

Pedestrian/Bicycle Road Safety Assessment



July 25-28, 2017
South Lake Tahoe, CA



What is a Road Safety Assessment?

A road safety assessment is a formal safety performance examination of a future or existing road or intersection by an independent team.



What is a Road Safety Assessment?

The team considers the safety of all road users and qualitatively estimates and reports on road safety issues and opportunities for road safety improvements.





Project History and Context

- Current projects were scoped in 1990's
- Shift from multi-threshold to single-threshold projects
- Community values, best practices, and agency missions have evolved to Complete Streets
- Example of Hwy 50 Trout Creek to Ski Run
- Complexity of land use and access
- Pedestrian and bicyclist demand with limited accessibility
- Missing connectivity



How Did We Get Here?

- Conversations between TRPA, Caltrans, and CSLT
- Support for proceeding with RSA
- Openness to incorporate changes based on recommendations
- Understanding of constraints of current construction projects (Hwy 50 Y to Trout Creek)
- Urgency to mitigate known risks not addressed in current construction projects
- Responding to community desire





Goals of Pedestrian/Bicycle RSA

- Balance need for pedestrian and bicyclist safety and access with need for vehicular movements
- Assess value and need for speed management strategies
- Coordinate and leverage current and planned projects on Hwy 50
- Enhance pedestrian and bicyclist crossings through implementation of proven strategies and countermeasures
- Enhance bicycle safety along highway
- Balance recommendations with maintenance needs

RSA Team



- Ray Jarvis
- Jim Marino
- Jeff Gartner
- Clark Peri
- Scott Waksdal
- Mikaela Hiatt
- Steve Pyburn
- Craig Allred
- Hillary Isebrands
- Brooke Struve

CSLT Public Works

CSLT Public Works

CHP

Caltrans

Caltrans

TRPA (Intern)

FHWA CA Division

FHWA

FHWA

FHWA



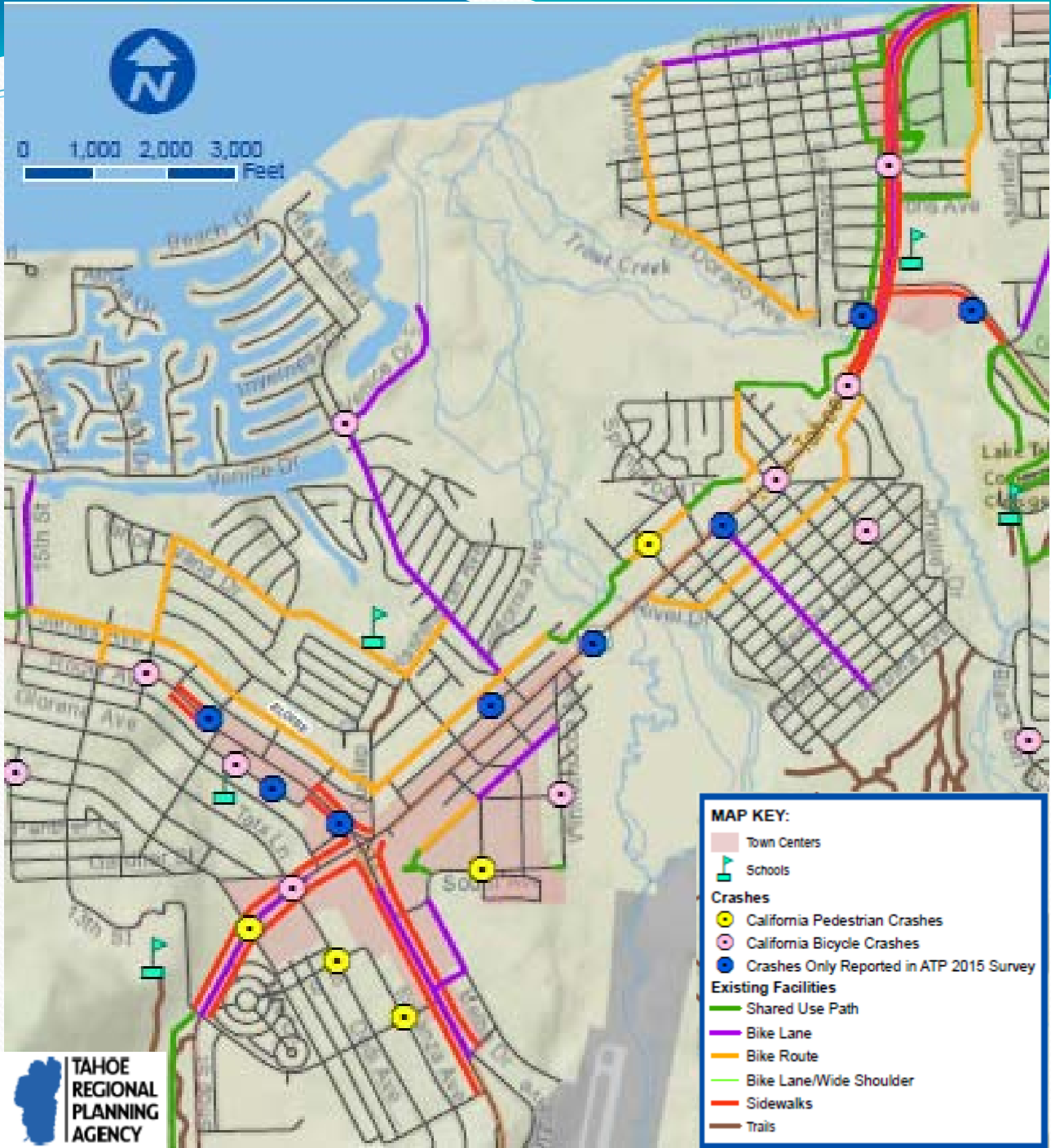
What's Working

- Multiagency coordination and support for projects
- \$26 million construction project (\$41 million total project cost)
 - Continuous sidewalk
 - Continuous bike lanes with markings
 - Drainage
 - Signal interconnection
 - Good faith effort to address work zone concerns
- Center turn lane (TWLTL)
- Snow removal
- Connectivity planning



Opportunities for Improvement

- Missing and inconsistent crash data
- Lack of data on minor injury and property-damage-only crashes
- Data sharing and accessibility
- Lake Tahoe Region Safety Plan development a potential for addressing data





Rx

How Healthy is Your Road System?

Find out with systemic analysis

Systemic analysis is like a health screening for your road system. Just as your doctor identifies risk factors for illness, systemic analysis identifies locations that are at highest risk for severe crashes. Practitioners can then prioritize projects based on risk and apply low-cost safety treatments to reduce severe crashes across the whole at-risk system.

