manual defines a grade crossing as any public or private roadway that is within UP Railroad property and crosses the UP Railroad track. The section describes various types of grade crossing projects, including crossing surface (planking) or pavement replacements, roadway widening or reconstruction, new grade crossings, temporary grade crossings grade crossing closures, and conversions from private crossings to public crossings.

For roadway widening or reconstruction, which may require geometric modifications, the Manual lists important items to consider when designing the grade crossing. One such item is as follows: “A major roadway reconfiguration or change in use will be reviewed as a new crossing by UP.”

For new crossings, the Manual states that UP, other railroads, the U.S. Department of Transportation (USDOT), and most states encourage communities to carefully consider all alternatives, including grade separations, as opposed to requests to create new at-grade crossings. The cost of grade separation projects should not outweigh the enhanced safety they would provide to the public. Every effort must be made to obtain alternative access using grade separations, parallel or other roads leading to existing crossings, and access from other directions. UP endorses the Federal Highway Administration (FHWA) goal of reducing the number of grade crossings per 23 Code of Federal Regulations 646.214(c) and the Manual on Uniform Traffic Control Devices (MUTCD) Section 8A.05. Proposals for establishing a new at-grade crossing shall identify three or more existing crossings for closure for each proposed new crossing. The crossings identified shall have the same characteristics as the proposed new at-grade crossing (i.e., similar average daily traffic / train counts, etc.). In addition, there may be specific engineering or rail operation considerations that would prevent the establishment of a new crossing. UP policy is not to permit private or public parallel roadways within the UP Railroad right-of-way (see Section 7 of the Manual). UP believes that the safest crossing is no crossing.

As noted in Section 4.4 of the Manual, UP endorses the USDOT/FHWA/Federal Railroad Administration (FRA) goal of reducing the number of at-grade crossings through consolidation, elimination, grade separation, and restriction of the number of new crossings installed. UP may participate in funding for crossing closures and consolidation.

## Sidewalks and Pathways

Section 6 (Sidewalks and Pathways) of the Manual discusses sidewalks and bicycle/pedestrian pathways.

For sidewalks, only sidewalk grade crossings immediately adjacent to an existing public highway-rail grade crossing equipped with an active grade crossing warning system will be considered. If a sidewalk is 25 feet or more away from the edge of travelled way of the roadway, it is considered a separate crossing. The Manual notes that warning device placement should be designed per the MUTCD, with the exception of sidewalks (as noted in Section 6.1 of the Manual). The Manual also provides design guidance in Appendix E (Guidance for Sidewalk Improvements).

For bicycle/pedestrian pathways, the Manual notes that UP does not allow new at-grade pathway grade crossings. Similar to sidewalks, the addition of a bicycle lane or separate pedestrian pathway should be reviewed for inclusion only if immediately adjacent to an existing public highway-rail grade crossing.

UP does not and will not permit any multi-use or recreational pathways to either cross the railroad tracks or be located within the UP Railroad right-of-way.

## Parallel Roadways

Section 7 (Parallel Corridor and Other Projects) of the Manual discusses Applicant projects on or adjacent to the UP Railroad, including parallel roadways. In the interest of public safety, parallel roadways shall be located off the UP Railroad right-of-way. Parallel roads involving intersections with existing or proposed roadways, where grade crossings are present, should be aligned to provide sufficient distance from the grade crossing for the largest vehicle (Design Vehicle) permitted to use the road. The Design Vehicle shall be able to stop between the railroad and the parallel road traffic control signs, markings, and other traffic control devices without interfering with railroad operations, obstructing or preventing the operation of traffic control devices, or obstructing the grade crossing in any manner.

## Grade Crossing Plan Sheet

Appendix F (Sample Grade Crossing Plan Sheet Rural) of the Manual provides a roadway grade crossing example, including crossing detail with dimensions of lanes, curb types, medians, sidewalk, right-of-way, track centers, warning devices, and other features.

# 4. Existing Conditions

This section presents the existing conditions of the existing and proposed new at-grade crossings, specifically, the traffic characteristics requested by the Manual.

## Average Daily Traffic

Table 1 lists the 2020 California Department of Transportation (Caltrans) annual average daily traffic (AADT) for the existing at-grade crossing (Breslauer Way) and the proposed new at-grade crossing (Buenaventura Boulevard). Generally, AADT is similar at the existing and proposed crossing locations.

***Table 1 Crossings AADT***

| ROUTE | PM | LOCATION DESCRIPTION | BACK | | | AHEAD | | |
|---|---|---|---|---|---|---|---|---|
| | | | PEAK HOUR | PEAK MADT | AADT | PEAK HOUR | PEAK MADT | AADT |
| **273** | 14.184 | Breslauer Way | 1,500 | 17,700 | 14,100 | 1,900 | 20,800 | 18,500 |
| **273** | 14.470 | Buenaventura Blvd | 1,900 | 20,800 | 18,500 | 1,500 | 16,200 | 15,500 |

Source: Caltrans 2020 AADT

As noted in Chapter 3 (Corridor Conditions) of the *Existing Conditions Technical Report*, in 2020, corridor traffic volumes range from just under 10,000 average daily traffic (ADT) at the southern and northern ends of the corridor to 17,800 ADT north of Downtown Redding (Segment 2) and 18,600 ADT near S. Bonnyview Road (Segment 6).

