Oregon Department of Transportation

Bend Parkway at Reed Lane and Badger Pedestrian Safety Audit

Presented by:

Joel McCarroll, PE – Region 4 Traffic Manager

and

Dan Serpico, PE – Senior Traffic Analyst

Presentation Outline

- Overview of Road Safety Audit (RSA) process
- Review of Data Collection and Field Observations
- RSA findings – Key Issues Identified
- Recommendations – What's been done to date, planned for near future and proposed for future

What is a Road Safety Audit?

A road safety audit is a

formal safety performance examination

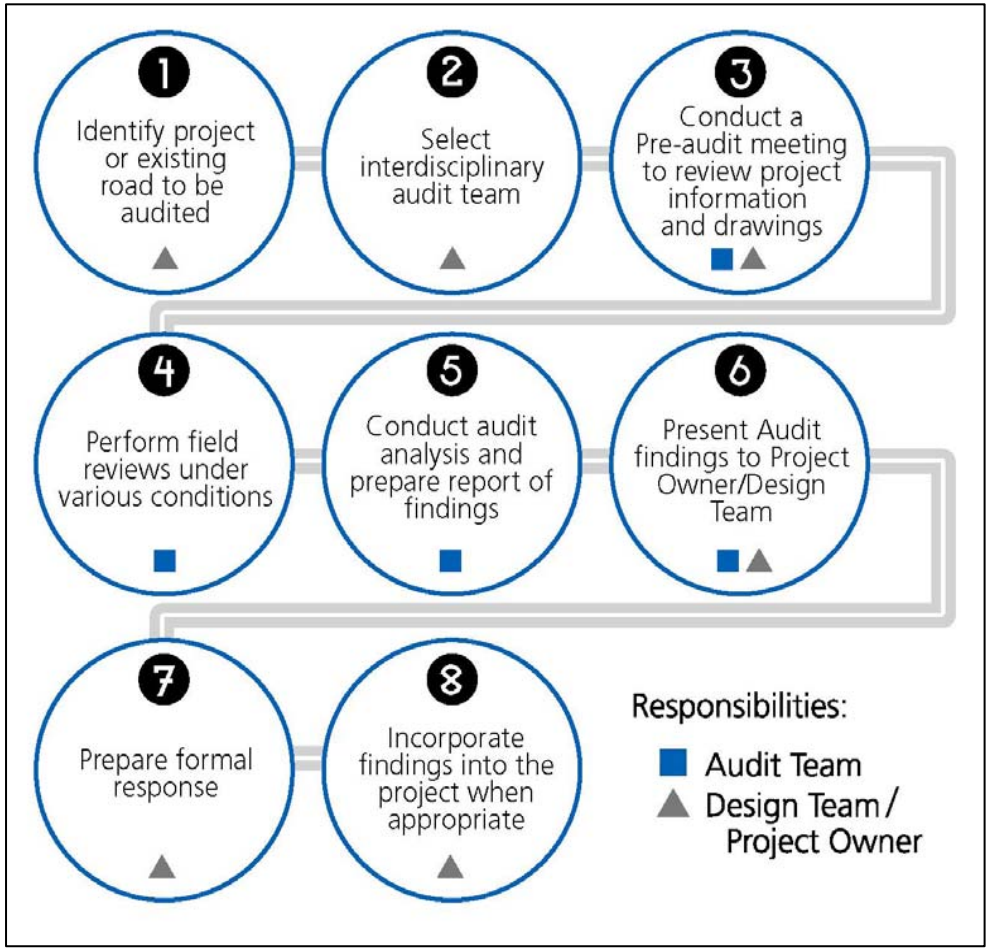
of an existing or future road or intersection

by an independent audit team.

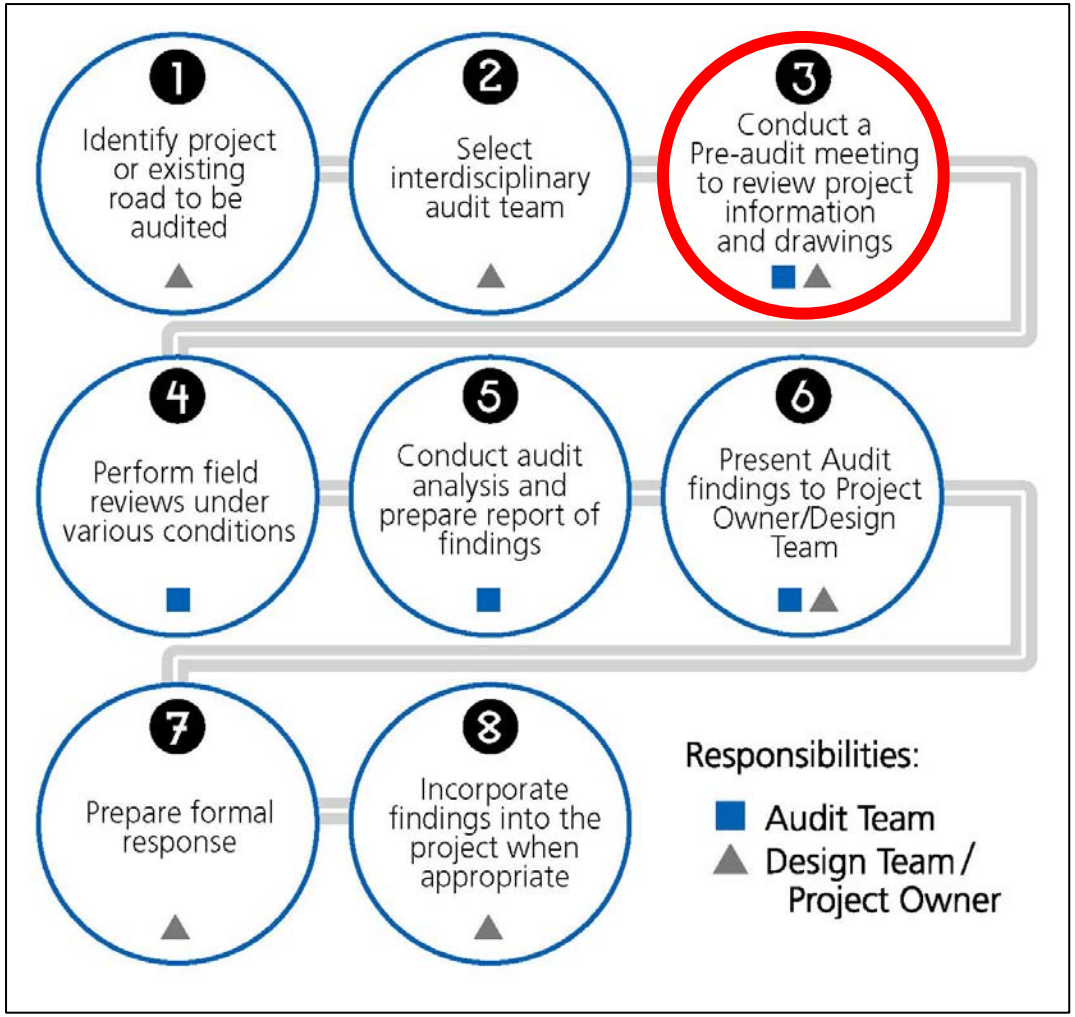
What is a Road Safety Audit?

• *formal:*	procedures and documentation
• *safety performance:*	focus on safety
• *independent:*	no previous experience with audited road
• *audit team:*	general experience and specialists

RSA Process


1
Identify project or existing road to be audited
2
Select interdisciplinary audit team
3
Conduct a Pre-audit meeting to review project information and drawings
4
Perform field reviews under various conditions
5
Conduct audit analysis and prepare report of findings
6
Present Audit findings to Project Owner/Design Team
7
Prepare formal response
8
Incorporate findings into the project when appropriate
Responsibilities:
Audit Team
Design Team / Project Owner

