U.S. Department of Transportation
Federal Highway Administration

Pedestrian and Bicycle Information Center

Raised Median Islands and Pedestrian Safety

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City of University Place

May 30, 2012

Today's presentation

- Introduction and housekeeping
- Audio issues? Dial into the phone line instead of using "mic & speakers"
- PBIC Trainings

  http://www.walkinginfo.org/training
- Registration and Archives at

  http://www.walkinginfo.org/webinars
- Questions at the end
- Follow-up E-mail with certificate of attendance for 1.5 hours of instruction and link to download slides

Medians and Median Islands

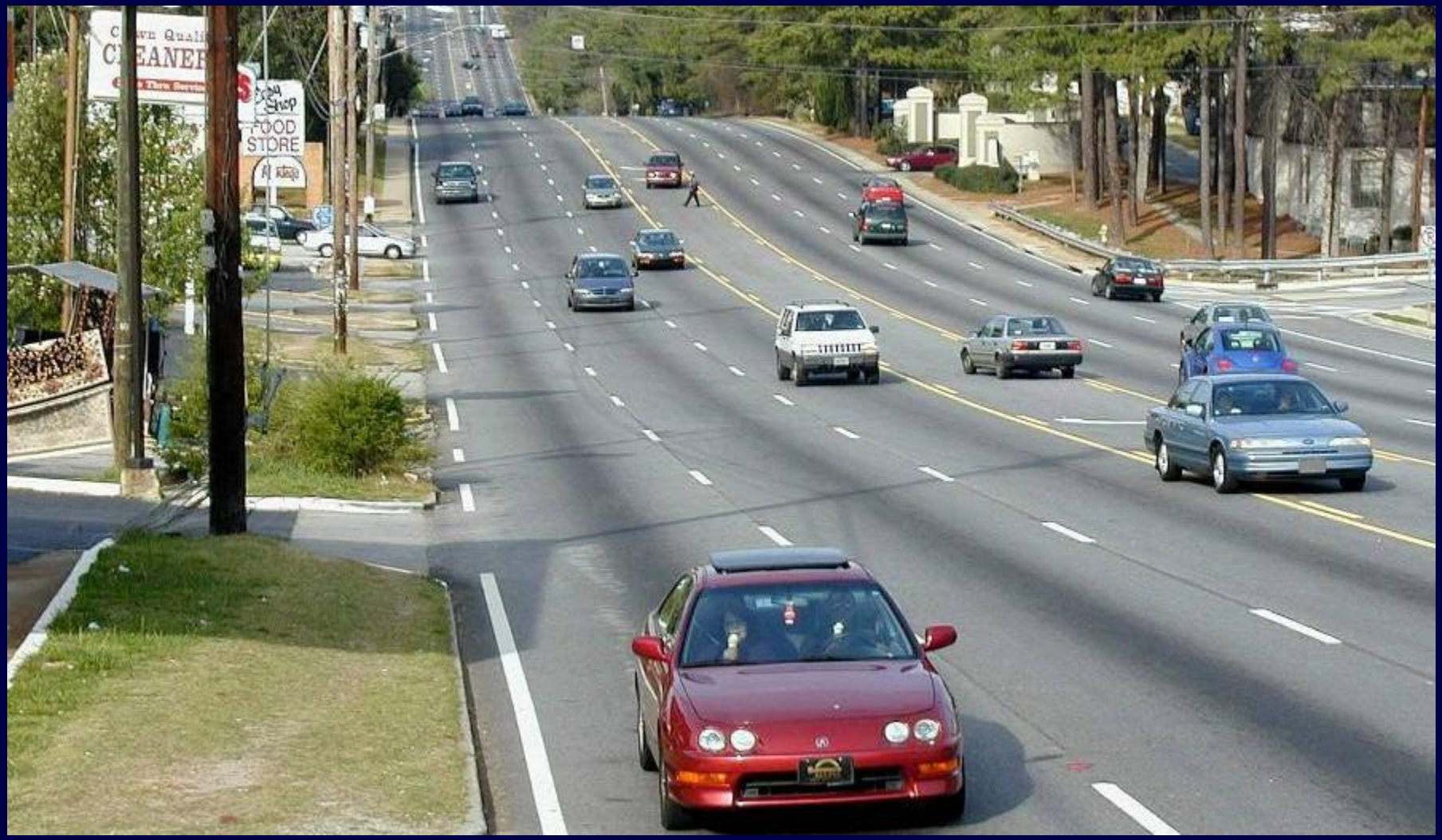
Overview and Effectiveness

Basic Street Crossing Techniques

- Crosswalks
- Illumination
- Signs
- Striping
- Medians/pedestrian islands
- Signals
- Over/undercrossings

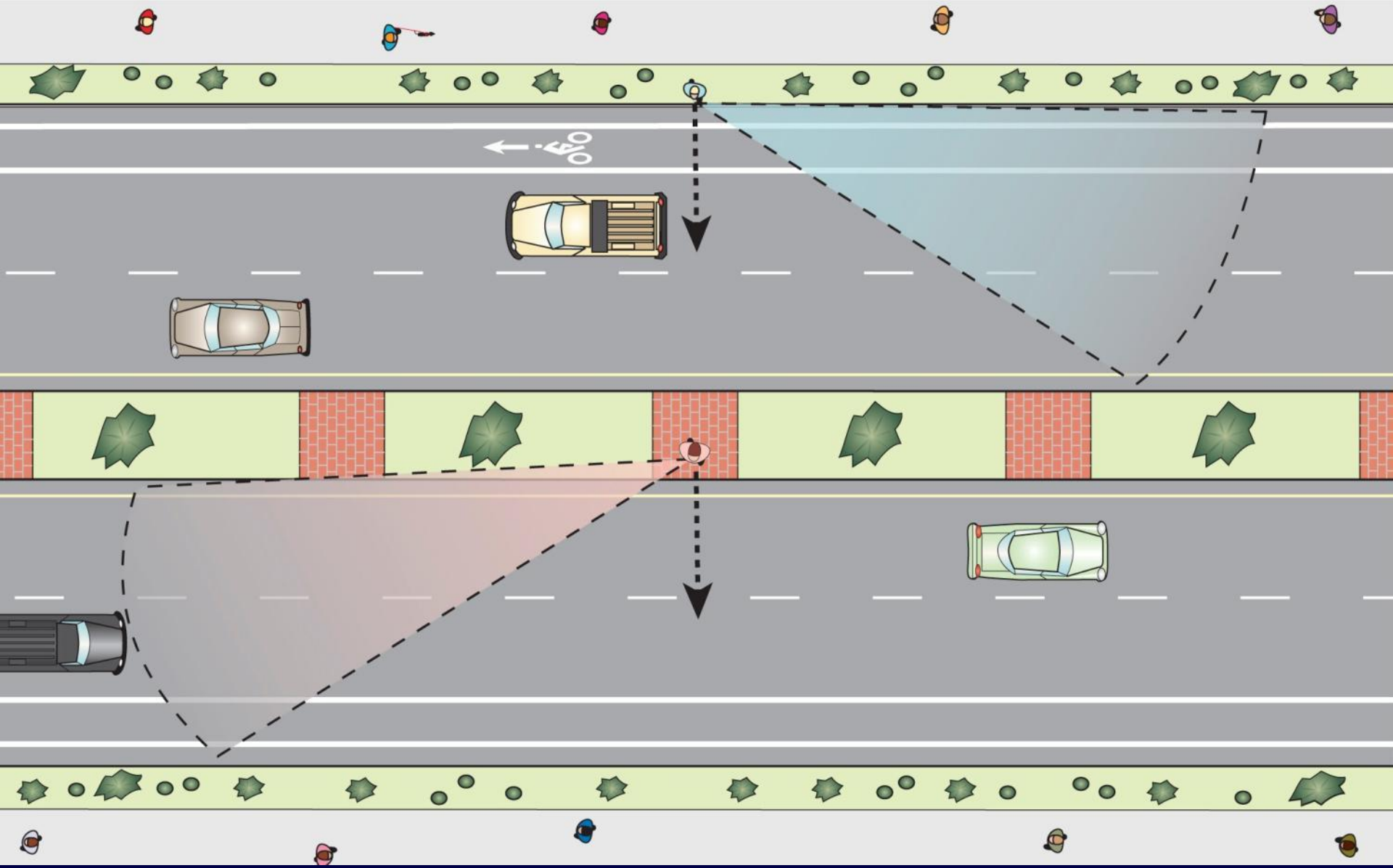
Need for Medians & Islands

Pedestrian crashes are correlated with ADT & number of travel lanes.