## Train Counts

Train counts are the same for the existing at-grade crossing (Breslauer Way) and the proposed new at-grade crossing (Buenaventura Boulevard). The two crossings are approximately 1,500 feet (0.28 miles) apart, with no spur sidings to private property in between.

# 5. Alternative Assumptions

This section describes the assumptions used for the proposed new at-grade crossing at Buenaventura Boulevard.

## UP Requirement: Crossing Closure Study

As noted in Section 4.3 of the Manual, UP expects communities to engage in a study to identify crossings for closure, exhausting all options (e.g., construction of new grade separated overpass crossing and use of roads leading to existing grade separated crossings, other grade crossings, and access from other directions) as opposed to requesting a new at-grade crossing.

This TM assumes that the Shasta Regional Transportation Agency (SRTA) and/or Caltrans will perform the required study, as well as other detailed analysis/design, prior to requesting any new at-grade crossing.

## UP Requirement: New Crossing Engineering Considerations

As noted in Section 4.3 of the Manual, there may be specific engineering or rail operation considerations that would prevent the establishment of a new crossing. This could include limited available public roadway right-of-way in the vicinity of the new at-grade crossing. This is an important consideration, as UP policy is not to permit private or public parallel roadways within the UP Railroad right-of-way.

Considering this UP requirement, the focused scope of this TM is to evaluate any planning-level engineering considerations that would render the proposed new at-grade crossing at Buenaventura Boulevard infeasible.

## New Crossing Design Guidance

This TM presents a conceptual layout of the proposed new at-grade crossing at Buenaventura Boulevard. Mostly, UP guidance listed in the Manual was referenced, including the following:

– Appendix E (Guidance for Sidewalk Improvements)
– Appendix F (Sample Grade Crossing Plan Sheet Rural)
– Accommodation of the largest vehicle (Design Vehicle) permitted (Section 7 of the Manual).

California Public Utilities Commission (CPUC) General Order No. 26-D (Regulations governing clearances on railroads and street railroads with reference to side and overhead structures, parallel tracks, crossing of public roads, highways, and streets) was referenced for the required railroad minimum side clearance.

Additionally, a typical 100-foot railroad right-of-way width was assumed. Based on aerial research, this width currently exists in the corridor at UP Railroad/Girvan Road (public sidewalk on the east to public sidewalk on the west) and approximately 200 feet north of the proposed new at-grade crossing (fire hydrant on the east to utility pole on the west).

On parallel roadways (i.e., SR 273 and Eastside Road) design was limited to Design Vehicle requirements (Section 7 of the Manual), where possible.

# 6. Alternative Evaluation

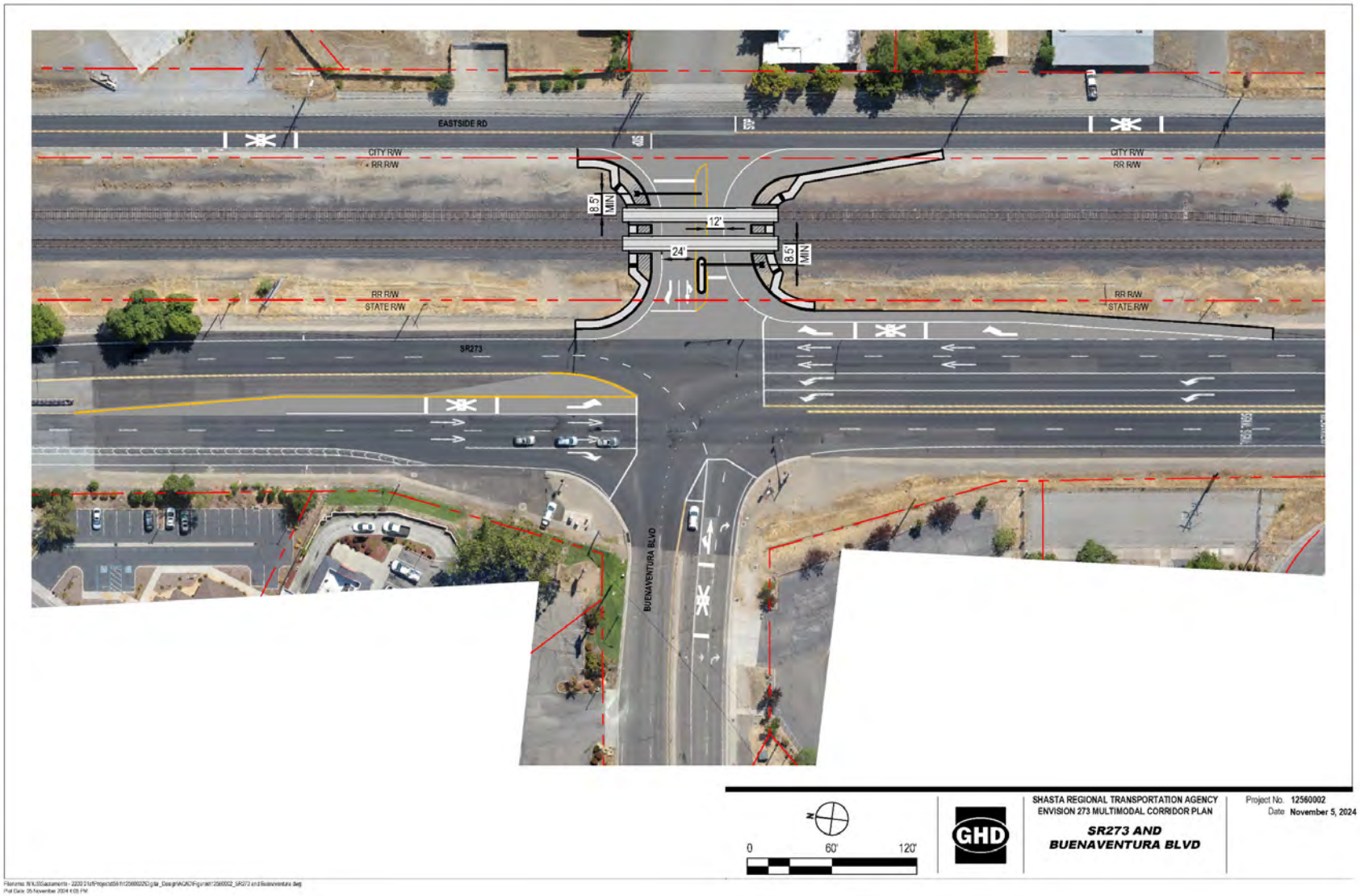
This section provides a planning-level evaluation of the proposed new at-grade crossing at Buenaventura Boulevard. The evaluation includes the assumptions listed in Section 5 of this TM.