RSA Process – Pre-Audit Meeting



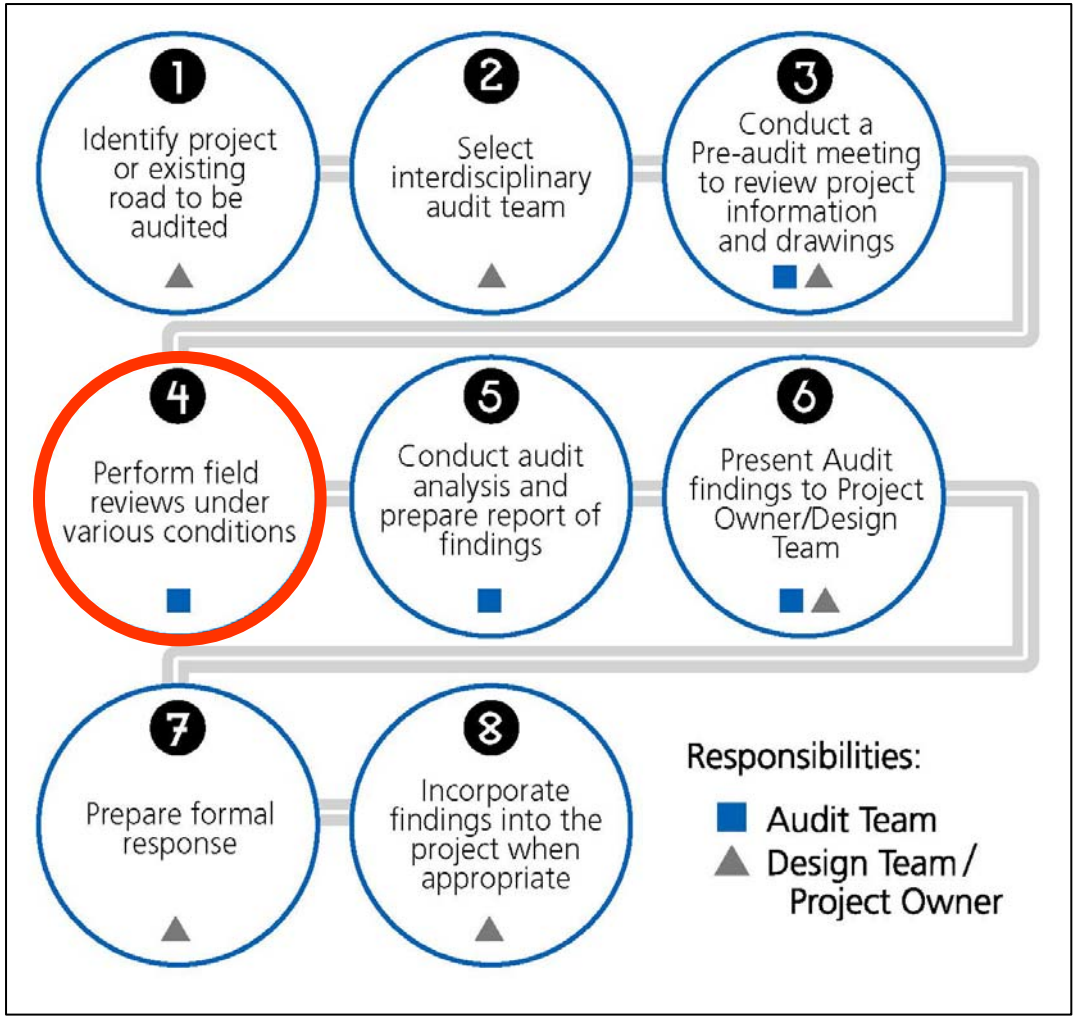
Pre-Audit Meeting: Review Information

- Drawings
- Background reports
- Design criteria
- Collision history
- Traffic volumes
- Aerial photographs

Pre-Audit Meeting

- Project objectives (owner)
  - Why is RSA being conducted?
- Project design elements/ constraints (owner)
- RSA process (audit team)

RSA Process – Field Review



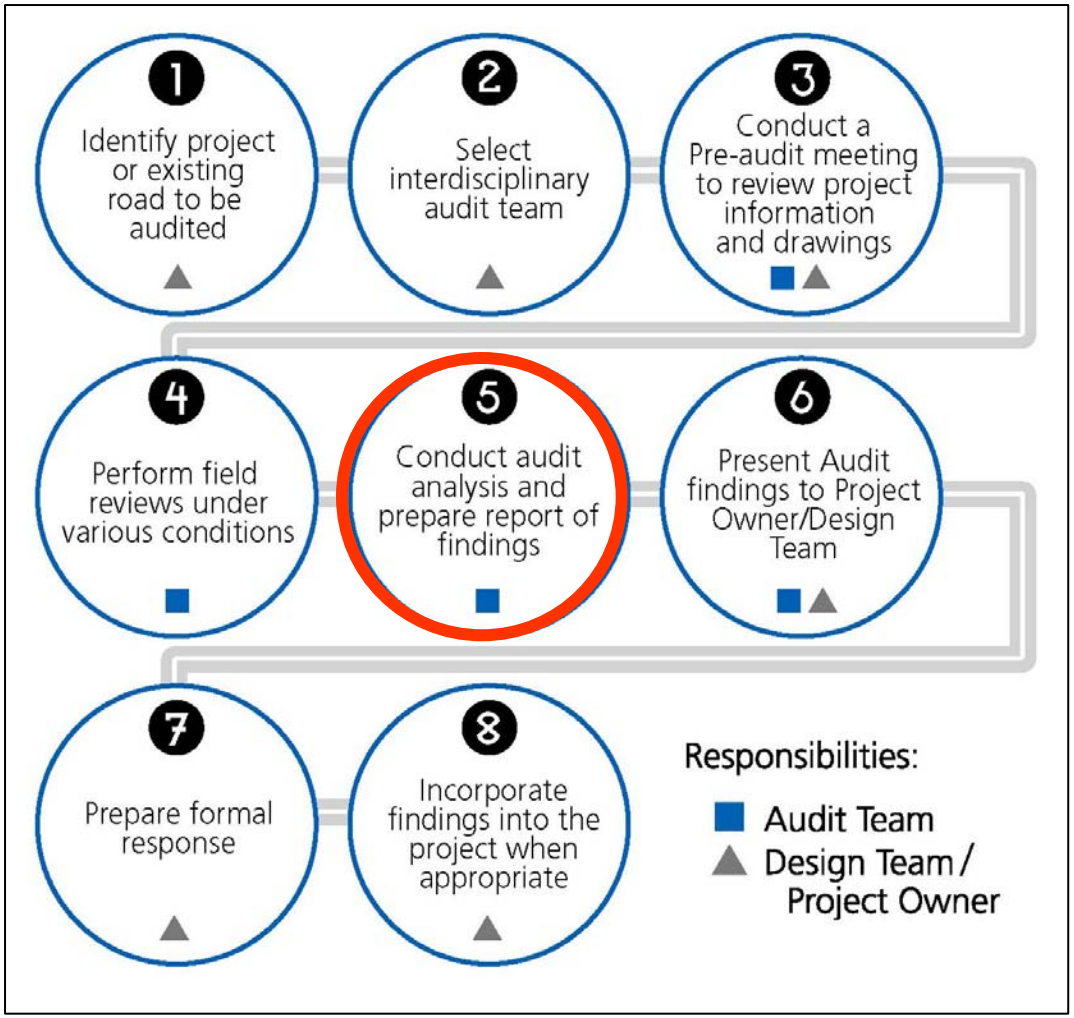
Field Review

- Observe road user characteristics
- Observe surrounding land uses
- Observe link points to the adjacent transportation network

Field Review

- Consider all users
- Consider human factors
- Use prompts to assist review
- Take notes/photos
- Work cooperatively