CURVE COUNTY - X-RAY RESULTS

Symptoms

Severe roadway departure crashes on curves.

Possible Risk Factors:

- 🚗 % Avg. Daily Traffic > 1,000 vehicles
- ⊖ Curve Radius < 1,000 feet
- + Intersection within Curve
- 🚦 Visual Trap within Curve
- 🚗 Severe Crash within Curve

Diagnosis

11% of all curves have 3 or more risk factors.

Lab Results:

- Curve A 🚗
- Curve B 🚗 ⊖ + 🚦 🚗
- Curve C 🚗 +
- Curve D 🚦
- Curve E ⊖ 🚦 🚗

Treatment

Prioritize highest risk sites and treat with low-cost countermeasures such as chevron signs or rumble strips.

Follow-Up

Track and evaluate safety improvements. Further remediation can be implemented as needed.

Systemic vs. Systemwide

Systemic does not mean treating all locations. It allows agencies to treat the highest-risk sites within limited budgets.



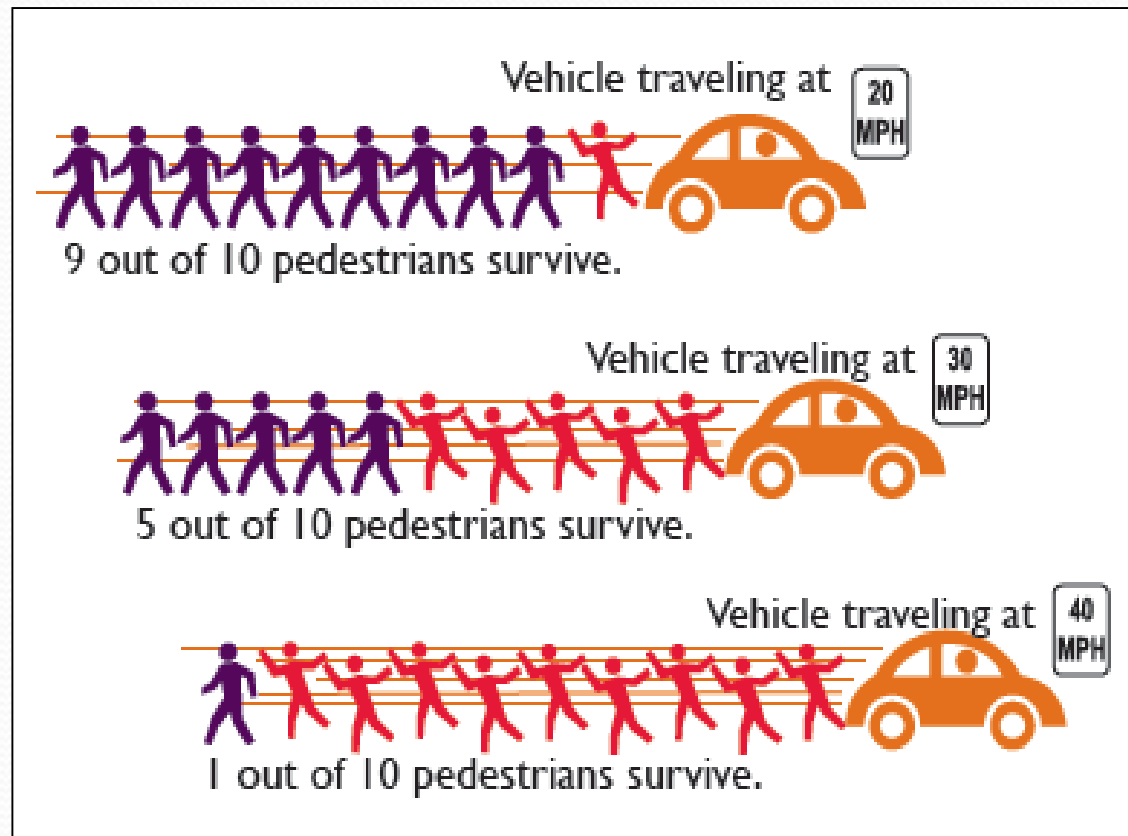
U.S. Department of Transportation
Federal Highway Administration

For more information visit
www.fhwa.dot.gov/innovation/everydaycounts/edc-3/ddsa.cfm



Opportunities for Improvement

- Speed Management



Speed Management

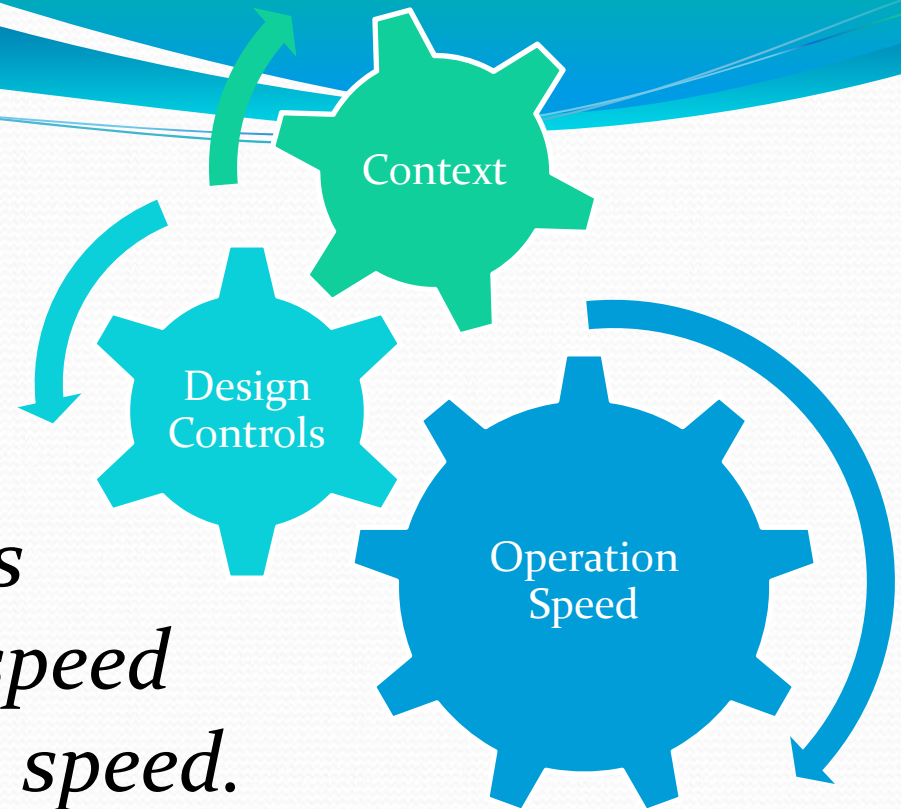
Speed management is necessary within many highways to achieve an optimal multimodal transportation environment that will support the land use and transportation contexts.