Definitions of Medians & Islands

- A median is an area between opposing lanes of traffic, excluding turn lanes that can be open (pavement markings only) or channelized (raised medians or islands) to separate road users
- Pedestrian refuge islands (center islands, refuge islands, pedestrian islands, median slow points) are raised islands that are placed on a street to separate crossing pedestrians from motor vehicles

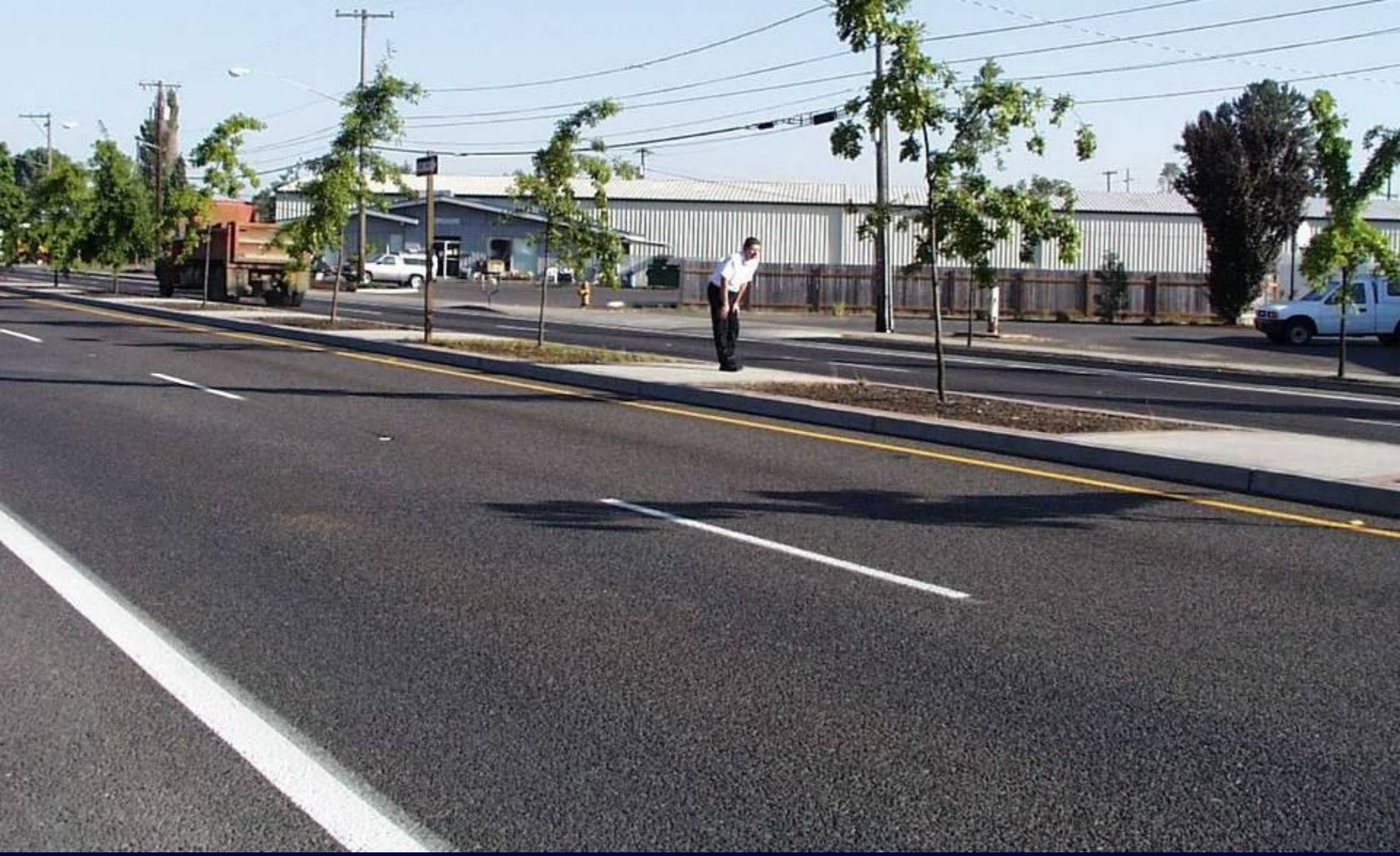


Continuous raised median – basic principle:

Breaks long complex crossing into two simpler crossings

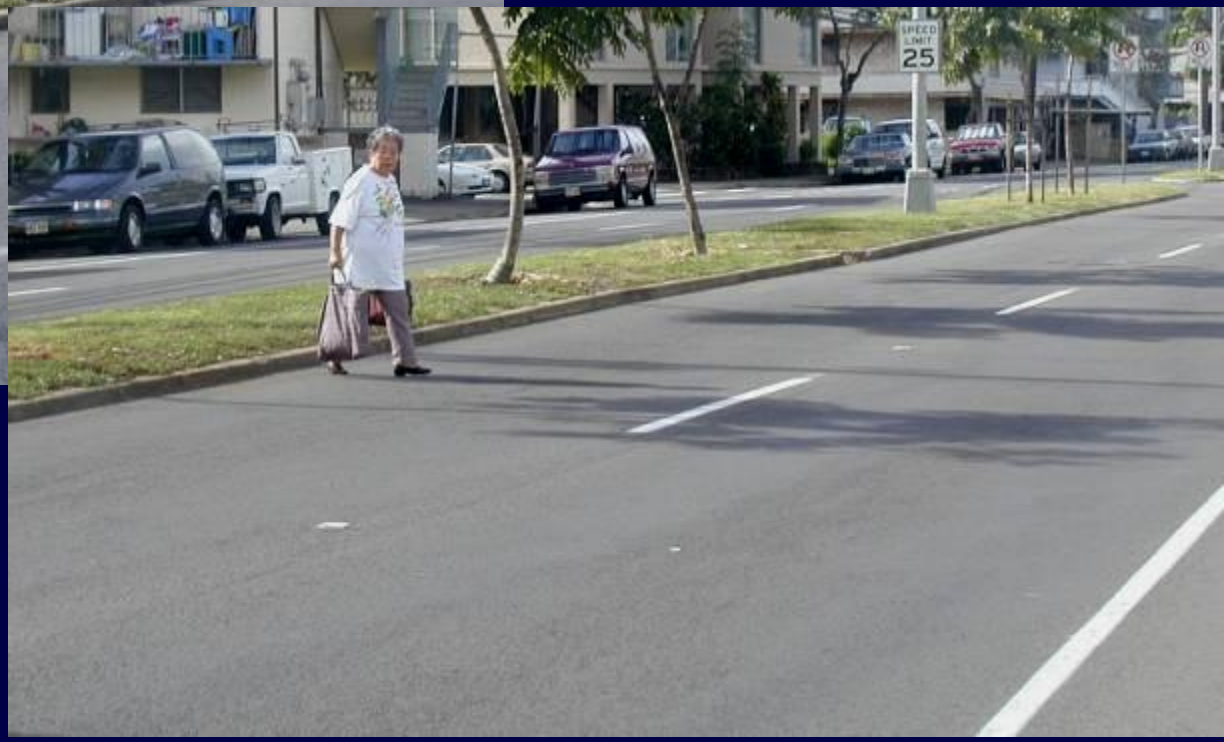
Step 1: look at traffic on left

Step 2: cross first half



Step 3: look at traffic on right

Step 4: cross second half



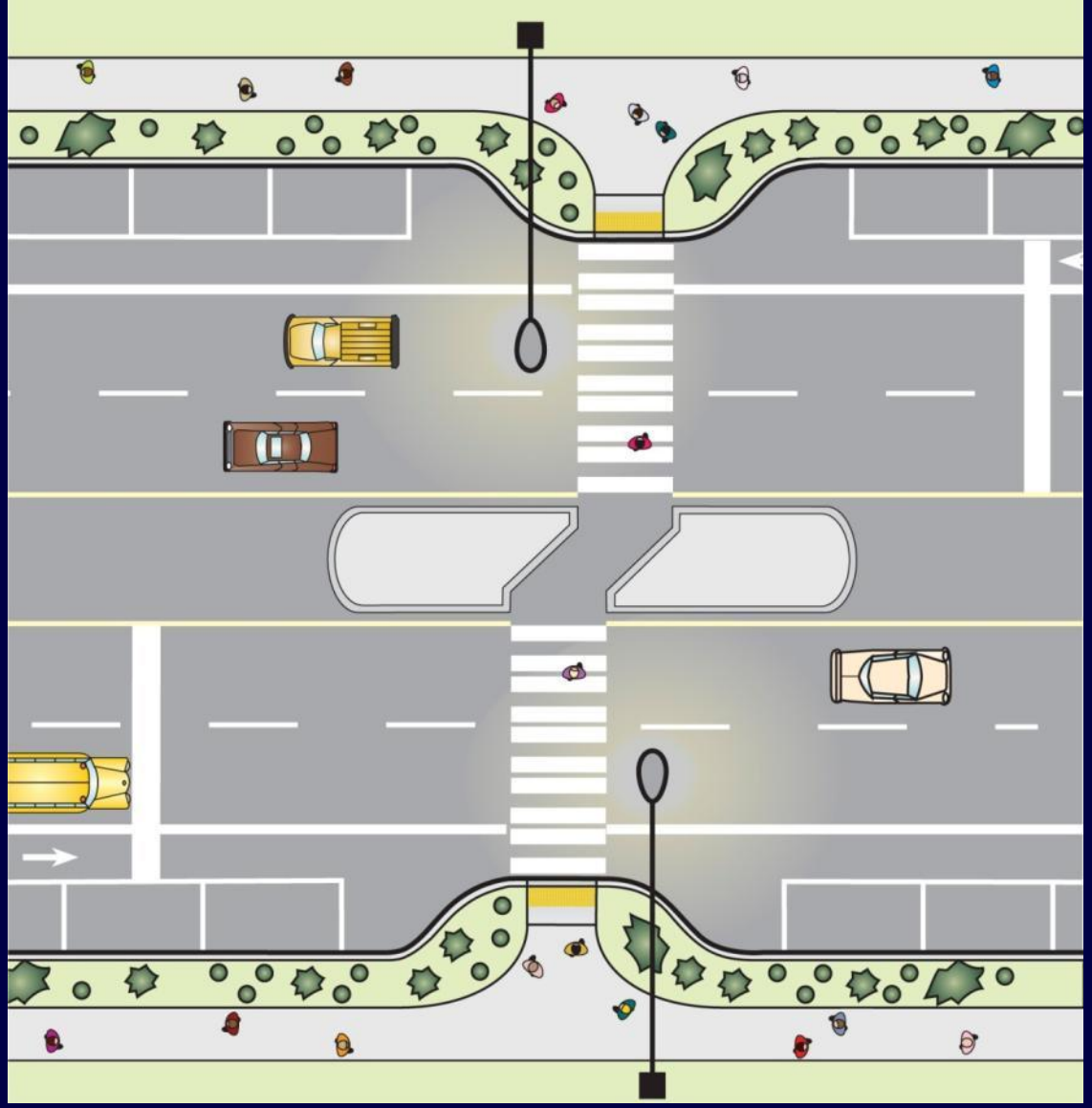
People figure out on their own how to use a median to cross in two steps

FHWA Guidance: Medians & Islands

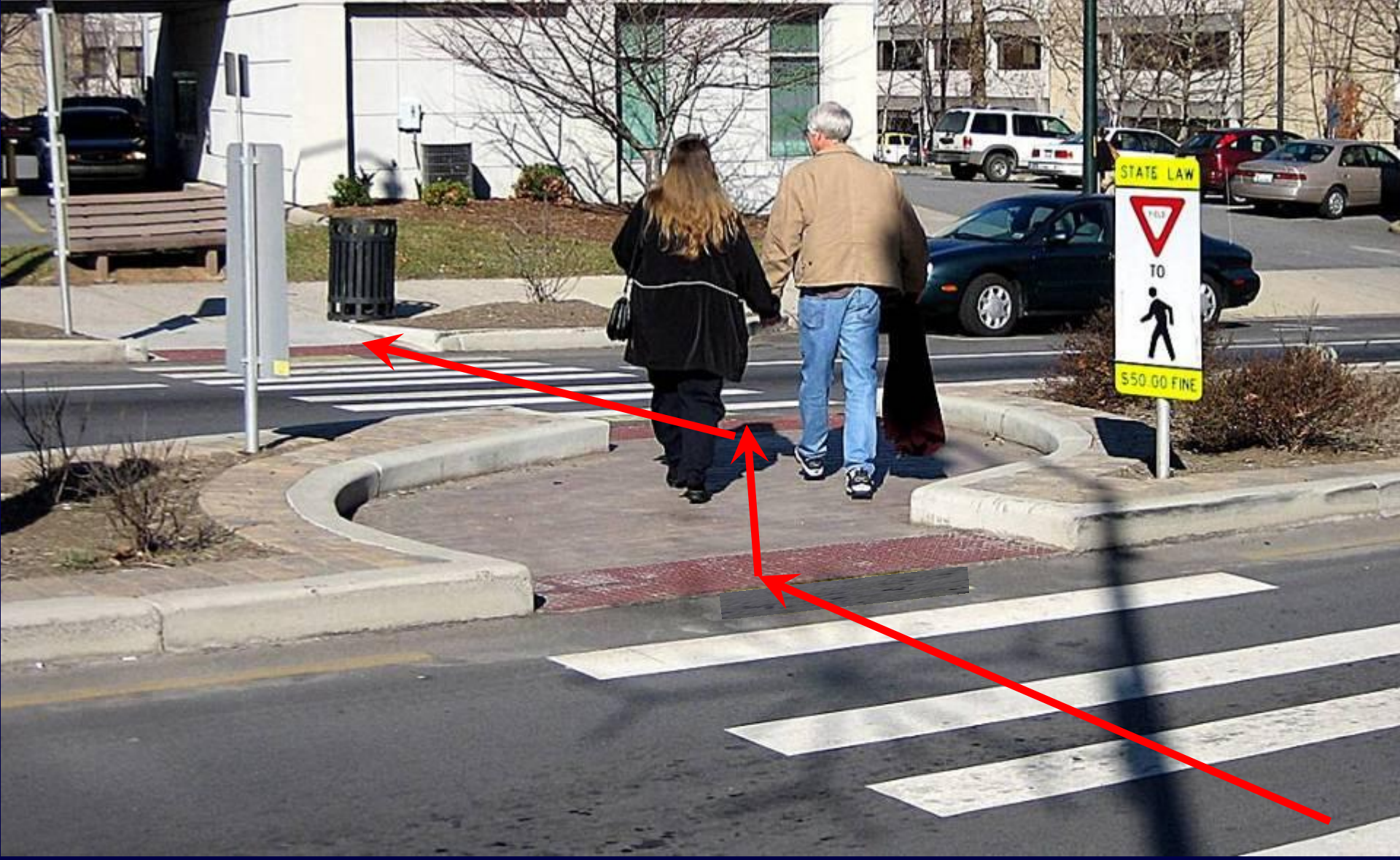
- Should be considered on curbed sections of multi-lane roads in urban and suburban areas
- Most beneficial for ADT's of 12,000 or above and/or high vehicle speeds
- Should be at least 4 feet wide, but although 8 feet preferred to allow for pedestrians to wait for gaps in traffic
- Should conform to ADA requirements

A flush median is not a refuge

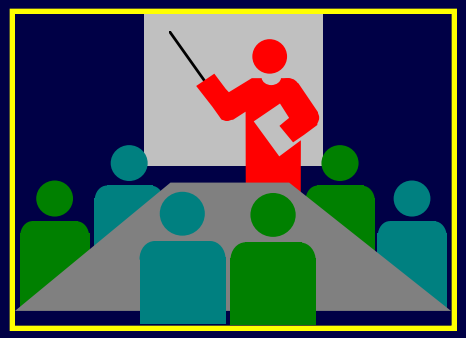
Add a raised island



Crossing island at marked crosswalk - same principle:
Breaks long complex crossing into two simpler crossings



Option: stagger or angle cut-through so pedestrians face oncoming traffic before 2nd crossing



Medians:

Why do medians reduce pedestrian crashes?

They reduce crossing distance and break up an otherwise complex task into 2 simpler crossings

What is the crash reduction factor?