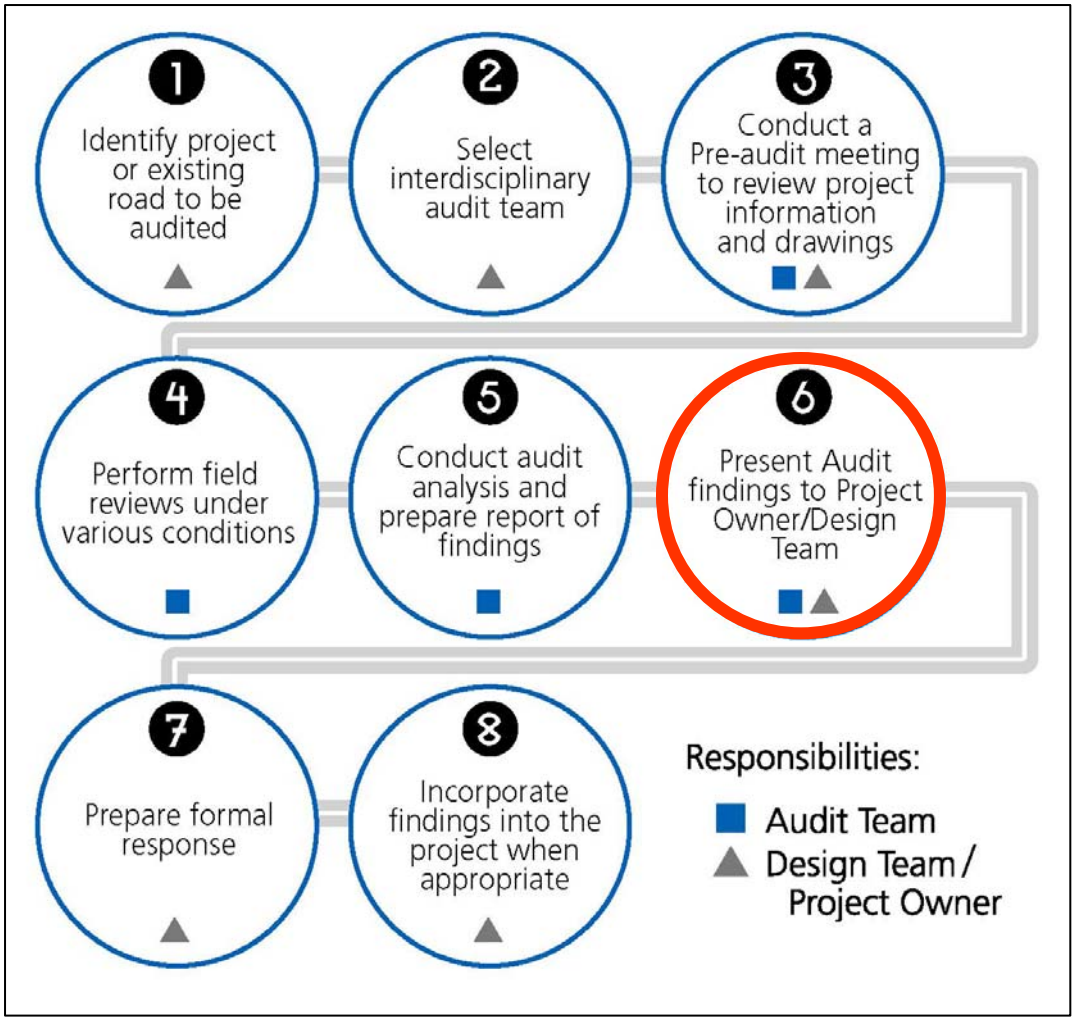
RSA Process – RSA Analysis



RSA Analysis: Conducting the RSA

- Workshop setting
- Review background reports and design criteria
- Systematically review design drawings and/or other information
- Identify, prioritize, and mitigate safety issues

RSA Process – Presentation of Findings

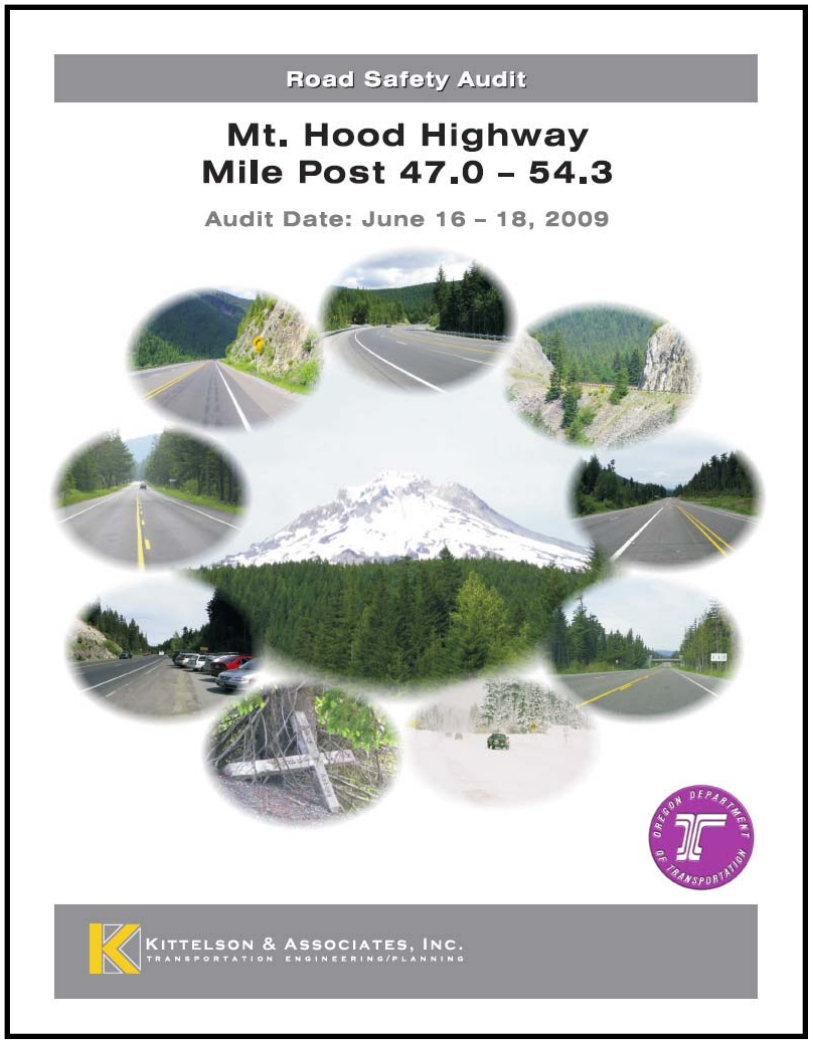


Presentation of Findings: Preliminary Findings Meeting

- RSA team, design team, owner
- Discuss preliminary findings and possible solutions
- Use results to prepare RSA report

Presentation of Findings: RSA Report

- Documents the results of the RSA
- Identifies and prioritizes safety issues
- May include suggestions for improvements



US 97 Bend Parkway Audit Team

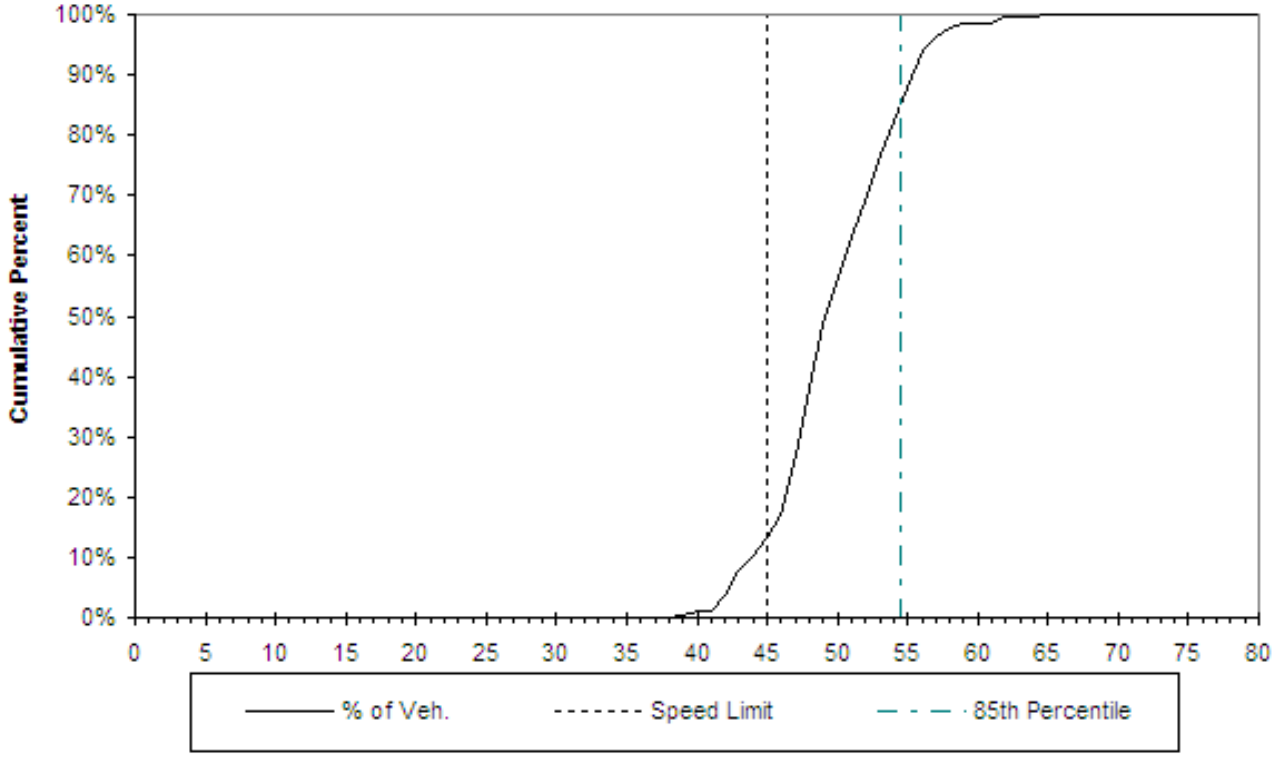
- Joel McCarroll, ODOT-Traffic
- Dan Serpico, ODOT-Traffic
- Mike Condon, ODOT-Traffic
- Sheila Lyons, ODOT-Bike/Ped Program
- Rick Williams, ODOT – Maintenance
- Della Mosier, ODOT – Roadway Design
- Rick Root, City of Bend – Transportation
- Sergeant Chris Carney, City of Bend – Police
- Officer John Beck, City of Bend – Police
- Erik Huffman, Bend Transportation Safety Advisory Committee
- Cheryl Howard, Deschutes County Bicycle Pedestrian Advisory Committee
- Lucas Freeman, Deschutes County Bicycle Pedestrian Advisory Committee
- Casey Bergh, Kittelson and Associates