Target Speed

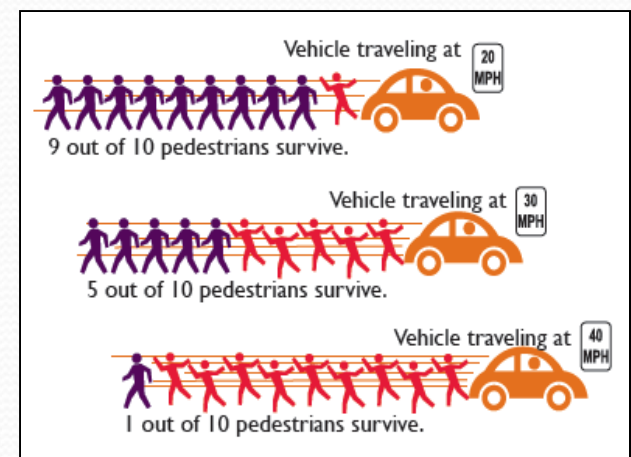
The objective of the target speed approach is to establish the design speed at the desired operating speed.

The design speed selection is derived from all other design controls, as well as transportation and land use context characteristics.



Opportunities for Improvement

- Speed Management
 - Intermittent raised landscaped median
 - Reduced speed limit
 - Buffered bike lanes
 - Contrasting pavement colors or materials
 - Speed feedback dynamic signs

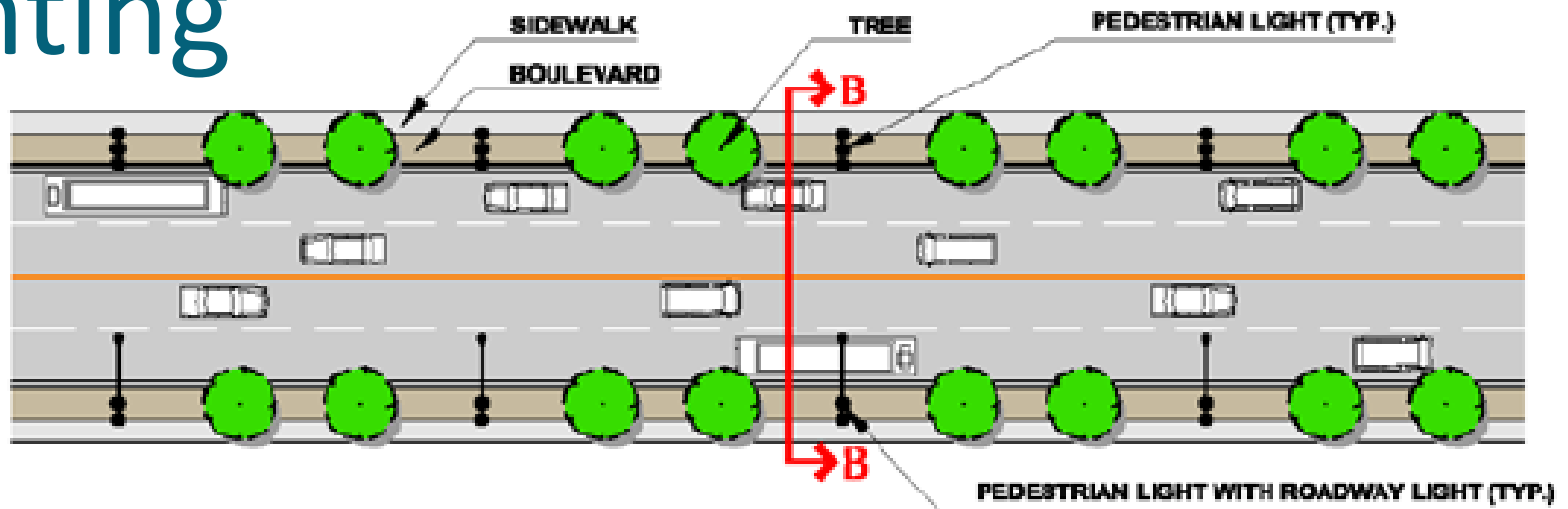




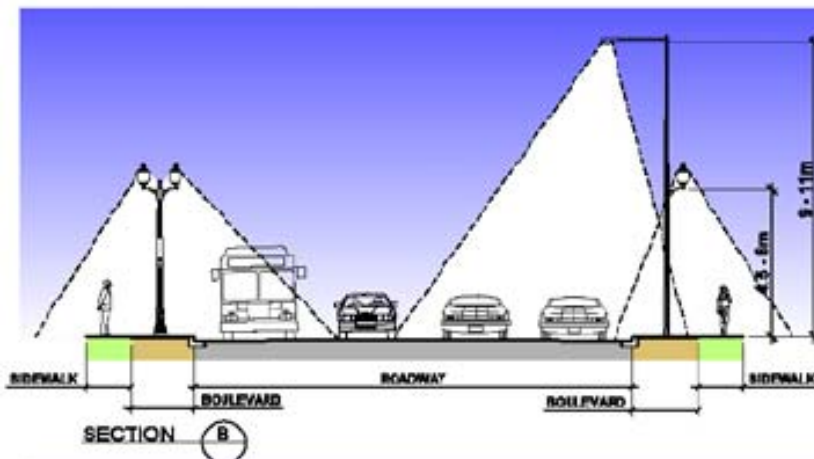
Opportunities for Improvement

- Lighting
 - Roadway and pedestrian
 - Conduit for future installation of pedestrian lighting