At marked crosswalks CMF = 0.54 (CRF = 46%)

At unmarked crosswalks CMF = 0.61 (CRF = 39%)

Stage 1: Ped stops traffic in one direction

Stage 1: Ped crosses to median island

Stage 1 over: Traffic in one direction resumes

Stage 2: Ped stops traffic in other direction

Stage 2 over: Traffic resumes

Detail 1: Requires ped push button on island

Detail 2: Fences force peds to walk against on-coming traffic

Phoenix, AZ – W. Van Buren Street. Before: 1/2-mile signal spacing; high-volume, high-speed; marked crosswalks at unsignalized intersections

Before: No frills marked crosswalk at intersection

Before: Challenging 6-lane crossing at Community Center

After: Raised median with stagger, Advance stop lines (not visible), Location near destination

Medians and Crossing Islands can:

- Reduce pedestrian crashes by 39 to 46 percent
- Decrease motorist delay by 30%
- Provide a safe place for peds.
- Enhance visibility of pedestrians
- Reduce vehicle speeds
- Provide access management
- Provide space for signs

Oregon DOT – Pedestrian Islands

Three Types

- Continuous Medians
- Pedestrian Crossing Islands
- Pork Chop Islands

Oregon DOT – Pedestrian Islands

Three Types

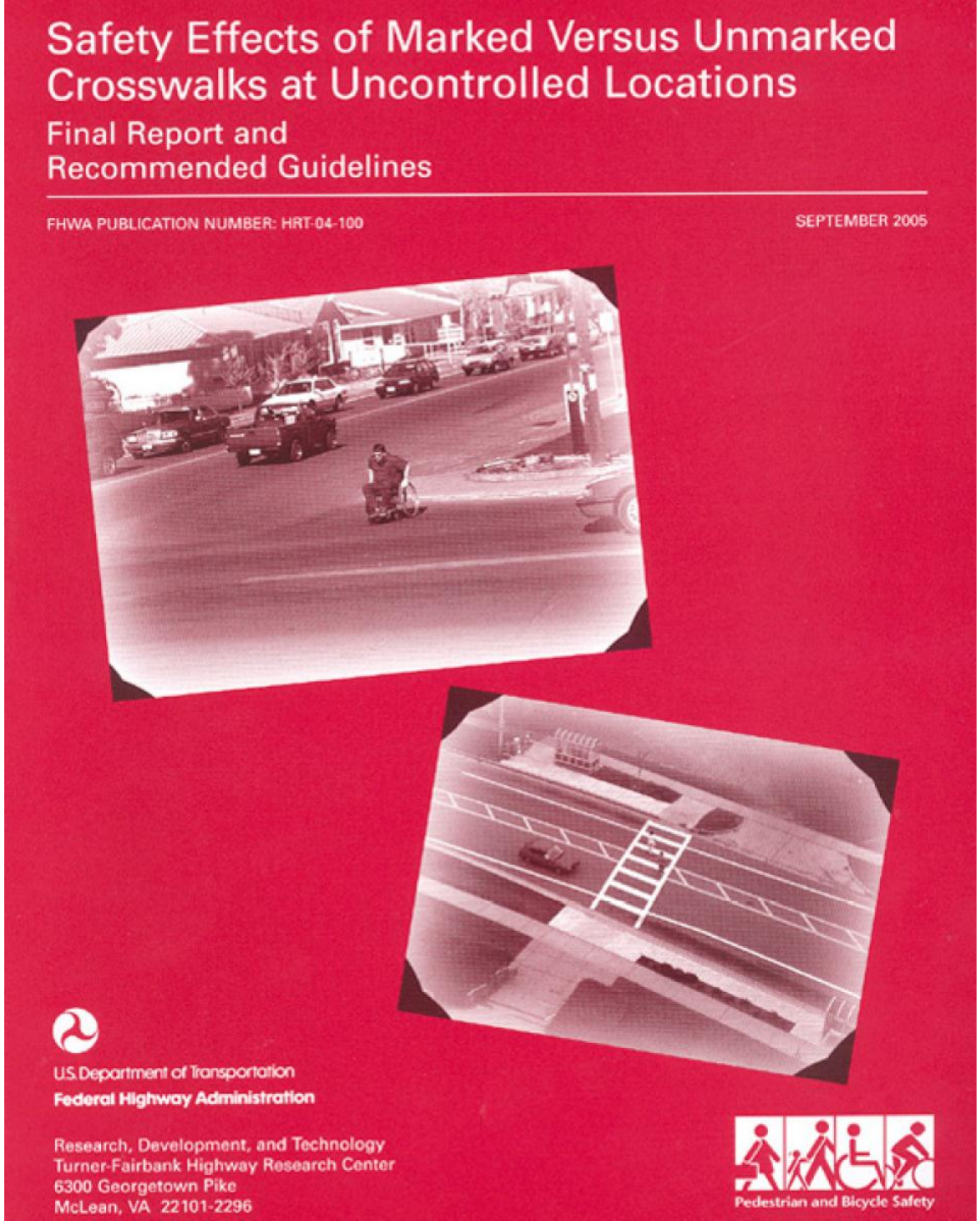
- Continuous Medians
- Pedestrian Crossing Islands
- Pork Chop Islands

FHWA Publication

HRT-04-100

September 2005

Charles Zeeger



Significant findings

Most important correlate between crashes and other factors: **ADT & number of travel lanes**.

- This confirms observations made on urban state highways in Oregon & other studies

Marked Crosswalks should not be used:

Speed Limit > 40 MPH

Without a **median** on a multi-lane roadway with ADT > 12,000

On multi-lane roadways with ADT >15,000 (with or without a median)

In close proximity to a signalized intersection

The following treatments are recommended:

- Raised **Medians/Islands** on multi-lane roads
- Traffic and ped signals where warranted
- Crossing exposure reduction
  - **Medians/Islands**
  - Curb Extensions
  - Lane Reduction (width, number)
- Locate bus stops on far side of uncontrolled intersections
- Traffic Calming
  - Raised Crosswalks
  - Street Narrowing
  - Diverters/traffic circles
- Illumination

Conclusions/recommendations

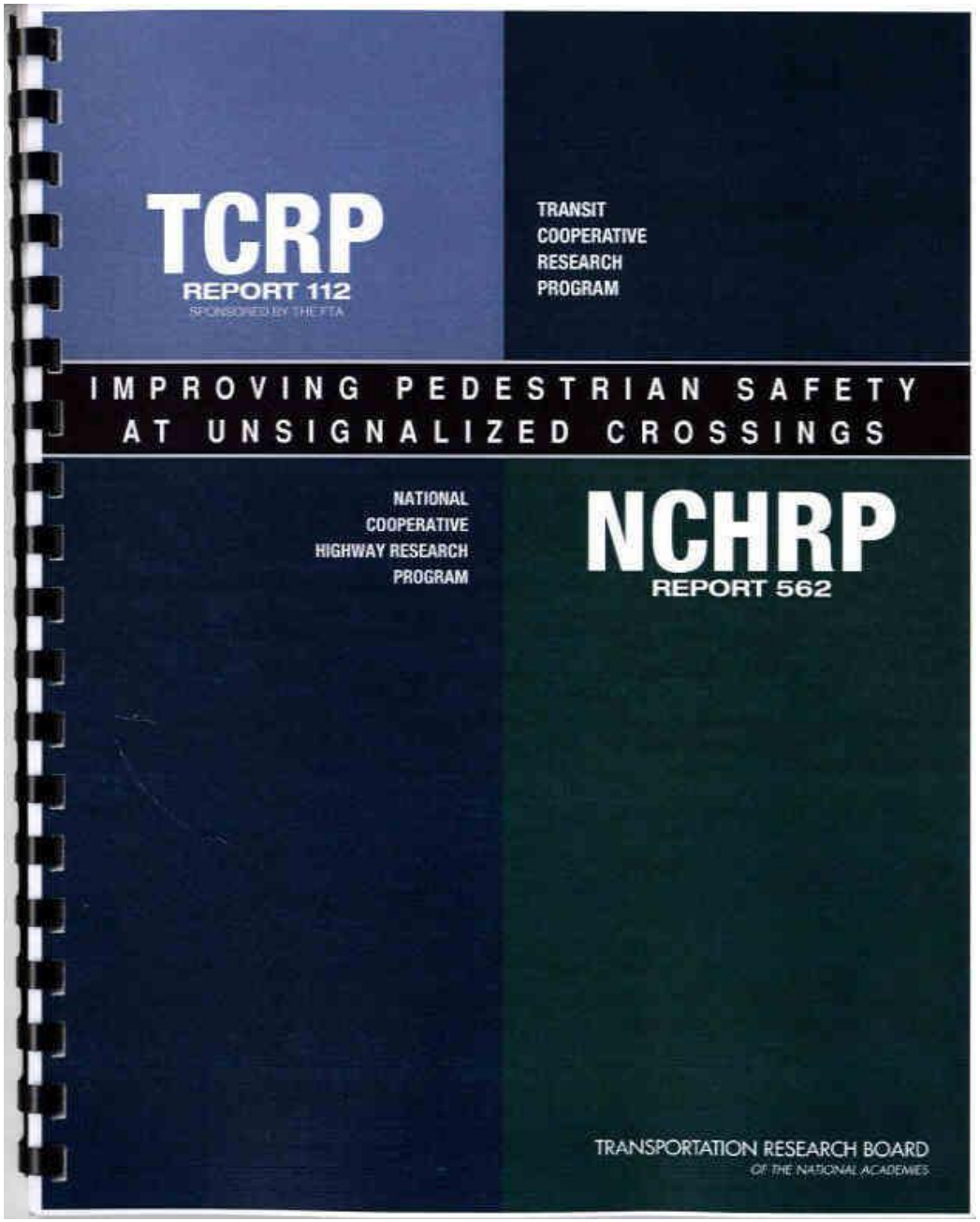
- OK to mark crosswalks at ADT <10,000 **w/o median***
- OK to mark crosswalks at ADT <15,000 **w/ median***
- **Medians reduce crash risk significantly**
- **High ADT roadways require added mitigation**
- Signalization or other treatments should be considered where large portion of pedestrians are young and/or elderly