RSA Data Collection and Field Observations

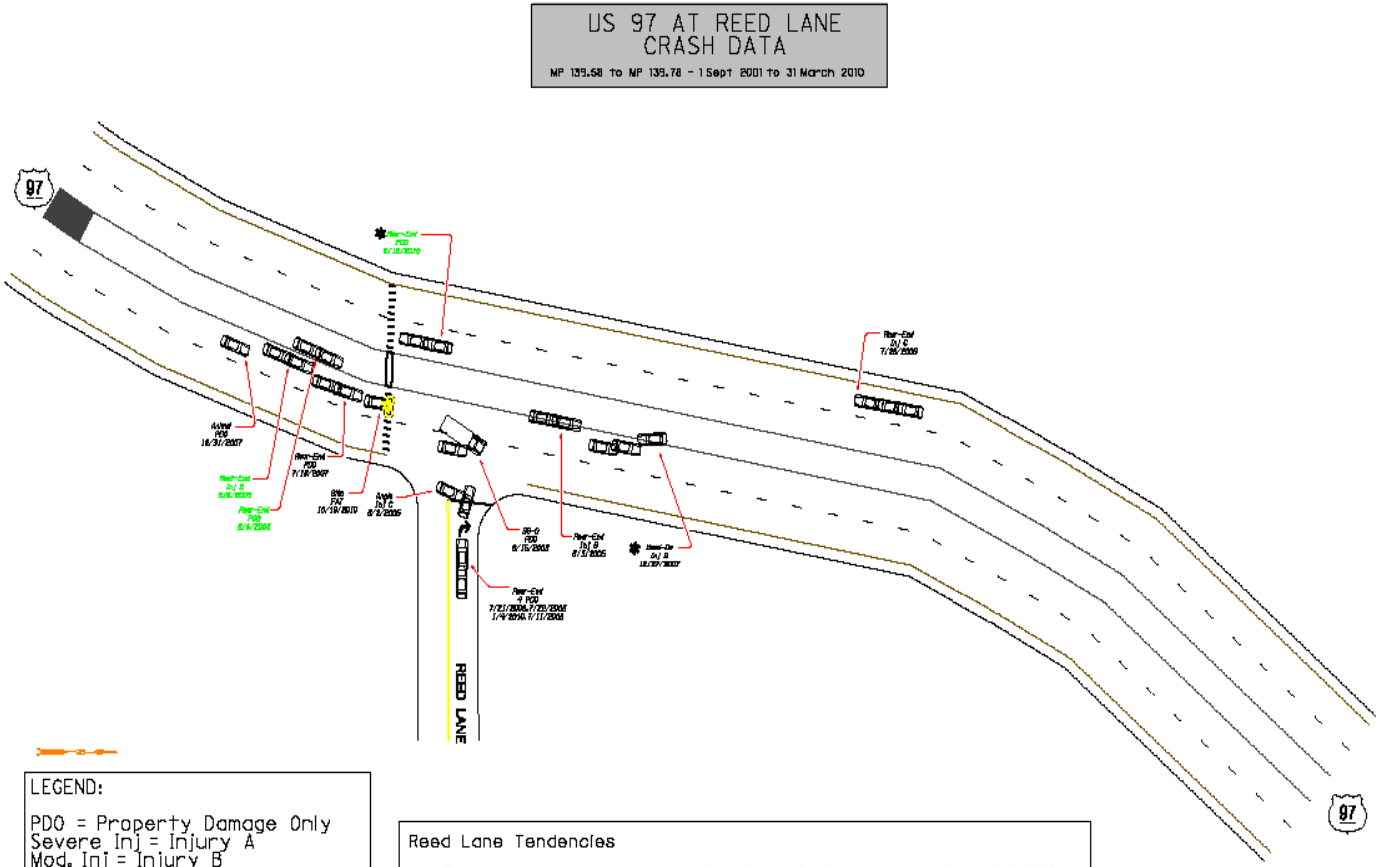
Bicycle and Pedestrian Volumes

- Reed Lane
  - A 14 hour weekday count in October: 50 Bicyclists and Pedestrians
  - 27 bicyclists and pedestrians in an 8 hour period on the weekend in late October
- Badger Road
  - A 12 hour weekday count in October: 46 bicyclists and pedestrians
  - 44 bicyclists and pedestrians in an 8 hour period on the weekend
  - Approximately 50% of bicyclists and pedestrians do not use the 'Z' Crossing. They cross straight across.

Speed – 85% = 54mph



Reed Lane Crash Diagram



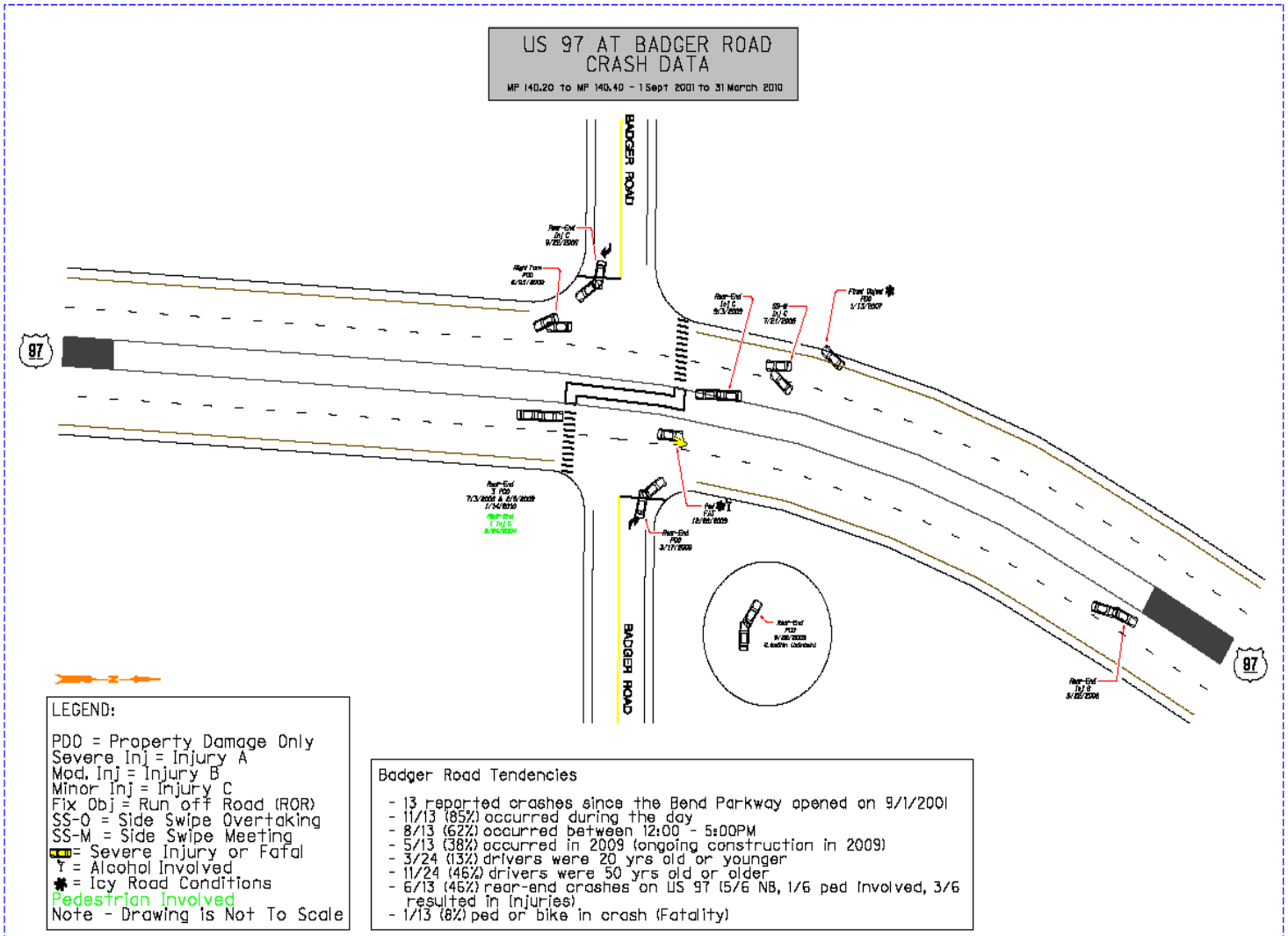
LEGEND:

PDO = Property Damage Only
Severe Inj = Injury A
Mod. Inj = Injury B
Minor Inj = Injury C
Fix Obj = Run off Road (ROR)
SS-O = Side Swipe Overtaking
SS-M = Side Swipe Meeting
= Severe Injury or Fatal
= Alcohol Involved
= Icy Road Conditions
Pedestrian Involved
Note - Drawing is Not To Scale

Reed Lane Tendencies

- 15 reported crashes since the Bend Parkway opened on 9/1/2001
- 13/15 (87%) occurred during the day
- 10/15 (67%) occurred between 12:00 - 4:00PM
- 6/15 (40%) occurred in 2009 (ongoing construction in 2009)
- 7/29 (24%) drivers were 20 yrs old or younger
- 14/29 (48%) drivers were 50 yrs old or older
- 6/15 (40%) rear-end crashes on US 97 (4/6 NB, 3/6 ped involved, 2/6 resulted in injuries)
- 4/15 (27%) rear-end crashes on Reed Lane (5/5 PDO)
- 1/15 (7%) ped or bike in crash (Fatality)

Badger Lane Crash Diagram



Existing Conditions

- Crossings are in locations where people want to cross. It provides connectivity between residents and services particularly retail.
- Attempt to focus crossings on specific locations rather than random locations.
- Two-Stage Crossing generally can be made safely – adequate gaps most times of the day.
- Crossings are illuminated.
- Good ADA infrastructure.
- Marked and signed.
- Vegetation has been trimmed and sight distance is improved.

Lack of Available Gaps in Peak Period

- In the PM peak it can be difficult to find an available gap.
- At other times (AM Peak and Lunch) large gaps are generally available in less than 30 seconds.

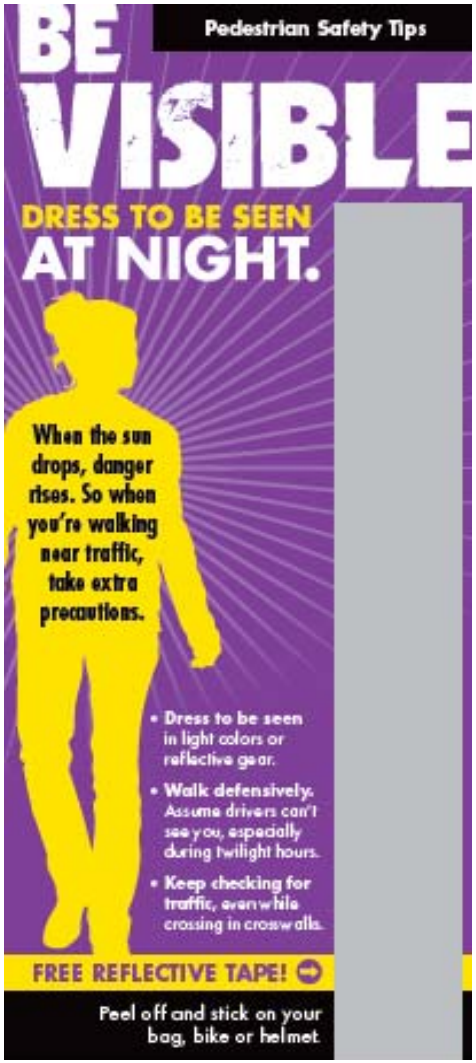
Bicycling Across the X-Walk

- Speed of a bicycle and location of the rider relative to the threat can contribute to multi-threat crash.
- Higher center of gravity of a mounted rider may contribute to increased severity.
- Solution is likely to be education and signing.

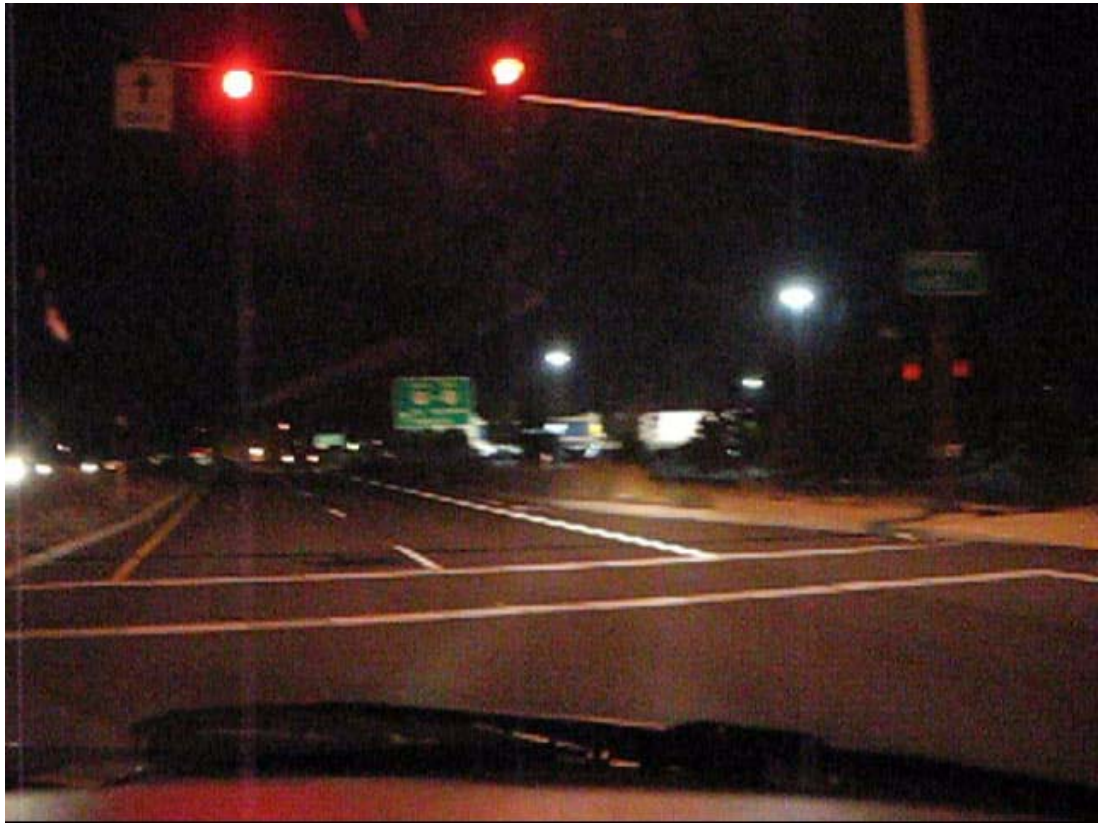
Night-Time Visibility of Bicyclists and Pedestrians

- Illumination in some cases may be inadequate for motorists to see bicyclists and pedestrians in low light conditions.
- Existing illumination can cast shadows in some locations.

Media Campaign



- Print Public Services Announcements
- Educational campaign to encourage bicyclists and pedestrians to have appropriate gear for lighting conditions.



Night-Time Visibility of Bicyclists and Pedestrians Mid-Term Solutions

- Redesign Illumination

Fig 11. Traditional midblock crosswalk lighting layout

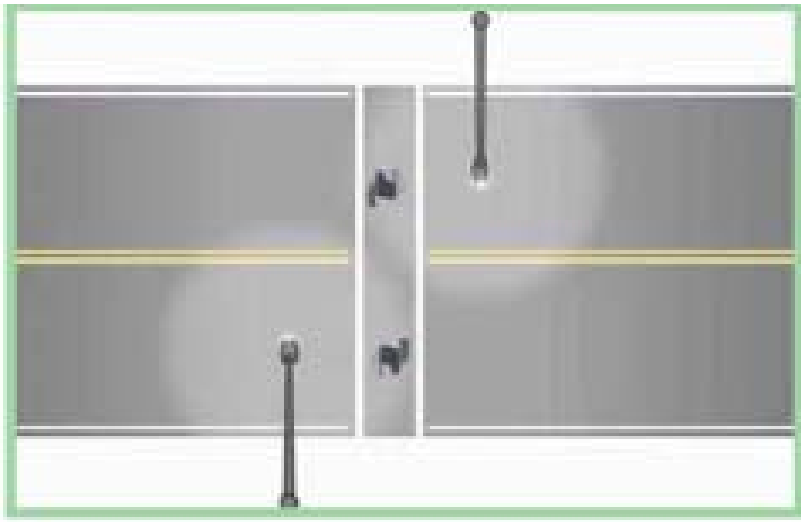


Fig 12. New design for midblock crosswalk lighting layout

Z-Crossing at Badger

- Some pedestrians don't use the 'Z' Crossing at Badger.
- They cross straight across or
- They cross at angle from the fence gate at Walmart.
- Pedestrians may be uncomfortable in the median.