Lighting



4 LANE URBAN ROAD - PEDESTRIAN AND OVERHEAD LIGHT

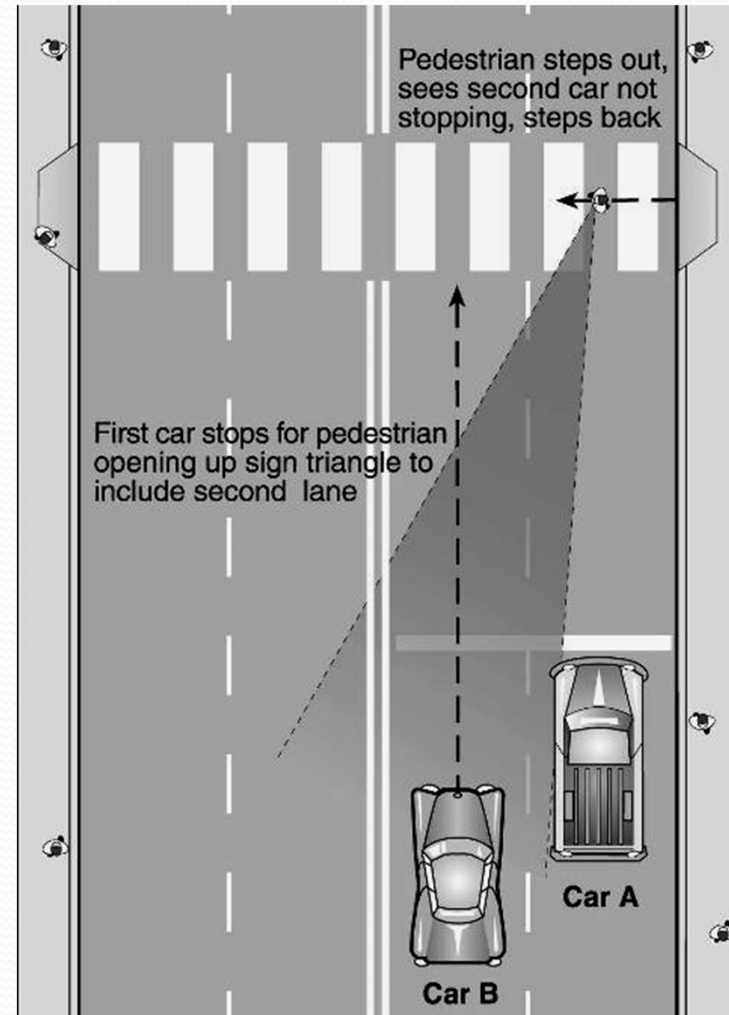
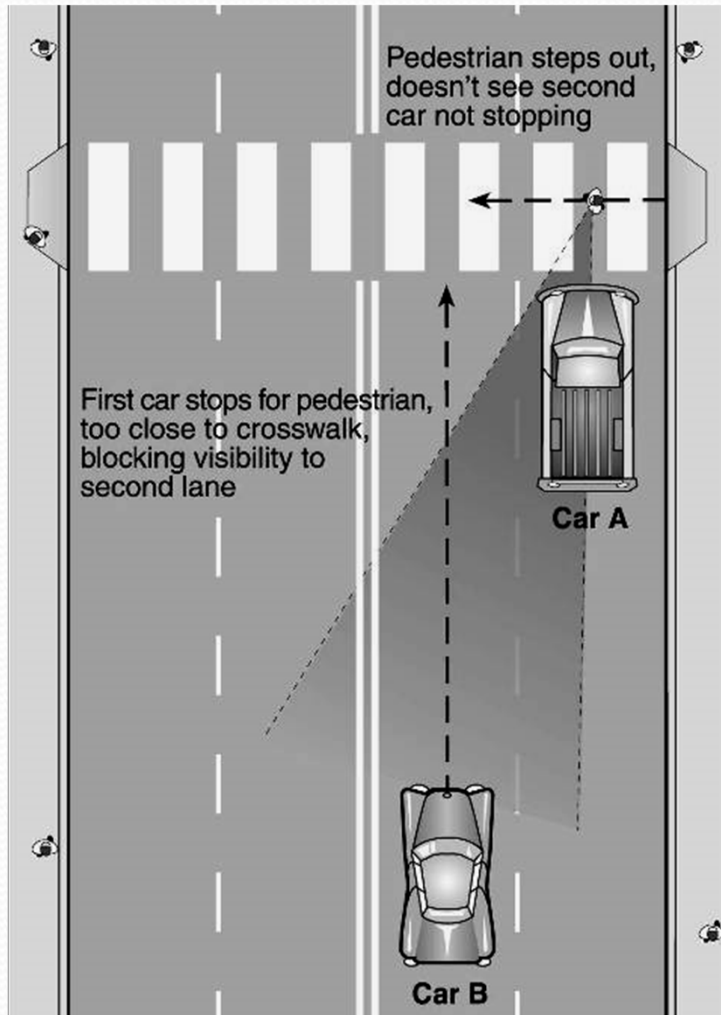




Opportunities for Improvement

- Cross-section
 - Narrow or eliminate TWLTL where no left turns needed
 - One-lane snow removal operation?
 - Intermittent Raised median
 - Vegetation for BMP
 - Low-profile vegetation for pedestrian visibility
 - Plow to roadside where no driveways
 - Aesthetics
 - Landscape lighting or highway safety lighting to make visible to motorists

Multiple Threat





Opportunities for Improvement

- Access management
 - Reduce or combine driveways
 - Aligning offset driveways
 - Improve connectivity to intersecting trails
 - Improve access to transit network
- Streamline permitting process through collaboration between CSLT and Caltrans



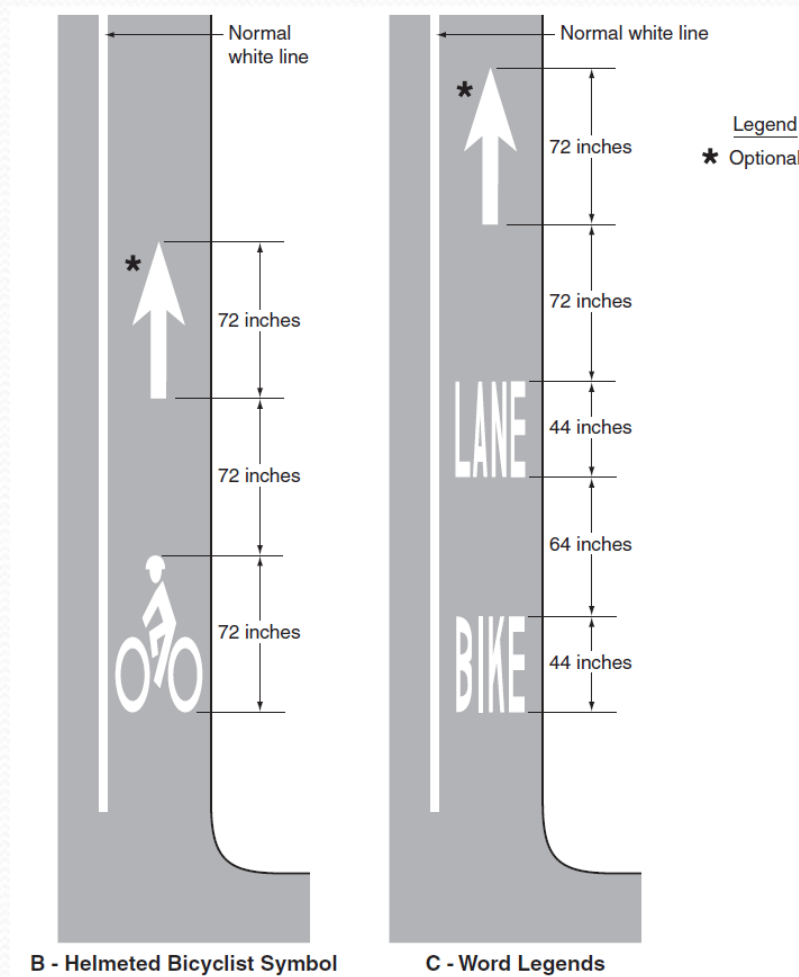
Opportunities for Improvement

- Signing and Striping
 - Wayfinding to intersecting trails and alternate routes
 - Advance signs
 - Street names
 - Warning for pedestrian and bicyclist crossings
 - Bike lane marking
 - Symbol rather than text
 - Interval
 - Directional arrow
 - Buffers
 - Bike lane signs
 - Durable striping materials