* **Raised Median**

Provides methodology for determining what type of crossing treatment to use to improve safety of crossings on high speed high volume roadways

Recommends modifications to the MUTCD pedestrian signal warrant (Now in the 2009 MUTCD)

Includes research review and Field Studies



Oregon DOT Policies

Oregon DOT Traffic Manual

http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/Traffic_Manual_09.pdf

Marking Crosswalks at Uncontrolled Intersections

(Oregon DOT Traffic Manual Section 6.6.1.2)

Engineering study required. Location must meet the following criteria:

1. Good Sight Distance (Stopping SD as Min.)
2. No alternative crossing location
3. There is established pedestrian traffic
4. Posted Speeds are 40 MPH or less
5. ADT < 10,000 ADT
6. **If ADT ≥ 10,000 median Island is required**
7. On multi-lane highways additional features (medians, curb extensions, lighting) are encouraged

Marking Crosswalks at Mid-Block Locations

(Section 6.6.1.3)

Engineering study required. Location must meet the following criteria:

1. Good Sight Distance (Stopping SD as Min.)
2. No alternative crossing location
3. There is established pedestrian traffic
4. Posted Speeds are 40 MPH or less
5. ADT < 10,000 ADT
6. **If ADT ≥ 10,000 median Island is require**
7. Location is >300’ from a traffic signal
8. Curb extensions should be considered
9. There are adjacent bus stops

Other Considerations

- Opportunity to concentrate ped x-ings
- Free turning movements or other traffic characteristics inhibit x-ing opportunities at nearest intersection


Circle Blvd Corvallis, OR

Hwy 42 Winston, OR

Hwy 101 Depoe Bay, OR

Bailey Hill Rd Eugene, OR - Before

Bailey Hill Rd Eugene, OR - After


53rd St, Benton County, OR

Hwy 126B, Springfield, OR

A Tale of Six Islands

Hwy 99W

Corvallis

Oregon

Hwy 99W Corvallis, OR

Seven Pedestrian Islands were installed on 99W in Corvallis in 2005, along a 2 mile segment.

- All mid-block
- Paired with transit stops
- All have **median islands**
- Four with pole mounted pedestrian activated amber flashers

Sheila's Observations (personal & tape analysis)

Traffic has slowed 3 – 5 MPH

Pedestrian crossings are concentrated at islands (85 observed 5-7-07)(over 200 peds walked past camera)

Stopping compliance improved

Crash data shows increase in rear-enders – as expected

Very young children have been observed using

Overall improvement to pedestrian environment

Oregon DOT – Pedestrian Islands

Three Types

- Continuous Medians
- Pedestrian Crossing Islands
- Pork Chop Islands

Oregon DOT Highway Design Manual

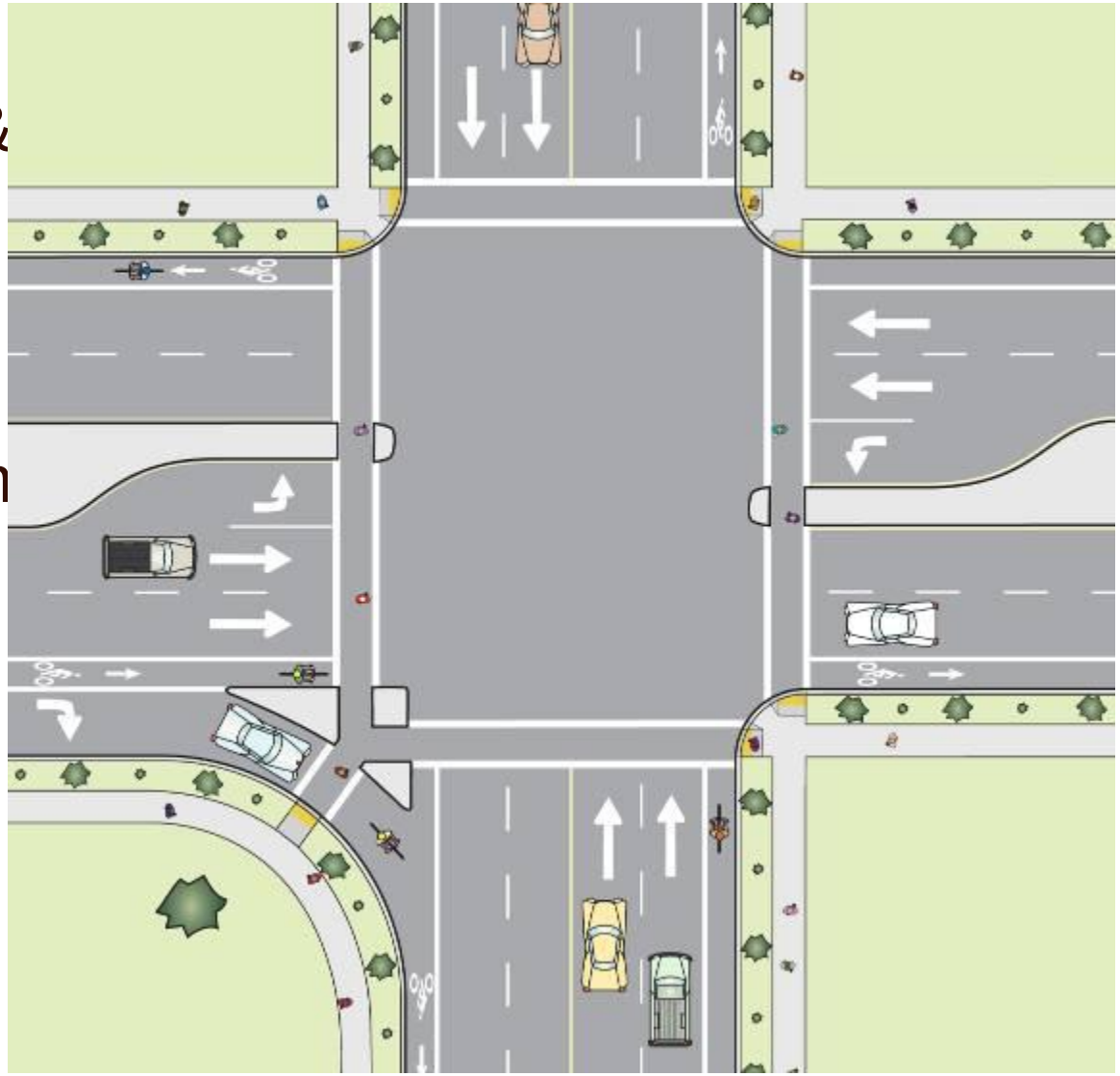
- Used when a right turn pocket is present
- Used whenever there is real estate available
- Current policy is to use cut-thrus for wheelchairs
- Provides a place to locate signal poles