## Conceptual Layout

Figure 2 illustrates the proposed new at-grade crossing at Buenaventura Boulevard. As shown, at the grade crossing, three 12-foot lanes (one eastbound and two westbound) can be accommodated, as well as sidewalks on both the north and the south (adjacent to and within 25 feet of the edge of travelled way of the new roadway). The required railroad minimum side clearance of 8.5-feet (from the railroad center line) also can be accommodated. However, at the proposed new at grade crossing, the Design Vehicle cannot be accommodated within the existing Eastside Road right-of-way and/or geometry without interfering with local roadway and railroad operations. As stated in Section 7 of the Manual, “the Design Vehicle shall be able to stop between the railroad and the parallel road traffic control signs, markings, and other traffic control devices without interfering with railroad operations, obstructing or preventing the operation of traffic control devices, or obstructing the grade crossing in any manner.” In this instance, a right turn lane (from Southbound Eastside Road to Westbound Buenaventura Boulevard) and a left turn lane (from Northbound Eastside Road to Westbound Buenaventura Boulevard) to store the Design Vehicle is needed.

For future study, the Eastside Road right-of-way limits should be clearly understood, as well as any potential to modify the Eastside Road geometry, to accommodate the Design Vehicle. The inability to accommodate the Design Vehicle is a potential engineering constraint to be considered.

*Figure 2* *Proposed New At-Grade Crossing: Buenaventura Blvd*



# 7. Summary

To enhance grade crossing safety, UP endorses the USDOT/FHWA/FRA goal of reducing the number of at-grade crossings, through consolidation, elimination, grade separation, and restriction of the number of new crossings installed. UP believes the safest crossing is no crossing. UP insists that all other options—including new grade separated overpass crossings—be exhausted before applying for a new grade crossing.

At this time, other options/projects have yet to be exhausted (e.g., accessing Breslauer Way from Wyndham Lane and Eastside Road). Therefore, from the perspective of UP and other federal transportation agencies, the new at-grade crossing at Buenaventura Boulevard currently is infeasible, as it is not the preferred project to promote safety. As the project currently is infeasible, corridor performance improvements (i.e., in Segment 5, where the two crossings are located) were not assessed.

This TM recommends the completion of a corridor wide crossing closure study, where the full range of grade crossing options/projects can be explored, including new grade separated overpass crossings and the use of roads leading to existing grade separated crossings, other grade crossings, and access from other directions, as well as the Breslauer Way grade crossing closure. For any viable proposed new at-grade crossings, existing crossing closures (using the most recent UP ratio) should be identified. As noted in the Manual, UP may participate in funding for crossing closures and consolidation. Additionally, there exists the opportunity to pursue grant funds from federal transportation agencies for more costly projects, such as grade separated overpass crossings.

# Appendix G.

## Induced Bicycling Demand and Bicycle Mode Shift Benefits

# Induced Bicycling Demand and Bicycle Mode Shift Benefits

## *Methodology*

Based on research cited in the National Cooperative Highway Research Program (NCHRP) Report 552, Guidelines for Analysis of Investment in Bicycle Facilities, bicycle facilities proposed in the Plan may result in induced bicycling demand for new facilities among both existing and new bicyclists. The NCHRP 552 methodology describes an approach for estimating the induced demand associated with a given bicycle facility and translates the demand to the monetized benefit categories described below.