Illuminated Street Signs



Bike Lane Marking



Bikeway Signing

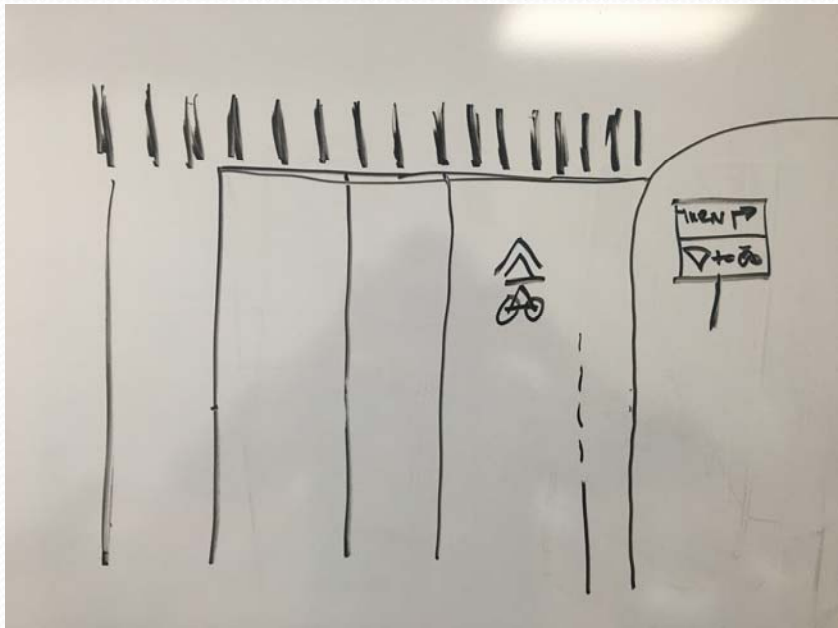


R7-9



R7-9a



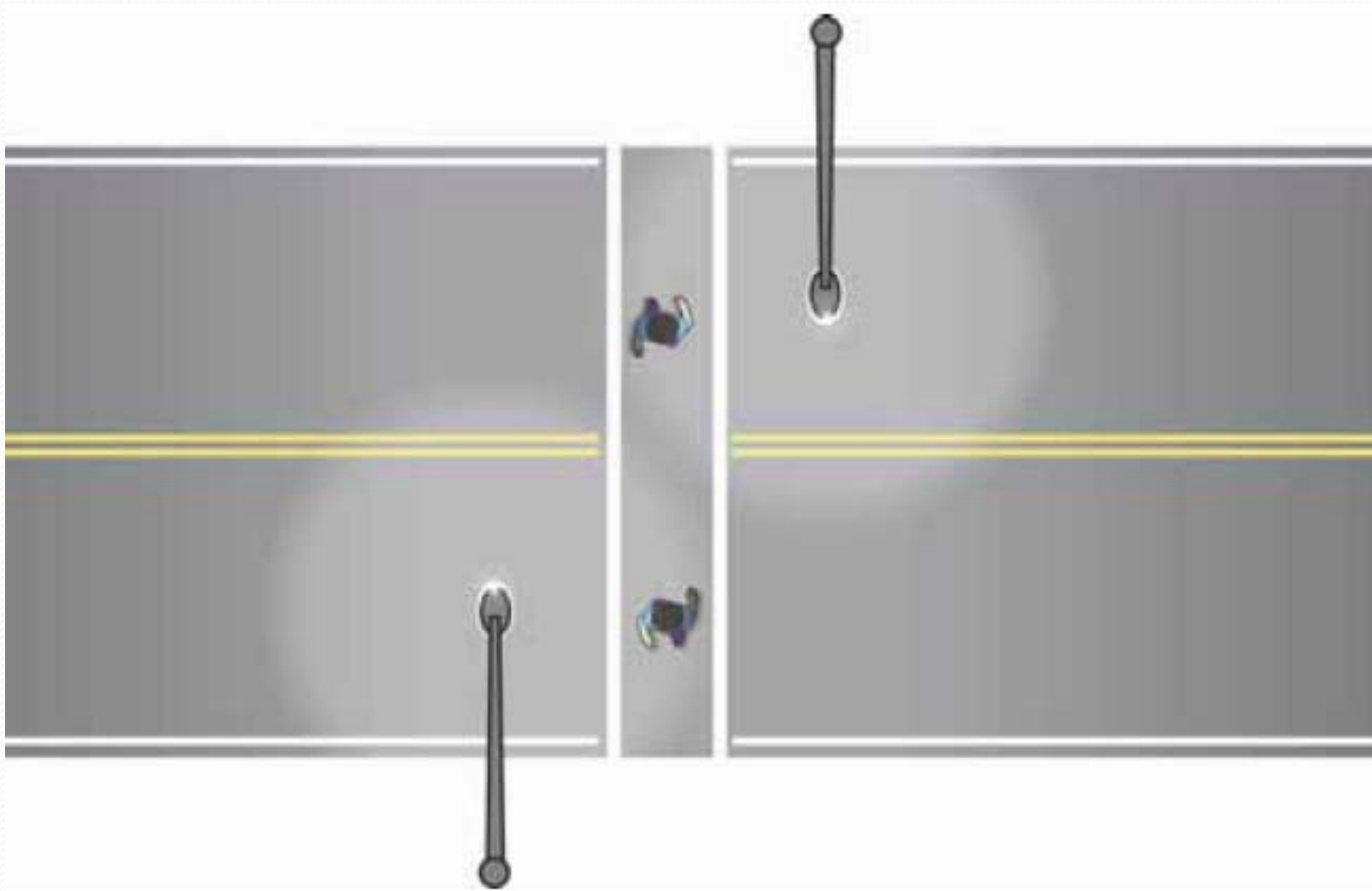




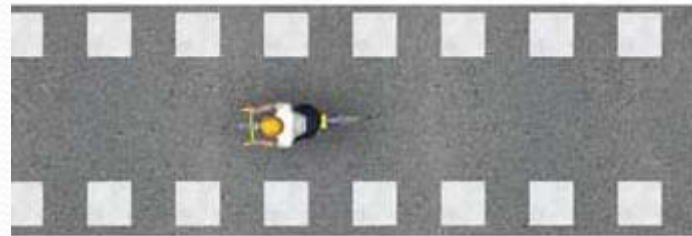
Opportunities for Improvement

- Signals & Intersections
 - Bike detection, especially for intersecting bike routes
 - Timing signals for slower speed progression
 - Enhance pedestrian lighting at intersections to draw pedestrians to signalized crossing
 - Improve pedestrian lighting at intersection crosswalks
 - Crosswalks for all legs at signalized intersections
 - Pavement marking for bicycle conflict points
 - Leading Bicycle Interval with Bike Signal