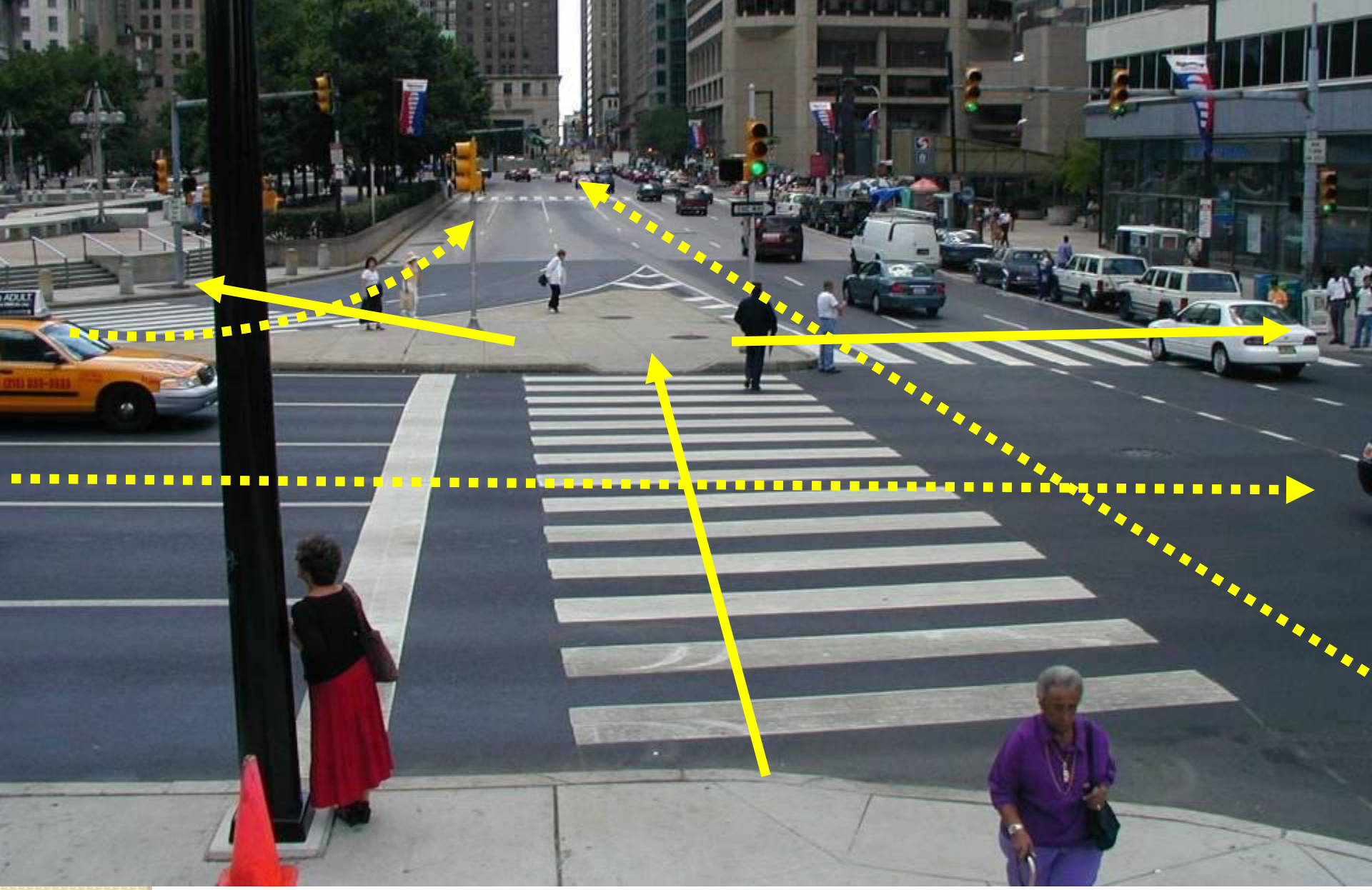
http://egov.oregon.gov/ODOT/HWY/ENGSERVICES/hwy_manuals.shtml

Pedestrian Islands

Benefits:

- Separate conflicts & decision points
- Reduce crossing distance
- Improve signal timin
- Reduce crashes

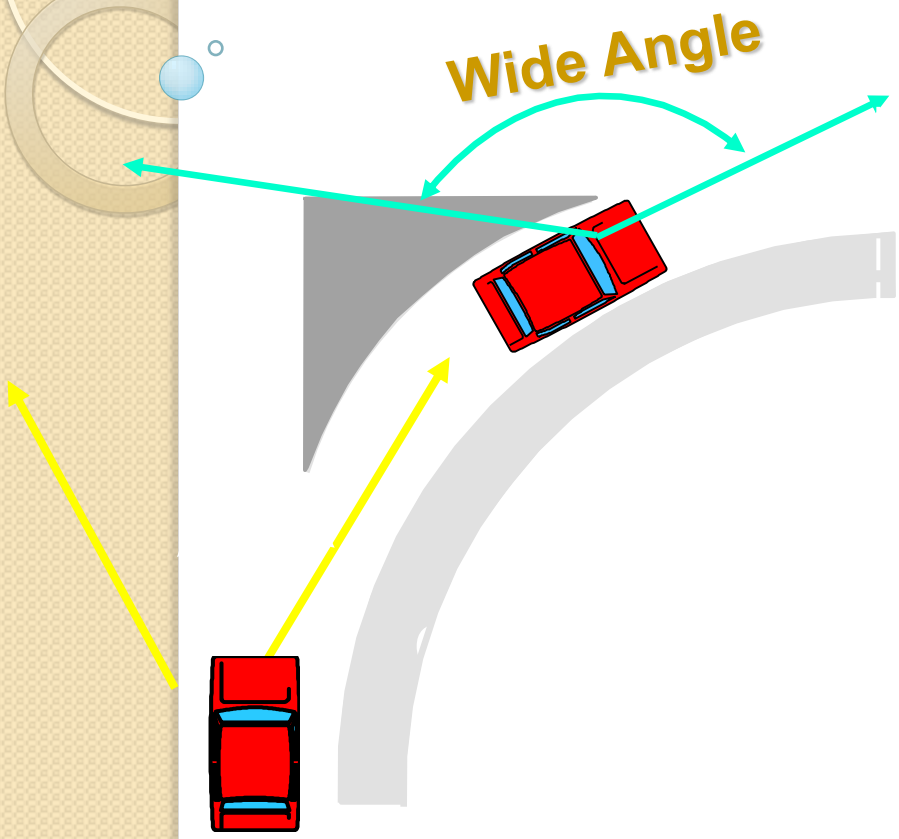




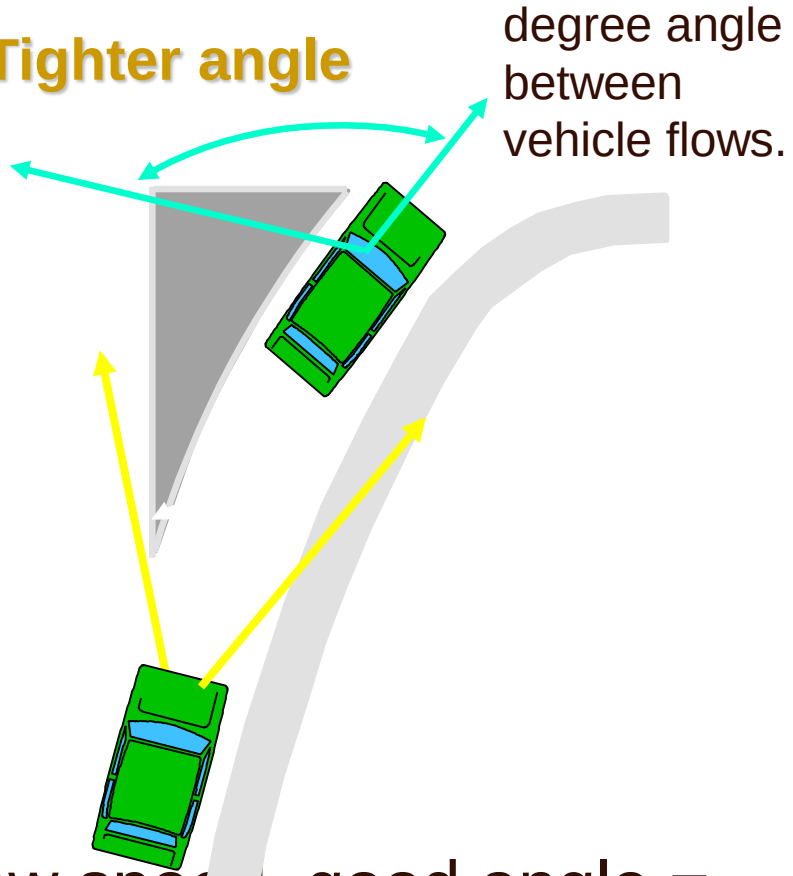
Imagine the signal timing without island