- **Mobility Benefits** represent the time cost associated with a shift to a new bicycle facility based on the time bicycle commuters are willing to spend to access an improved facility.
- **Health Benefits** represent the annual per-capita health cost savings from physical activity benefits associated with a new bicycle facility.
- **Recreation Benefits** represent the time cost that new bicyclists induced by a new bicycle facility are willing to spend on a typical recreation day.
- **Decreased Auto Use Benefits** represent the user cost savings associated with reduced congestion and air pollution.

This analysis quantifies the induced bicycling demand expected to be associated with the proposed improvements and monetizes the annualized mobility, health, recreation and decreased auto use benefits provided by the projected induced bicycling demand at high, moderate, and low estimates based on Census population and commuter pattern data and average bicycling trip length estimates from Fall 2022 Replica data. The methodology is based on several assumptions:

- Existing bicyclists near a new facility will shift from the existing nearby facility to the new facility.
- The new facility will result in an induced number of bicyclists as a function of the number of existing bicyclists, relative to the attractiveness of the proposed facility (i.e., Class I shared-use path vs. Class II bicycle lanes).
- People are more likely to ride a bicycle if they live within 1.5 miles of a facility than if they live outside that distance.

The NCHRP 552 methodology suggests that existing bicycle commute mode share can be utilized to estimate the number of existing and future bicycle ridership based on low, moderate, and high likelihood multipliers and the population within 1.5-mile, 1-mile, and 0.5-mile buffers that surround a given bicycle facility. According to the NCHRP 522 research, the total rate of adult bicycling ranges from a low estimate, based on the Census bicycling commute mode share, to a high estimate, based on 0.6 percent plus three times the Census commute share.[1]

Moreover, the highest likelihood of a member of the population using the facility exists if they live within a 0.5-mile buffer around the facility. Thus, demand is calculated at low, medium, and high estimates for the populations at each buffer distance. Each buffer area—at 0.5-, 1- and 1.5-mile distances from a proposed bicycle improvement is created using a network-based analysis in a GIS environment.

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*1 U.S. Census Bicycle Commute Mode Share Estimates, American Community Survey (ACS) 2021 5-Year Estimates, Table S0801 Commuting Characteristics by Sex*

### *Induced Bicycling Demand*

Based on the medium estimate likelihood multiplier, it is estimated that new bicycling trips induced by bicycle improvements along the corridor could include more than 15,000 commute trips, over 250,000 adult non-commute trips and almost 90,000 trips by children annually.

### *Vehicle Miles Traveled Reduction*

It is estimated that the bicycle improvements along the corridor could result in a daily Vehicle Miles Traveled (VMT) reduction of nearly 1,000 VMT. This could translate to over 230,000 VMT annually.

### *Estimated Bicycle Benefits*

The following sections provide an overview of the benefits provided from the bicycle improvements of each alternative, as detailed in Table 1 through Table 5 below.

#### Mobility Benefits

The recommended facilities would provide an annual mobility benefit of $1 million.

#### Health Benefits

The recommended facilities would provide health benefits annually at the moderate estimate of $140,000.

#### Recreation Benefits

The recommended facilities would provide nearly $1.3 million in recreation benefits annually in the moderate case.

#### Decreased Auto Use Benefits

The recommended facilities would provide an annual reduced auto use benefit of about $2,300.

#### Total Bicycling Benefits

A moderate estimate of total benefits from the recommended facilities is $3.1 million.

*Table 1 Induced Bicycling Demand Mobility Benefits*

| Segment Location<br>Recommended Facility | Segment 1 - 190<br>Class 1 Path | Segment 2 - 191<br>Class 1 Path | Segment 2 - 183<br>Class IV Bikeway | Segment 2 - 184<br>Class 1 Path | Segment 3 - 189<br>Class 1 Path | Segment 3 - 185<br>Class 1 Path | Segment 4 - 188<br>Class IV Bikeway | Segment 4 - 193<br>Class I Path | Segment 5 - 187<br>Class I Path | Segment 6 - 192<br>Class I Path | Segment 7 - 196<br>Class I Path | Segment 8 - 197<br>Class I Path | Segment 9 - 194<br>Class I Path | Segment 10 - 186<br>Class I Path | Total Corridor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mobility Benefits** | | | | | | | | | | | | | | | |
| Existing Bike Commuters | 24 | 17 | 24 | 22 | 23 | 41 | 31 | 19 | 29 | 16 | 10 | 5 | 19 | 25 | 202 |
| New Bike Commuters | 5 | 6 | 8 | 6 | 5 | 5 | 7 | 5 | 7 | 3 | 2 | 1 | 3 | 4 | 46 |
| Value of Time (V) [1] | | | | | | | | | | | | | | | $ 16.20 |
| # Minutes Commuter Willing to Spend to Access Facility (Separated Facility) [2] | | | | | | | | | | | | | | | 20.38 |
| # Minutes Commuter Willing to Spend to Access Facility (On Street, no parking Facility) [2] | | | | | | | | | | | | | | | 18.02 |
| Weeks per Year [3] | | | | | | | | | | | | | | | 48 |
| Days per Week [4] | | | | | | | | | | | | | | | 5 |
| Trips per Day [5] | | | | | | | | | | | | | | | 2 |
| Per Trip Benefit (Separated Facility) [6] | | | | | | | | | | | | | | | $ 5.50 |
| Per Trip Benefit (On Street, no parking Facility) [6] | | | | | | | | | | | | | | | $ 4.87 |
| **Annual Mobility Benefit** | **$ 76,918** | **$ 61,772** | **$ 85,673** | **$ 71,946** | **$ 73,185** | **$ 121,759** | **$ 99,607** | **$ 61,855** | **$ 94,811** | **$ 50,567** | **$ 32,306** | **$ 16,586** | **$ 59,295** | **$ 75,890** | **$ 982,169** |
| **20-Year Mobility Benefit** | **$ 1,144,348** | **$ 919,010** | **$ 1,274,591** | **$ 1,070,373** | **$ 1,088,806** | **$ 1,811,468** | **$ 1,481,899** | **$ 920,240** | **$ 1,410,553** | **$ 752,303** | **$ 480,629** | **$ 246,762** | **$ 882,167** | **$ 1,129,047** | **$ 14,612,197** |