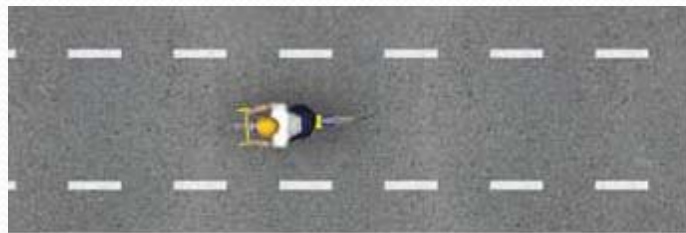
Crosswalk Lighting



Conflict Zones



Elephant's Feet



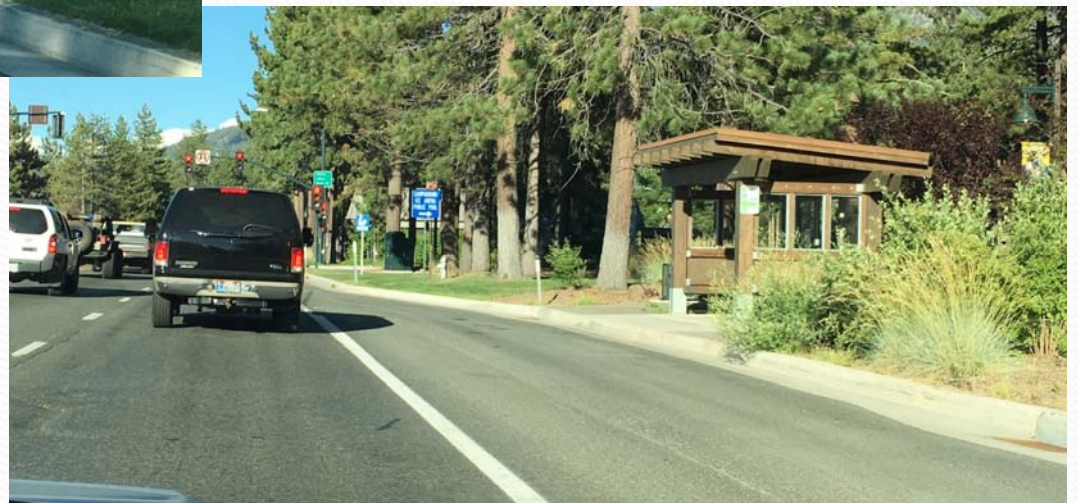
Dotted Line Extensions

Opportunities for Improvement

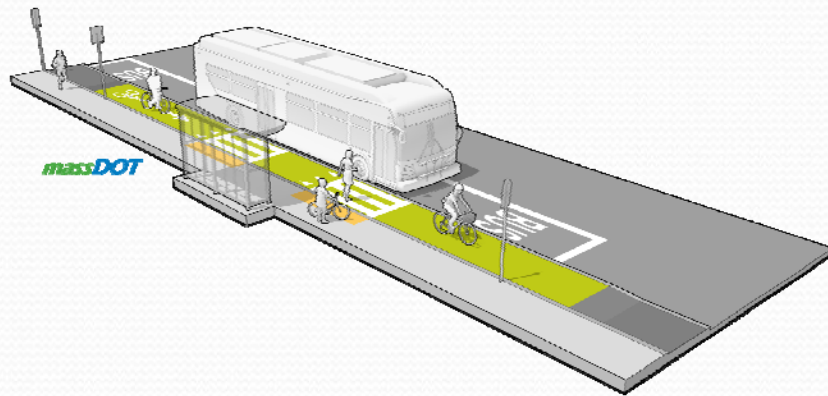
- Transit stops
 - Location of stops relative to crossing locations
 - Consolidating bus stops at enhanced location
 - Partial turnouts with insufficient space for bus



Bus Pull-Out



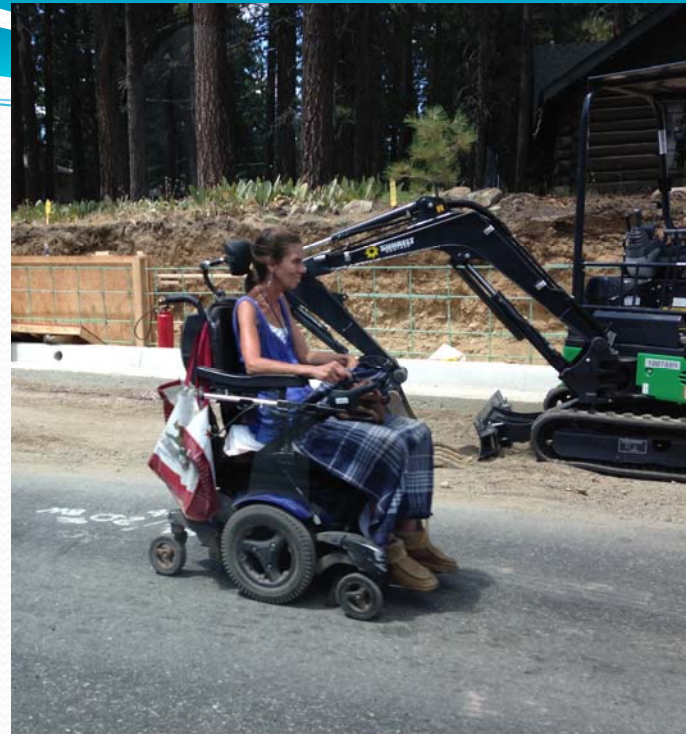
Bike Lanes & Bus Stops





Opportunities for Improvement

- Work Zones
 - Accessible sidewalk closures and detours
 - Maintenance of pedestrian way
 - Maintenance of bicyclist way
 - Accessibility of temporary pedestrian buttons
 - Surfaces are firm, stable, and slip resistant







Opportunities for Improvement

- Maintenance
 - Facilitating maintenance operations
 - Pavement markings through winter and refresh
 - Timing of fog-line/bike lane striping refresh
 - Recessed thermoplastic for bike-lane markings
 - Pavement marking test section
 - Scheduling paint crews early in season
 - Sidewalk snow removal and sweeping
 - Reinforce highway code with adjacent property owners
 - Proactive approach



Opportunities for Improvement

- Education
 - Encourage helmet usage
 - Bicycle LED head & tail lights – community grant
 - Encourage Reflective/light-colored clothing
 - Discourage wrong-way riding
 - Broaden TRPA Safe-Routes-to-Schools program through multi-agency support (TTD, Hospital, CSLT, El Dorado County, Caltrans, School District, Chamber of Commerce)



Opportunities for Improvement

- Enhance partnership and communication between TRPA, Caltrans, and CSLT

Motel 6/Grocery Outlet

- Positive

- ?