Philadelphia PA

Right-Turn Slip Lane: Design for Pedestrians

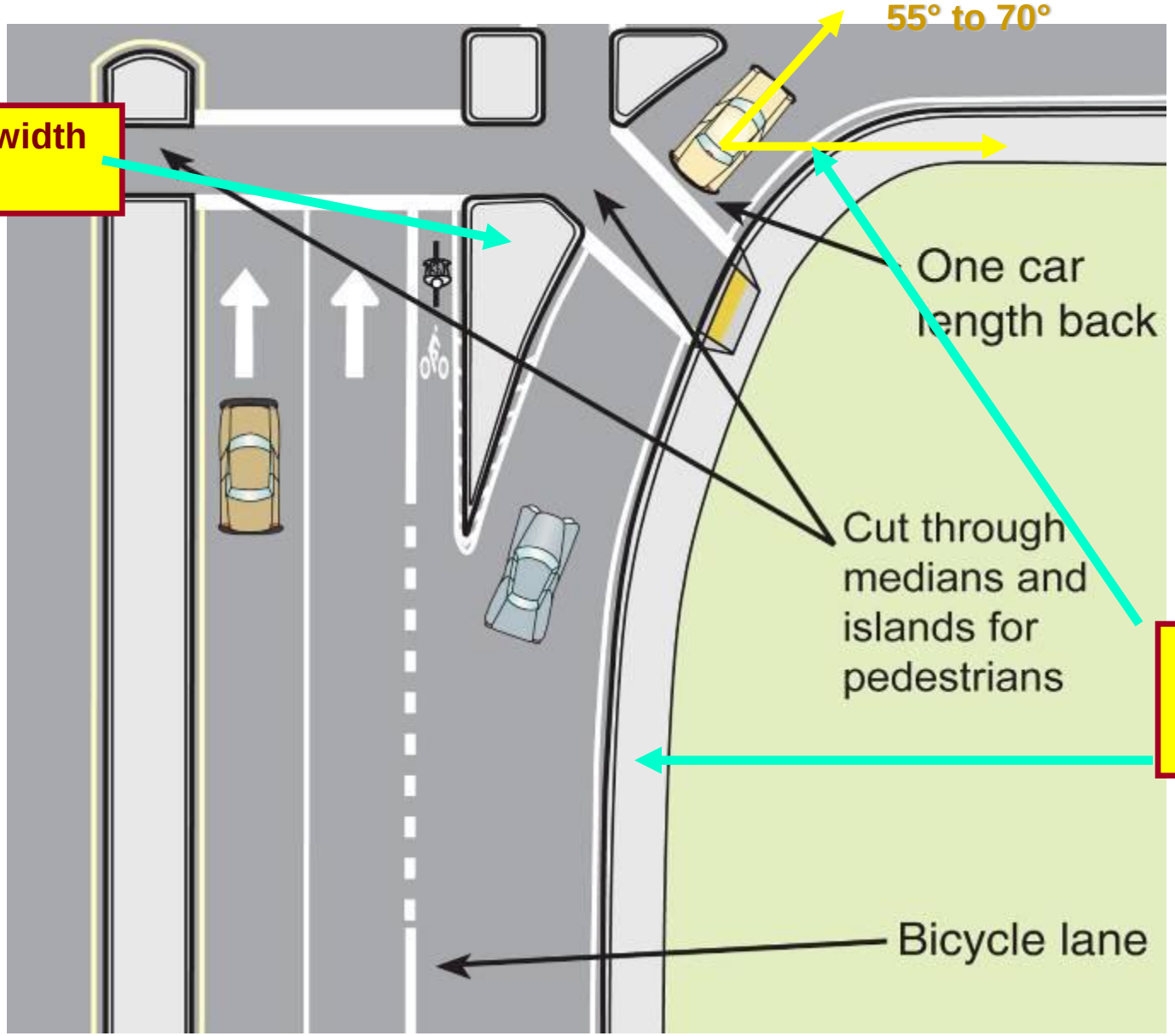


High speed, head turner = low visibility of pedestrians



Slow speed, good angle = good visibility of pedestrians

Right-Turn Slip Lane - Details



Fairbanks AK

Should we mark this crosswalk?

Atlanta GA

What does the MUTCD say?

- “Crosswalks should be marked at all intersections where there is substantial conflict between vehicular and pedestrian movements.”
- “Marked crosswalks also should be provided at other appropriate points of pedestrian concentration, such as loading islands, midblock pedestrian crossings, or where pedestrians could not otherwise recognize the proper place to cross.”

Should we mark this crosswalk?

Oregon DOT Traffic Manual

- Policy is to mark the crosswalk
- Signalization is optional

Wall St. Bend, OR


ONE WAY


SOHIO ALASKA

Worlds Tallest Man on a Bicycle

Photo Credit: Michael Frederick, City of St. Petersburg, FL

Improving Safety with Medians

Florida DOT's Restrictive Median Policy

Multilane Median Policy (1993)

Directs all Department multi-lane projects over 40 mph in design speed to have a restrictive median

It also directs our designers to find ways to use restrictive medians in **all** multi-lane projects, even those below the 40 mph design speed.

http://www.dot.state.fl.us/rddesign/PPMManual/2011/Volume1/Chap02.pdf

Now in the Plans Preparation Manual 2.2.2

2

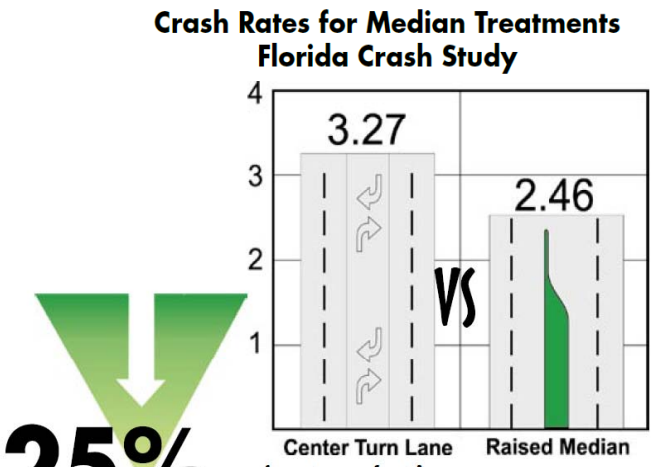
Even Small Islands Help

3

Even Small Islands Help

4

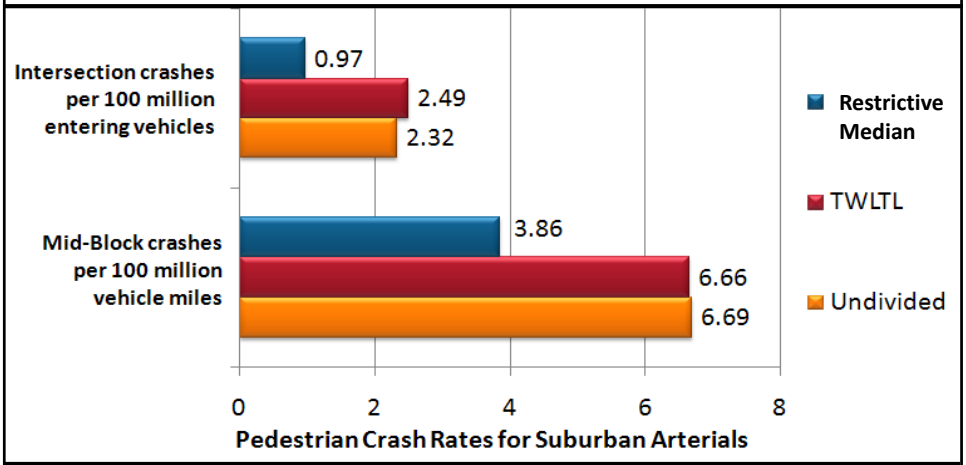
What Led to the Policy?