Z-Crossing at Badger

- If pedestrians don't want to use the 'Z' and it is not necessarily unsafe for them to do so we should add additional crosswalks and illumination.

Z-Crossing at Badger
Short-Term Solutions

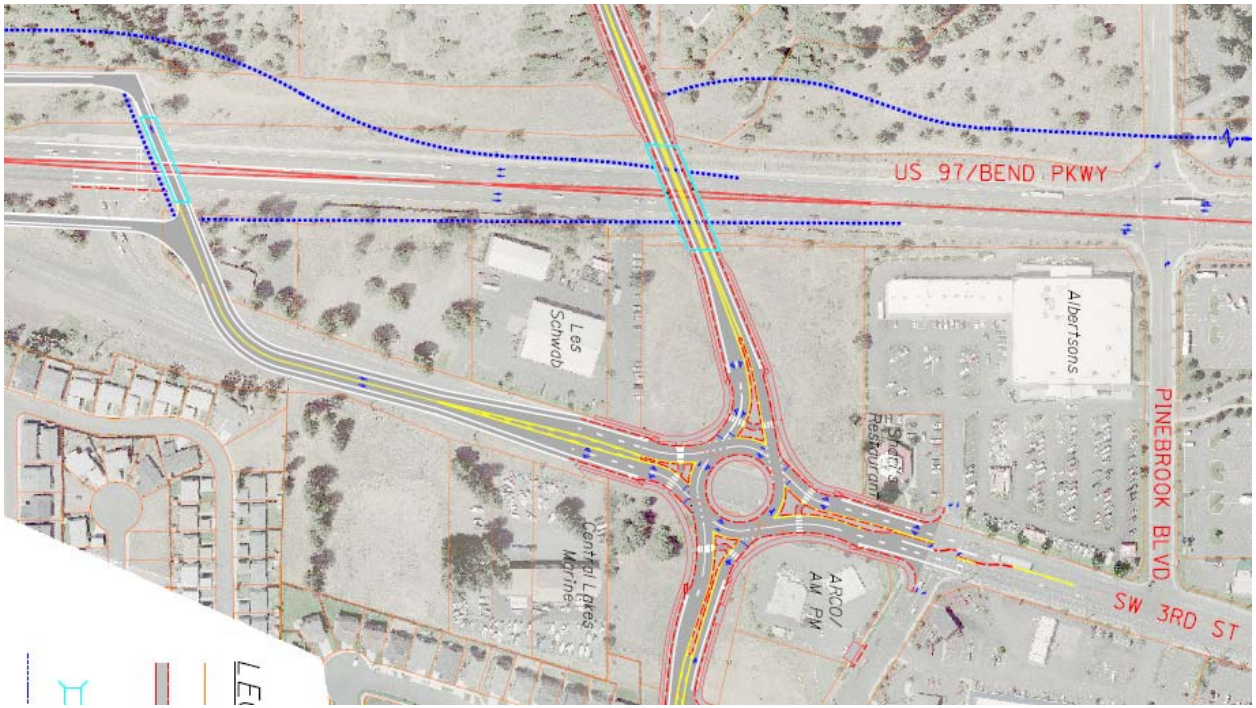
- Stripe X-walks on Badger
- Evaluate additional signs closing crosswalks and use delineators or rails to guide pedestrians to the ‘Z’.
- Permanently close gate on the west side of Walmart.
- Install signing and work with Walmart to formalize a path on the west side of the store.

Badger
Mid-Term Solutions

- Reduce the turning radii on Badger to shorten the distance crossing Badger or in the 'Z'

Changing Context of South Parkway

- The development of the Murphy Road project will change the context of the South Parkway.
- 3rd Street and Pinebrook signals will be removed.
- This will lead to fewer gaps and potentially higher speeds.



Changing Context of South Parkway

- Murphy Road Overcrossing will not necessarily replace the functionality of the Pinebrook Blvd and Badger Road crossings.
- Need to evaluate existing, proposed and additional connections.
- Evaluate Grade Separated Crossings
- Evaluate the use of the COID Canal including improved connections to the local streets and Parkway on both sides of the Parkway.

Connections Are Key

- On the west side, connections can be made as far west as Silver Lake Blvd.

- On the east side, where do you make connections to nearby apartments and Fred Meyer

Connections (Cont.)

- Connections to Reed Lane and the Parkway sidewalk and bike lanes are important as well.

Alternate Routes

- From Reed Lane to Fred Meyer using Powers Rd Signal adds an additional 9+ minutes.
- Using Pinebrook Blvd Signal rather than crossing at Badger adds about 6+ minutes to get from Badger to Walmart.
- These times are for healthy adult pedestrians.

Alternate Routes

- No other north-south routes on the west side of the Parkway have continuous sidewalk.
- There is no connection from the neighborhood to north of Badger to Pinebrook except the Parkway sidewalk.

Alternate Routes

- Gaps in sidewalk on 3rd Street force pedestrians to walk in the street.
- Many access points are risky for pedestrians

Alternate Routes

- East-West Alternate routes also have sidewalk gaps and poor connections.

Alternate Routes

- Powers Road can be challenging

Alternate Routes

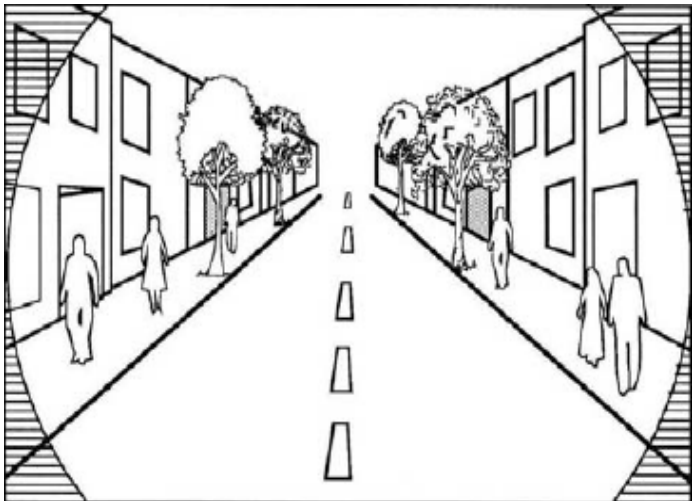
- Crosswalk users told us they felt that the alternate routes are

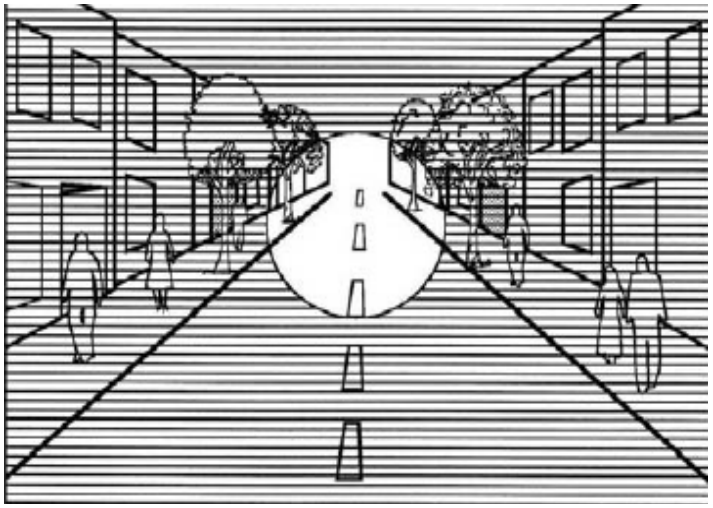
- Not as safe – motorists don't always yield at driveways and STOP controlled intersections such as the Powers ramp terminals
- Not as comfortable (walking or biking alongside heavy traffic)
- Too Long
- Less Convenient

Key Issues Identified

- Crossings are well marked and are at locations where people want to cross.
- High speed and mixed message about context make it hard for drivers to be aware of bicycles and pedestrians crossing.
- Drivers tend to not yield to avoid being rear-ended and when they do yield, braking maneuvers are abrupt and can be late.
- Multi-Threat Crash