Source:
1. Value of travel time (VOT), Caltrans Cal B/C Parameter Guide, Version 8.1, March 2022.
2. NCHRP 552, Chapter 4; Appendix D., Translating Demand and Benefits Research into Guidelines White Paper.
3. Assumes 48 working weeks per year to accommodate vacation, sick time,etc. and to be conservative in estimate.
4. Assumes value of time (V) of $16.20 per hour, 20.38 (M) as the time a bicyclist is willing to spend to access a separated facility and 18.02 (M) as the time a bicyclist is willing to spend to access an on-street bike lane with no parking. Per trip benefit is calculated by using this equation M * V/60. V is divided by 60 because the M is in minutes and V is in hours; dividing V by 60 converts it to minutes so that the result can easily be multiplied by the minutes.
5. Annual Mobility Benefit is calculated using the following equation: Annual mobility benefit = M * V/60 * (existing commuters + new commuters) * 48 * 5 * 2

*Table 2 Induced Bicycling Demand Health Benefits*

| Segment Location | Segment 1 - 190 | Segment 2 - 191 | Segment 2 - 183 | Segment 2 - 184 | Segment 3 - 189 | Segment 3 - 185 | Segment 4 - 188 | Segment 4 - 193 | Segment 5 - 187 | Segment 6 - 192 | Segment 7 - 196 | Segment 8 - 197 | Segment 9 - 194 | Segment 10 - 186 | Total Corridor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Recommended Facility** | **Class 1 Path** | **Class 1 Path** | **Class IV Bikeway** | **Class 1 Path** | **Class 1 Path** | **Class 1 Path** | **Class IV Bikeway** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | |
| **Health Benefits** | | | | | | | | | | | | | | | |
| Total New Cyclists, High | 140 | 102 | 151 | 139 | 150 | 266 | 198 | 117 | 181 | 99 | 61 | 31 | 122 | 157 | 1263 |
| Total New Cyclists, Moderate | 78 | 57 | 85 | 79 | 86 | 151 | 113 | 66 | 103 | 56 | 35 | 18 | 69 | 89 | 714 |
| Total New Cyclists, Low | 57 | 41 | 63 | 58 | 63 | 112 | 83 | 49 | 76 | 41 | 25 | 13 | 51 | 66 | 526 |
| Annual per capita cost Savings from Physical Activity [1] | | | | | | | | | | | | | | | $ 128.00 |
| **Annual Health Benefit, High** | **$ 17,935** | **$ 13,048** | **$ 19,275** | **$ 17,760** | **$ 19,263** | **$ 33,999** | **$ 25,383** | **$ 15,030** | **$ 23,215** | **$ 12,694** | **$ 7,845** | **$ 4,029** | **$ 15,599** | **$ 20,062** | **$ 245,138** |
| **Annual Health Benefit, Moderate** | **$ 9,962** | **$ 7,271** | **$ 10,875** | **$ 10,080** | **$ 10,959** | **$ 19,343** | **$ 14,400** | **$ 8,502** | **$ 13,142** | **$ 7,169** | **$ 4,424** | **$ 2,280** | **$ 8,844** | **$ 11,380** | **$ 138,632** |
| **Annual Health Benefit, Low** | **$ 7,240** | **$ 5,298** | **$ 8,007** | **$ 7,457** | **$ 8,123** | **$ 14,339** | **$ 10,650** | **$ 6,273** | **$ 9,702** | **$ 5,282** | **$ 3,255** | **$ 1,683** | **$ 6,538** | **$ 8,416** | **$ 102,264** |
| **20-Year Health Benefit, High** | **$ 266,833** | **$ 194,126** | **$ 286,760** | **$ 264,223** | **$ 286,583** | **$ 505,823** | **$ 377,634** | **$ 223,613** | **$ 345,387** | **$ 188,849** | **$ 116,711** | **$ 59,942** | **$ 232,076** | **$ 298,476** | **$ 3,647,035** |
| **20-Year Health Benefit, Moderate** | **$ 148,216** | **$ 108,175** | **$ 161,793** | **$ 149,961** | **$ 163,041** | **$ 287,780** | **$ 214,239** | **$ 126,492** | **$ 195,522** | **$ 106,655** | **$ 65,812** | **$ 33,921** | **$ 131,580** | **$ 169,308** | **$ 2,062,494** |
| **20-Year Health Benefit, Low** | **$ 107,713** | **$ 78,825** | **$ 119,121** | **$ 110,945** | **$ 120,857** | **$ 213,326** | **$ 158,445** | **$ 93,328** | **$ 144,348** | **$ 78,589** | **$ 48,432** | **$ 25,036** | **$ 97,264** | **$ 125,202** | **$ 1,521,432** |