- Issues

- Crossing demand
- Lack of lighting
- Long distance to next crossing
- Bus stop
- Inadequate bus pull-out
- Wide street
- Speed



Motel 6/Grocery Outlet

- Recommendations
 - Study location for mid-block crossing
 - Alternatives
 - Single-stage PHB
 - Two-stage, offset PHB
 - Relocate Motel 6 driveway across from Grocery Outlet driveway and add signal
 - Relocate Grocery outlet driveway to west property boundary
 - Relocate bus stops closer to crossing
 - Consolidate four bus stops to two at the crossing



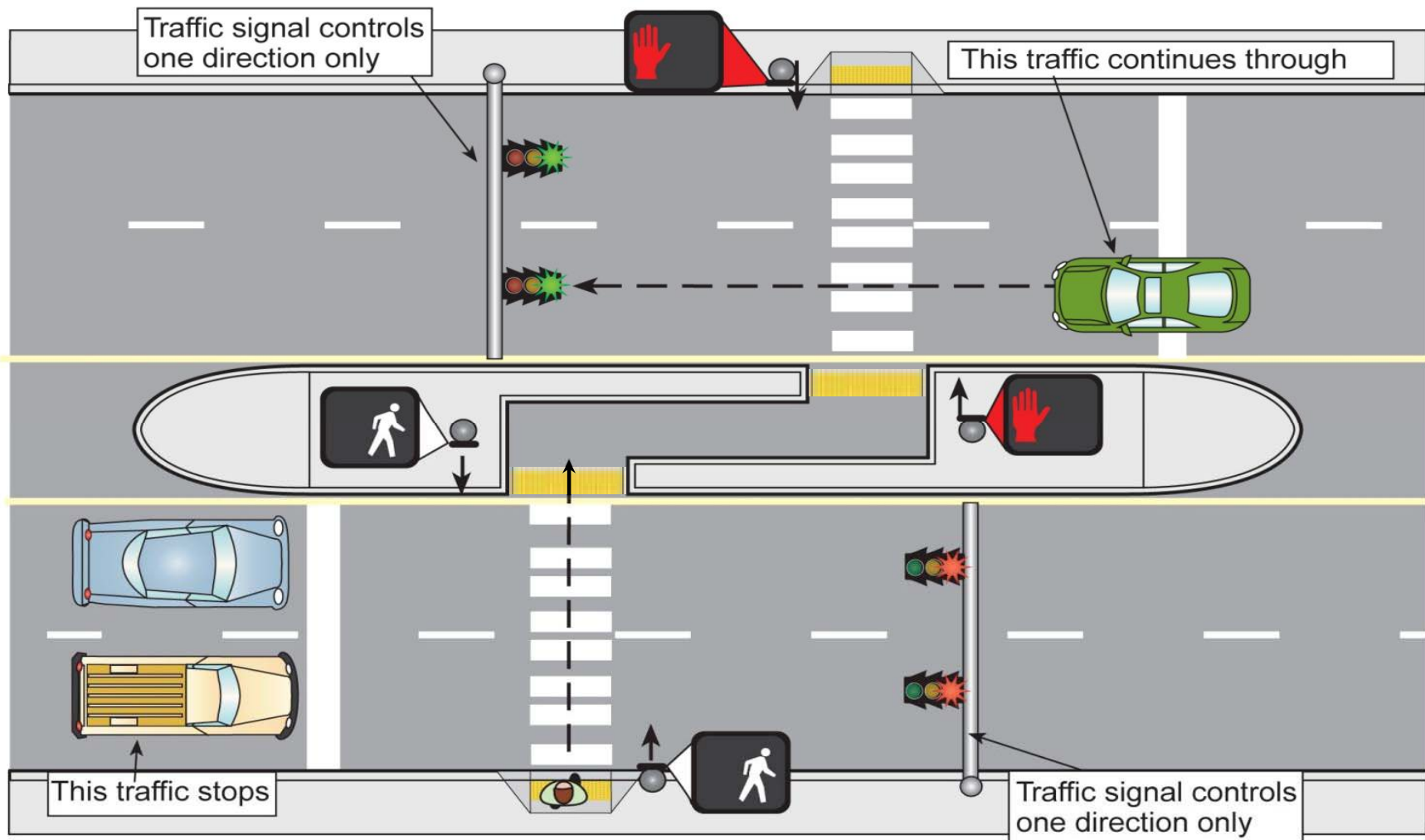
Motel 6/Grocery Outlet

- Project Features
 - Lighting
 - Raised Median
 - Snow-plowing
 - Mountable curbs to reduce damage
 - High strength concrete

Pedestrian Hybrid Beacon “Hawk”



Pedestrian Hybrid Beacon "Hawk"



Drivers



Proceed with Caution



Flashing

Slow Down
(Pedestrian has activated the push button)



Prepare to Stop



STOP!
(Pedestrian in Crosswalk)