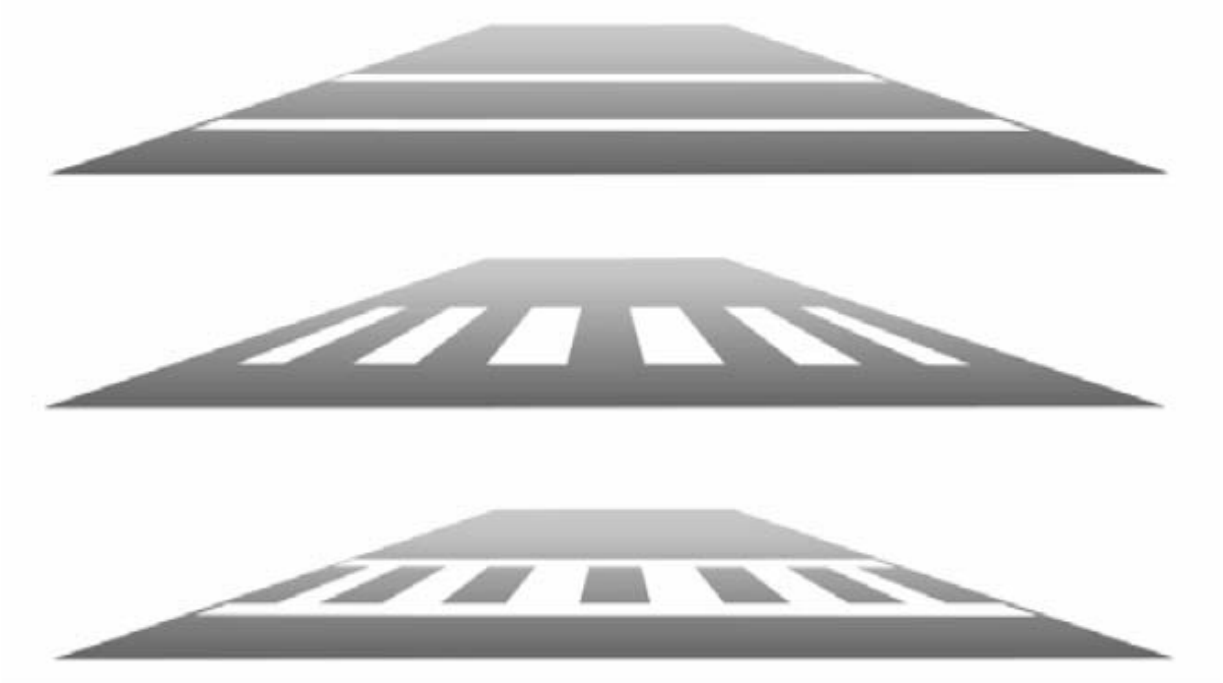
Driver Awareness of X-Walk





- High Speeds as vehicles approach Crossings
- Mixed Clues about the Driving Environment
- Tall vegetation

Crosswalk Visibility



Crosswalk Marking Types

Driver Awareness of X-Walk Short-Term Solutions

- Install advance warning signs for X-walk in the median in both directions.
- Maximize sign spacing. Remove or relocate other redundant signs.
- Install Ped/bike legends on the pavement.
- Install additional delineators in the median and shoulders to draw attention to the crosswalk.
- Ladder Style Crosswalk

Driver Awareness of X-Walk Short-Term Solution

- Develop educational/media campaign including talking points for staff, policy makers and community activists (87% of motorists are exceeding the posted speed).
- Research and literature search regarding the effectiveness of pedestrian activated beacons on high speed multi-lane roadways.

Driver Awareness of X-Walk Mid-Term Solutions

- Rectangular Rapid Flash Beacon or other type of beacon
- Pedestrian Hybrid Beacon (eg. High-Intensity Activated Cross-Walk HAWK)

Vegetation Management

- Tall vegetation along the Parkway restricts pedestrians view of headlights.

- Vegetation also hides pedestrians form motorists.

Vegetation Management Long-Term Solutions

- Develop long-term vegetation management plan
- Consider hardscaping some areas or replace with lower growing vegetation

Approach Speeds Are Too High Short-Term Solutions

- **87% of motorists are exceeding the posted speed.**
- Increase enforcement – narrow focus of speed enforcement grants from ODOT.
- Use driver feedback radar trailers – test possible locations for permanent installations.
- Use delineators and speed reduction markings to try and reduce speeds.
- Media Campaign
- Photo Enforcement

Approach Speeds (cont.)

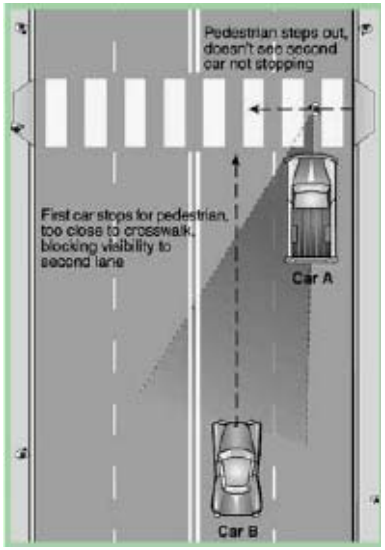
- ODOT deployed a Portable Speed Trailer for Southbound Traffic
- 85th Percentile Speed Dropped 3 MPH
- Total Number of Drivers Exceeding Posted Speed Decreased by 10%
- Percent in Pace Increased 10 Percentage Points

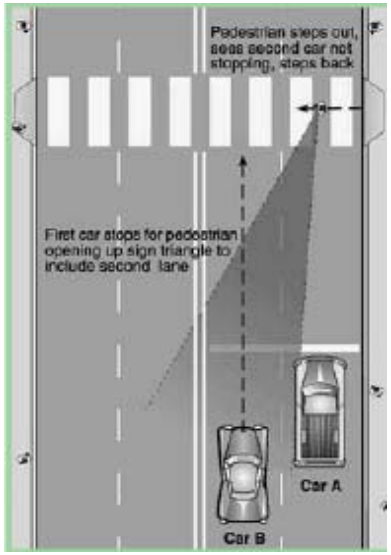
Rear-Enders Related to Motorists Yielding

- Many motorists are following too closely as they leave the Pinebrook Blvd and Powers Road signals.

- Lack of visual clues regarding the X-walk and the presence of pedestrians means many drivers are not expecting to stop.