Source:
1. NCHRP 552, Appendix E.

*Table 3 Induced Bicycling Demand Recreation Benefits*

| Segment Location | Segment 1 - 190 | Segment 2 - 191 | Segment 2 - 183 | Segment 2 - 184 | Segment 3 - 189 | Segment 3 - 185 | Segment 4 - 188 | Segment 4 - 193 | Segment 5 - 187 | Segment 6 - 192 | Segment 7 - 196 | Segment 8 - 197 | Segment 9 - 194 | Segment 10 - 186 | Total Corridor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Recommended Facility** | **Class 1 Path** | **Class 1 Path** | **Class IV Bikeway** | **Class 1 Path** | **Class 1 Path** | **Class 1 Path** | **Class IV Bikeway** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | |
| **Recreation Benefits** | | | | | | | | | | | | | | | |
| Total New Adult Cyclists, High | 114 | 83 | 120 | 110 | 119 | 209 | 157 | 93 | 144 | 79 | 49 | 25 | 97 | 124 | 1005 |
| Total New Adult Cyclists, Moderate | 52 | 37 | 54 | 50 | 54 | 95 | 71 | 42 | 65 | 36 | 22 | 11 | 44 | 56 | 455 |
| Total New Adult Cyclists, Low | 30 | 22 | 32 | 29 | 32 | 56 | 42 | 25 | 38 | 21 | 13 | 7 | 26 | 33 | 268 |
| Total New Commuter Cyclists | 12 | 9 | 12 | 11 | 12 | 21 | 16 | 10 | 15 | 8 | 5 | 3 | 10 | 13 | 103 |
| Total New Recreation Cyclists, High | 101 | 70 | 108 | 97 | 106 | 197 | 145 | 81 | 132 | 67 | 36 | 13 | 84 | 112 | 905 |
| Total New Recreation Cyclists, Moderate | 39 | 25 | 42 | 37 | 41 | 83 | 59 | 30 | 53 | 23 | 10 | -1 | 31 | 44 | 356 |
| Total New Recreation Cyclists, Low | 18 | 10 | 20 | 17 | 19 | 43 | 29 | 12 | 26 | 9 | 1 | -6 | 13 | 21 | 168 |
| Value of Typical Day of Recreation Time [1] | | | | | | | | | | | | | | | $ 10.00 |
| Days Per Year [2] | | | | | | | | | | | | | | | 365 |
| **Annual Recreation Benefit, High** | **$ 370,461** | **$ 255,932** | **$ 392,727** | **$ 355,193** | **$ 387,728** | **$ 719,065** | **$ 527,462** | **$ 295,095** | **$ 480,023** | **$ 242,757** | **$ 133,032** | **$ 45,804** | **$ 306,927** | **$ 407,455** | **$ 3,303,663** |
| **Annual Recreation Benefit, Moderate** | **$ 143,109** | **$ 91,189** | **$ 153,203** | **$ 136,187** | **$ 150,936** | **$ 301,143** | **$ 214,283** | **$ 108,943** | **$ 192,777** | **$ 85,216** | **$ 35,474** | **$ (4,069)** | **$ 114,307** | **$ 159,879** | **$ 1,298,992** |
| **Annual Recreation Benefit, Low** | **$ 65,476** | **$ 34,935** | **$ 71,414** | **$ 61,405** | **$ 70,081** | **$ 158,437** | **$ 107,343** | **$ 45,379** | **$ 94,693** | **$ 31,422** | **$ 2,162** | **$ (21,099)** | **$ 48,534** | **$ 75,341** | **$ 614,470** |
| **20-Year Recreation Benefit, High** | **$ 5,511,527** | **$ 3,807,619** | **$ 5,842,784** | **$ 5,284,374** | **$ 5,768,408** | **$ 10,697,877** | **$ 7,847,308** | **$ 4,390,262** | **$ 7,141,531** | **$ 3,611,613** | **$ 1,979,176** | **$ 681,451** | **$ 4,566,294** | **$ 6,061,899** | **$ 49,150,160** |
| **20-Year Recreation Benefit, Moderate** | **$ 2,129,098** | **$ 1,356,660** | **$ 2,279,268** | **$ 2,026,122** | **$ 2,245,551** | **$ 4,480,243** | **$ 3,187,985** | **$ 1,620,791** | **$ 2,868,033** | **$ 1,267,803** | **$ 527,766** | **$ (60,536)** | **$ 1,700,592** | **$ 2,378,600** | **$ 19,325,718** |
| **20-Year Recreation Benefit, Low** | **$ 974,122** | **$ 519,747** | **$ 1,062,457** | **$ 913,548** | **$ 1,042,624** | **$ 2,357,149** | **$ 1,596,997** | **$ 675,118** | **$ 1,408,790** | **$ 467,478** | **$ 32,162** | **$ (313,898)** | **$ 722,060** | **$ 1,120,888** | **$ 9,141,762** |