Flashing

STOP!
Proceed with Caution if Clear



Proceed if Clear

Pedestrians



Push the Button to Cross



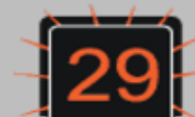
Wait



Continue to Wait



Start Crossing

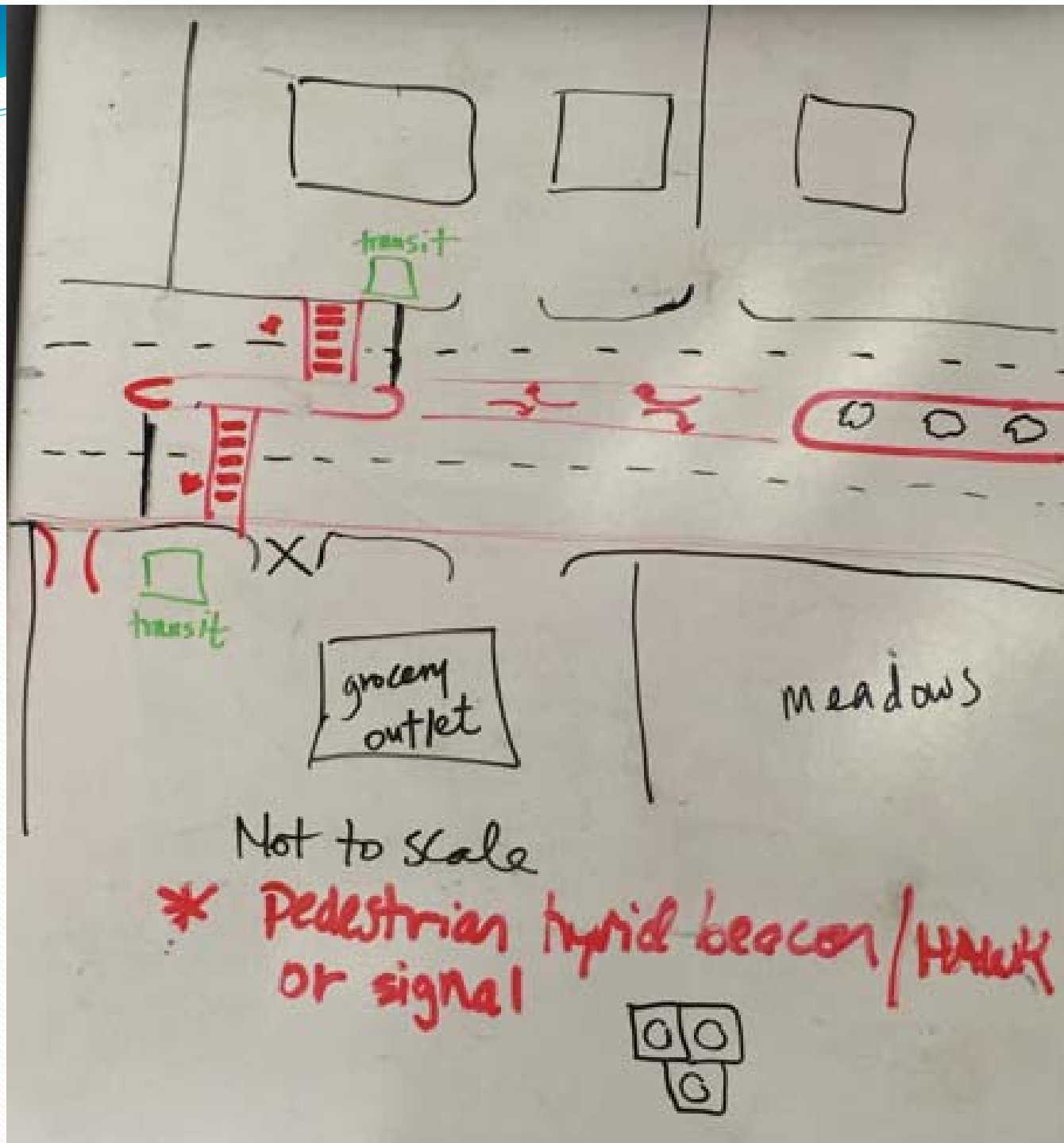


Flashing

Continue Crossing
(Countdown Signal)

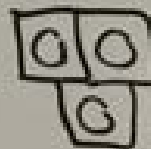


Push the Button to Cross



Not to scale

* Pedestrian hybrid beacon / HAWK or signal



Meadows

- Positive
 - No driveways
 - Space available because of TWLTL and bridge
- Issues
 - Minimum bike lane
 - Minimum sidewalk
 - Lighting
 - Lack of crosswalks



Meadows

- Recommendations
 - Roadway reconfiguration
 - Narrow or eliminate TWLTL
 - Add width to bike lanes
 - Add width to sidewalks
 - Pull-out for trailhead or scenic locations
 - Replace TWLTL with intermittent landscaped median
 - Lighting



Recommendations for Immediate Action

- Explore opportunity to install conduit in current project phases for future pedestrian lighting
 - Barriers: ROW encroachment for city, cost of change order
 - Possible concessions: City encroach w/out being responsible for roadside ROW, Cost sharing
 - As a minimum, add enhanced pedestrian lighting at intersections in current project phases
 - Follow-up with Senator Gaines



Recommendations for Immediate Action

- Evaluate current plan for signing and striping
 - Narrowing or eliminating TWLTL at Meadows
 - Crosswalks at Sierra, Carson, & 3rd
 - Bike lane marking
 - increase interval
 - choice of symbol
 - Bike lane signing



Recommendations for Immediate Action

- Evaluate current plan for signing and striping (continued)
 - Bike lane conflict zones at intersections & transit stops
 - Turning Vehicles Yield to Bikes
 - Way-finding to off-highway alternate bikeways
 - Reroute bikeway on River Ave to Lodi Ave (CSLT)
 - Stop or Yield sign on O'Malley approaching Carson (CSLT)



Recommendations for Immediate Action

- Signal preemption for emergency vehicles at 3rd in current project
- Evaluate current plan for removal of partial turn-outs for transit
- Evaluate current plan at Whiskey Dick's for control of pedestrians on sidewalk and pedestrian lighting
- Evaluate the work zones for accessibility
- Study for mid-block crossing at Motel 6 /Grocery Outlet



Recommendations for Mid-Term Action

- Study for slower speed limit (beyond 85⁰% methodology)
- Alternate curb detail with modified curb pan
- Full bus turn-outs at high-volume transit stops
- Pedestrian lighting along corridor
- Automated traffic signal performance measures when signal interconnect is complete



Recommendations for Long-Term Action

- Roadway reconfiguration to reallocate cross-section
 - Transit lanes, buffered or separated bike lane
- Contrasting pavement to visually narrow roadway



Other Issues

- Study for mid-block crossing on Hwy 89/50 (South of the Y) between B and D Streets
- Signal preemption for emergency vehicles at Al Tahoe & Hwy 89/50
- Close passing lanes on corridors exiting the basin during high congestion periods



Other Issues

- Study congestion management strategies
 - Mode shift
 - Shifting peak times through collaboration with business
 - Priority transit lane



Other Issues

- Traveler information
 - Coordinate with Google/Waze on avalanche and rockfall closures of highway
 - Information distributed through hotels
 - Alerts for avalanche, rockfall incidents that close highways
 - CHP checkpoints for ill-prepared winter drivers, potentially funding off-duty officers



Funding Opportunities

- SP&R Grant
- SB1 Funds
- HSIP Funds
- Local mitigation funds
- ATP
- OTS (402)
- Tahoe Fund



Next Steps

- Webinar presentation
- Immediate action items for current project with assigned follow-up
- Follow-up on-going coordination (meetings? calls?)
- Final report
- Response from decision-makers

Thank You