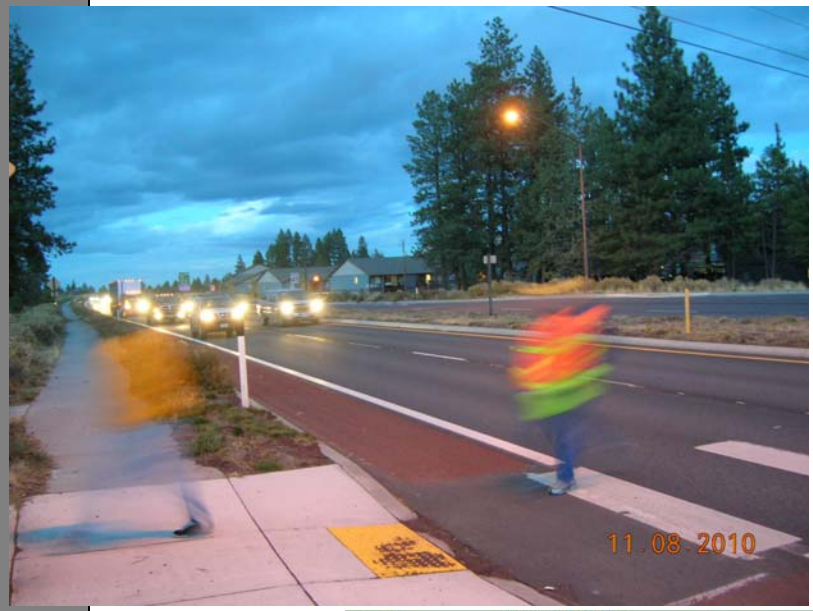
Multi-Threat Crash Short-Term Solutions





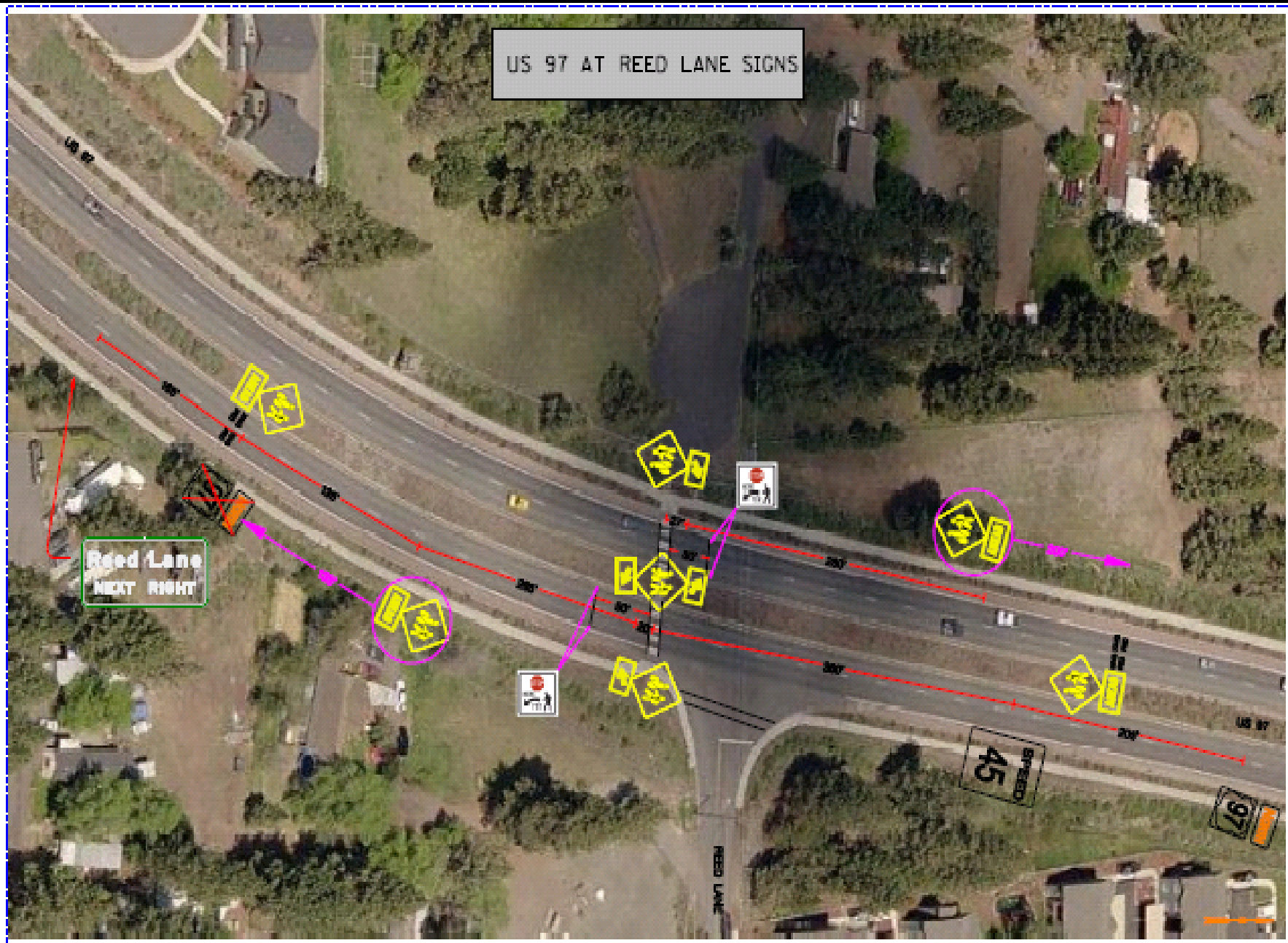
- Cars stopping in one lane screen approaching motorists and bicycles/pedestrians from each other.
- Install Advanced Stop Bar and STOP HERE FOR PEDS SIGN on shoulder and in median.
- Stripe a No Pass Zone Prior to the Crossing.

Advance Stop Bar (examples)

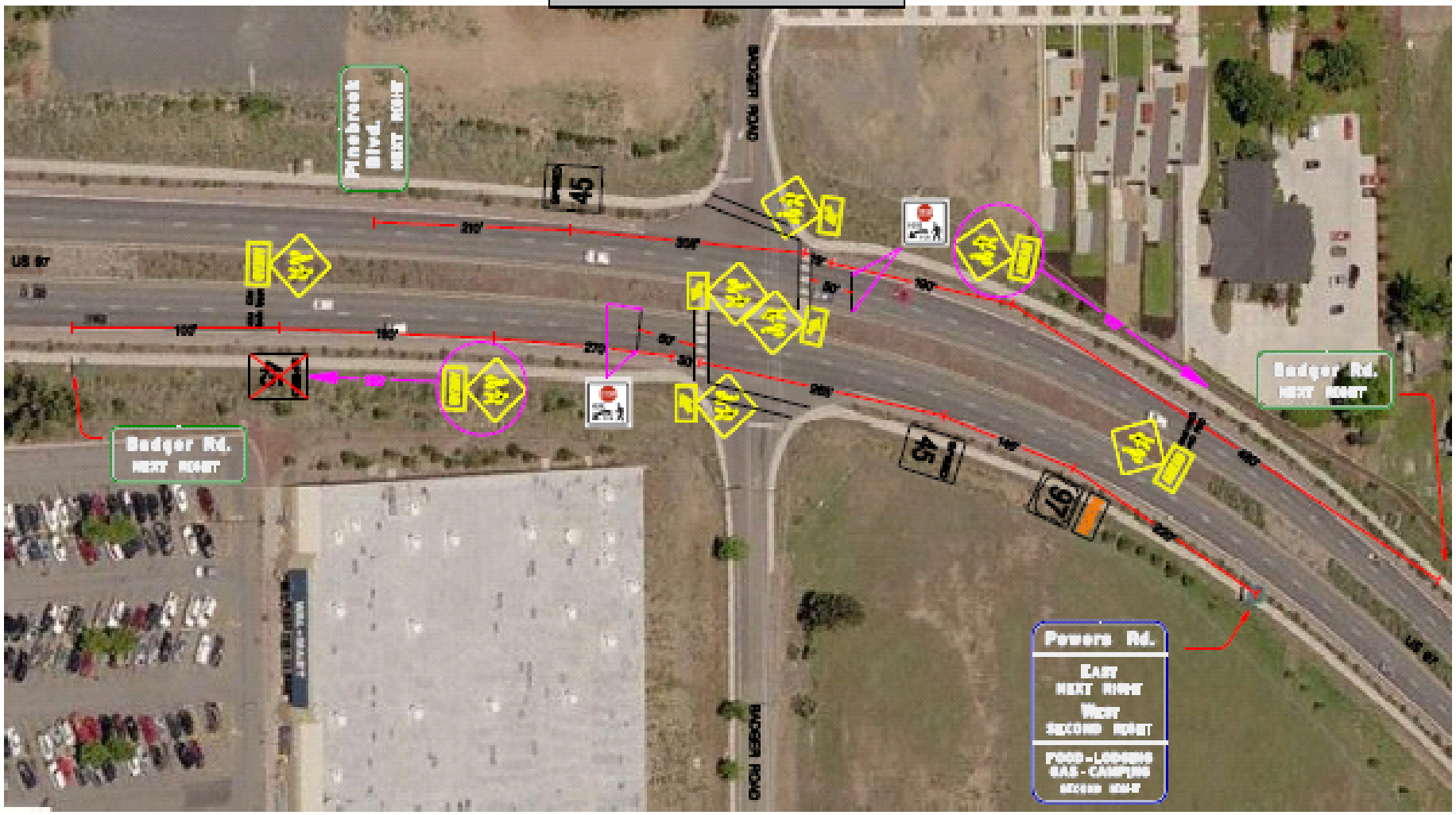


Immediate Recommendations – What's been done to date

- Gate to Walmart Closed at Badger Rd
- Current STIP Project still under construction - US 97 Bowery Lane to Romaine Village Way
- Requested for State Traffic Engineer's Approval to Install RRFB's – Approval Granted
- Construction documents designed by ODOT staff and submitted Change Order for about $100,000 to current construction project to Install RRFB's and improve striping.


US 97 AT REED LANE SIGNS
Reed Lane
NEXT RIGHT
US 97
REED LANE
45
97

US 97 AT BADGER RD SIGNS



Immediate Recommendations – What's been done to date

- Installed 16 RRFB's (4 for each direction) two in the median & two on the shoulder.
- Installed advance warning signs at least 500' from cross walk

Immediate Recommendations – What's been done to date (cont.)

- Installed Advance Stop Bars
- Pedestrian buttons have directional arrows, lights to indicate activation and audible message "Crosssing Parkway traffic may not stop"

Immediate Recommendations – What's been done to date (cont.)

- Vegetation has been trimmed along the entire Parkway by Maintenance Forces

Immediate Recommendations – What's still needs to be done

Near Future

- Install No-Pass for 150' in advance of crosswalk
- Install Ladder Crosswalk for Parkway Crossings
- Install Longitudinal Crosswalks on side streets
- Complete before and after Compliancy Study

Future

- Flexible Funds Grant: Plan long-term grade separation and implement facility improvements on local street system