Source:
1,2. NCHRP 552, Appendix G.

*Table 4 Induced Bicycling Demand Reduced Auto Use Benefits*

| Segment Location | Segment 1 - 190 | Segment 2 - 191 | Segment 2 - 183 | Segment 2 - 184 | Segment 3 - 189 | Segment 3 - 185 | Segment 4 - 188 | Segment 4 - 193 | Segment 5 - 187 | Segment 6 - 192 | Segment 7 - 196 | Segment 8 - 197 | Segment 9 - 194 | Segment 10 - 186 | Total Corridor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Recommended Facility** | **Class 1 Path** | **Class 1 Path** | **Class IV Bikeway** | **Class 1 Path** | **Class 1 Path** | **Class 1 Path** | **Class IV Bikeway** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | **Class I Path** | |
| **Reduced Auto Use Benefits** | | | | | | | | | | | | | | | |
| Total New Bicyclist Commuters | 12 | 9 | 12 | 11 | 12 | 21 | 16 | 10 | 15 | 8 | 5 | 3 | 10 | 13 | 103 |
| Average Round Trip Length [1] | | | | | | | | | | | | | | | 6.2 |
| Congestion savings per mile in urban areas | | | | | | | | | | | | | | | $ 0.13 |
| Congestion savings per mile in suburban areas [2] | | | | | | | | | | | | | | | $ 0.08 |
| Congestion savings per mile in small towns and rural areas | | | | | | | | | | | | | | | $ 0.01 |
| Weeks per Year [3] | | | | | | | | | | | | | | | 48 |
| Days per Week | | | | | | | | | | | | | | | 5 |
| **Annual Reduced Auto Use Benefit** | **$ 185** | **$ 133** | **$ 184** | **$ 164** | **$ 176** | **$ 310** | **$ 235** | **$ 142** | **$ 218** | **$ 121** | **$ 75** | **$ 38** | **$ 145** | **$ 186** | **$ 2,313** |
| **20-Year Reduced Auto Use Benefit** | **$ 2,755** | **$ 1,974** | **$ 2,739** | **$ 2,445** | **$ 2,618** | **$ 4,619** | **$ 3,503** | **$ 2,107** | **$ 3,241** | **$ 1,794** | **$ 1,118** | **$ 563** | **$ 2,160** | **$ 2,770** | **$ 34,407** |
| **Daily VMT Reduction** | **77** | **55** | **77** | **68** | **73** | **129** | **98** | **59** | **91** | **50** | **31** | **16** | **60** | **78** | **964** |
| **Annual VMT Reduction** | **18,519** | **13,268** | **18,409** | **16,436** | **17,594** | **31,049** | **23,544** | **14,160** | **21,785** | **12,061** | **7,515** | **3,787** | **14,517** | **18,622** | **231,266** |

Source:
1. Replica 2023 average trip length for one-way bicycling trips starting or ending along the corridor is 3.1 miles.
2. We assume small town and rural area for congestion savings, due to the unincorporated nature of the corridor.
3. Assumes 48 working weeks per year to accommodate vacation, sick time,etc.

*Table 5 Total Induced Bicycling Demand Benefits*

| Segment Location | Segment 1 - 190 | Segment 2 - 191 | Segment 2 - 183 | Segment 2 - 184 | Segment 3 - 189 | Segment 3 - 185 | Segment 4 - 188 | Segment 4 - 193 | Segment 5 - 187 | Segment 6 - 192 | Segment 7 - 196 | Segment 8 - 197 | Segment 9 - 194 | Segment 10 - 186 | Total Corridor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recommended Facility | Class 1 Path | Class 1 Path | Class IV Bikeway | Class 1 Path | Class 1 Path | Class 1 Path | Class IV Bikeway | Class I Path | Class I Path | Class I Path | Class I Path | Class I Path | Class I Path | Class I Path | |
| Total Benefits, High Estimate | $ 465,500 | $ 346,084 | $ 489,105 | $ 450,056 | $ 484,094 | $ 830,168 | $ 629,949 | $ 387,228 | $ 580,342 | $ 332,554 | $ 217,980 | $ 126,937 | $ 399,629 | $ 504,620 | $ 6,244,246 |
| Total Benefits, Moderate Estimate | $ 230,175 | $ 175,563 | $ 241,181 | $ 223,370 | $ 238,999 | $ 397,589 | $ 305,786 | $ 194,548 | $ 283,022 | $ 169,489 | $ 117,001 | $ 75,314 | $ 200,254 | $ 248,363 | $ 3,100,655 |
| Total Benefits, Low Estimate | $ 149,820 | $ 117,337 | $ 156,524 | $ 145,965 | $ 155,308 | $ 249,880 | $ 195,097 | $ 128,755 | $ 181,499 | $ 113,808 | $ 82,521 | $ 57,687 | $ 132,175 | $160,860 | $ 2,027,234 |
| 20-Year Total Benefits, High Estimate | $ 6,925,464 | $ 5,148,849 | $ 7,276,647 | $ 6,695,701 | $ 7,202,095 | $ 12,350,804 | $ 9,372,046 | $ 5,760,979 | $ 8,634,022 | $ 4,947,565 | $ 3,242,991 | $ 1,888,497 | $ 5,945,473 | $ 7,507,478 | $ 92,898,610 |
| 20-Year Total Benefits, Moderate Estimate | $ 3,424,418 | $ 2,611,938 | $ 3,588,164 | $ 3,323,186 | $ 3,555,696 | $ 5,915,127 | $ 4,549,328 | $ 2,894,387 | $ 4,210,658 | $ 2,521,562 | $ 1,740,682 | $ 1,120,489 | $ 2,979,276 | $ 3,695,012 | $ 46,129,921 |
| 20-Year Total Benefits, Low Estimate | $ 2,228,939 | $ 1,745,676 | $ 2,328,682 | $ 2,171,596 | $ 2,310,584 | $ 3,717,579 | $ 2,902,546 | $ 1,915,550 | $ 2,700,242 | $ 1,693,171 | $ 1,227,698 | $ 858,242 | $ 1,966,428 | $ 2,393,194 | $ 30,160,124 |

# Appendix H.

## Planning Level Costs Estimates

| Project Type / Description | | Construction Cost Estimate | Estimated Total Cost (Capital and Support) |
|---|---|---|---|
| Class I - General | Per Foot | $ 1,000.00 | $ 1,300.00 |
| Class I - Caterpillar to Northpoint | Length | $ 6,500,000.00 | $ 8,450,000.00 |
| Class I - Lake to Benton | Length | $ 6,000,000.00 | $ 7,800,000.00 |
| Class IV - Downtown | Length | $ 15,000,000.00 | $ 19,500,000.00 |
| Class I - Buenaventura to S. Bonnyview | Length | $ 9,500,000.00 | $ 12,350,000.00 |
| Class I - S. Bonnyview to Girvan | Length | $ 5,900,000.00 | $ 7,670,000.00 |
| Class I - Girvan to Happy Valley | Length | $ 5,880,000.00 | $ 7,600,000.00 |
| Class I - Happy Valley to Latona | Length | $ 7,400,000.00 | $ 9,620,000.00 |
| Class I - Latona to Briggs | Length | $ 14,700,000.00 | $ 19,110,000.00 |
| Class I - Briggs to Pleasant Hills | Length | $ 9,000,000.00 | $ 11,700,000.00 |
| Pedestrian Fencing | Per Mile | $ 150,000.00 | $ 195,000.00 |
| Pedestrian Crossings (Curb Ramps, Crosswalk, Signal Mods) | Per Location | $ 80,000.00 | $ 104,000.00 |
| Pedestrian Signal Modifications (Push Buttons + LPI) | Per Location | $ 40,000.00 | $ 52,000.00 |
| Roadway Lighting - Caterpillar to Quartz Hill | Length | $ 12,800,000.00 | $ 16,640,000.00 |
| Roadway Lighting - Buenaventura to South | Length | $ 10,000,000.00 | $ 13,000,000.00 |
| Roadway Lighting - General | Per Foot | $ 500.00 | $ 650.00 |
| Intersection Lighting | Per Location | $ 150,000.00 | $ 195,000.00 |
| Variable Speed Warning Signs (x2) | Per Location | $ 40,000.00 | $ 52,000.00 |
| Flashing Beacons (x2) | Per Location | $ 40,000.00 | $ 52,000.00 |
| Rumble Strips: SR 273 | Per Mile | $ 15,000.00 | $ 19,500.00 |
| Directional Median Openings (Does Not Include New Signalization) | Per Location | $ 100,000.00 | $ 130,000.00 |
| Traffic Signal Installation | Per Location | $ 2,000,000.00 | $ 2,600,000.00 |
| Traffic Signal Timing | Per Location | $ 10,000.00 | $ 13,000.00 |
| Hybrid Roundabout | Per Location | $ 12,000,000.00 | $ 15,600,000.00 |
| Single-Lane Roundabout | Per Location | $ 8,000,000.00 | $ 10,400,000.00 |
| Transit Amenities / New Transit Stop | Per Location | $ 40,000.00 | $ 52,000.00 |
| Roadway Reconfiguration (Road Diet) | Per Foot | $ 1,200.00 | $ 1,560.00 |