Long, Gan, Morrison, University of Florida 1993

ACCESS & PEDESTRIAN SAFETY

Atlanta, Phoenix, Los Angeles



SOURCE: Adapted from Bowman and Vecellio, 1994

Apalachee Parkway

Source : Debbie Danton

Apalachee Parkway

Source : Debbie Danton

Same Road Today

11

Same Road Today

12

Apalachee Parkway Before 2002 and Today

Question: *How has the median conversion affected safety?*

14

Crash Data Apalachee Pkwy

Crashes/Million Vehicle Miles

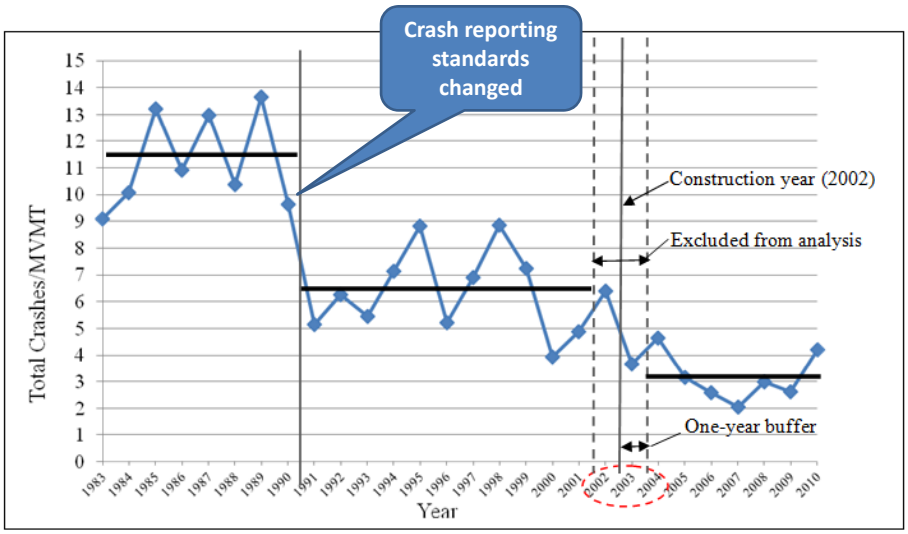
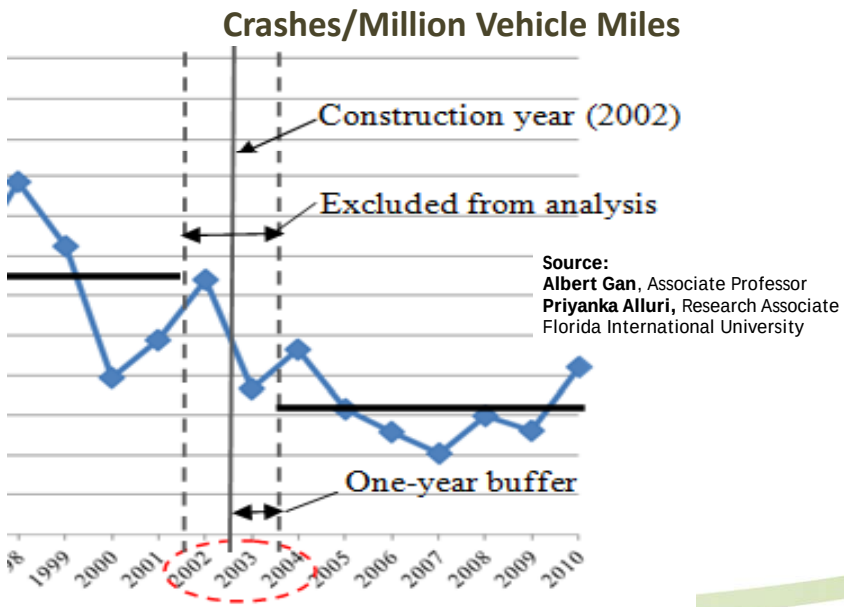


Figure 6. Total Crash Rates by Year

Crash Data Apalachee Pkwy



Source:
Albert Gan, Associate Professor
Priyanka Alluri, Research Associate
Florida International University

Problems in Implementation

- Controversy with existing businesses
- Resistance to U-turns


Businesses want median erased from road plan
Opponents say a median on State Road 44 would cause too many access problems for area stores.
By GEORGE WILKENS
Tribune Staff Writer
Green Cove 'road wars' heating up
By Bill Broome
Staff Writer
Up against the 6-inch wall
Median saves lives, costs customers
Group claims victory in median battle
Transportation planners recommend project redesign
By Dennis Thompson Jr.
FLORIDA TODAY
Business owners and residents along South Patrick Drive won a
DESOTO PKWY.
Atlantic Ocean
TRANSPORTATION
way by U-turning to reach shops


We Refined our Work with Public
ACCESS MANAGEMENT
BALANCING ACCESS AND MOBILITY
Answers to your questions

Some of Our Materials

CONFLICTS

Does FDOT just think this stuff up?

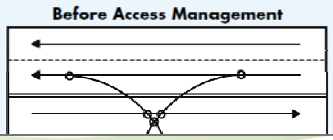
Many business and property owners have asked us this question. The answer is no. The standards developed by FDOT are based on research done around the world for the last 40 years. Much of this research involved studying actual locations, many in Florida, where different access management strategies have been used. The studies evaluated the impacts of different access management treatments on crashes, congestion, and even business performance. The standards used by FDOT are thought **to provide the optimal balance between access and mobility,** and consider the characteristics of different types of roadways.

NO, the standards are based on over 40 years of experience and research

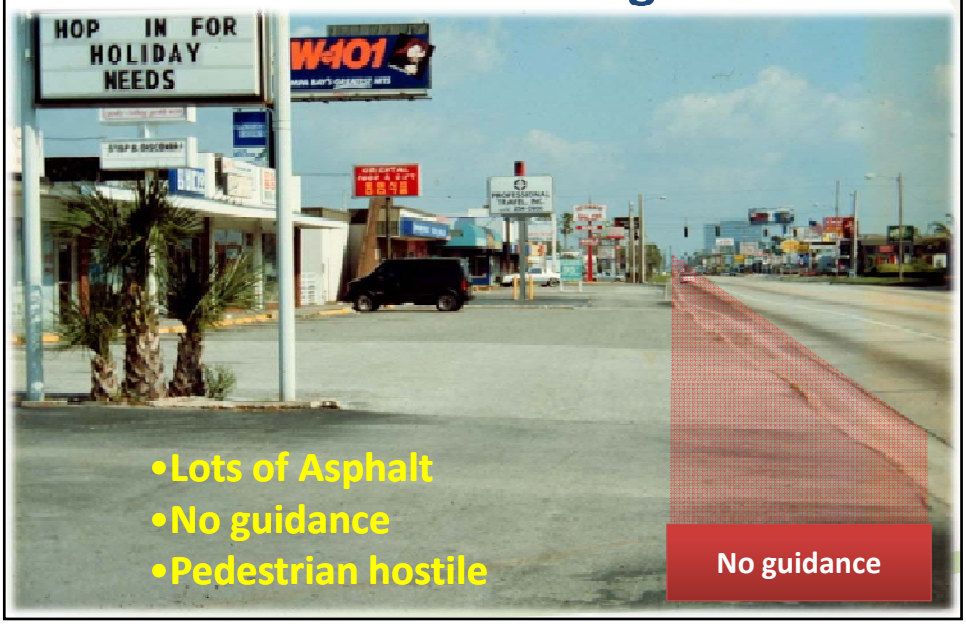
How does Access Management improve safety?

By reducing conflicts.

Conflict points are locations along a roadway where two vehicles' paths can legally cross. At a four way intersection there are as many as 36 conflict points. Each conflict point is a location where a crash can occur. **A basic principal of access management is to limit**



Poor Access Management



- Lots of Asphalt
- No guidance
- Pedestrian hostile

- Safety
- Aesthetics
- Efficiency
- Pedestrian/Transit friendly

US 192 – Kissimmee

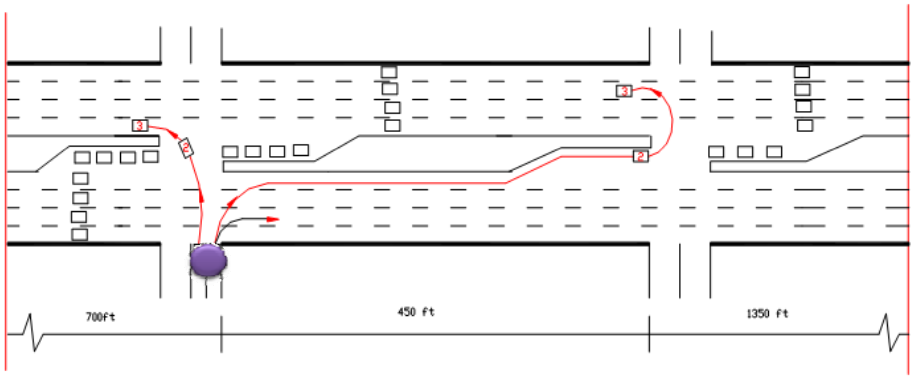
Source: Glatting Jackson

U-turns are controversial at public meetings ...but

USF UNIVERSITY OF SOUTH FLORIDA

Center for Urban Transportation Research

Safety Evaluation of Left Turns vs. Right Turn Plus U-turns



Operational Study

- Eight corridors in Tampa Bay area
- Over 300 hours of video
- Actual analysis of evasive maneuvers (Conflicts)

Some of the Studied Conflicts

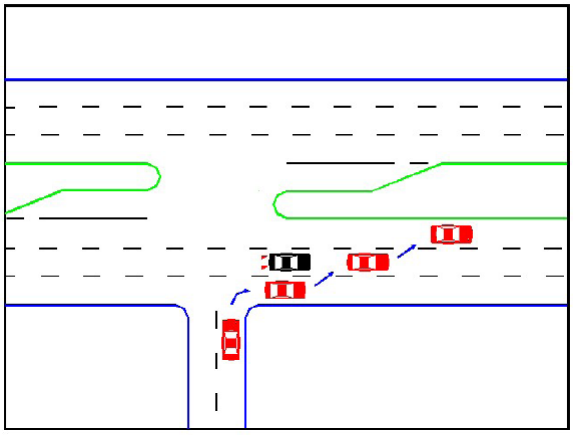


Figure 3.3 Lane Change Conflict (C3)

Some of the Studied Conflicts

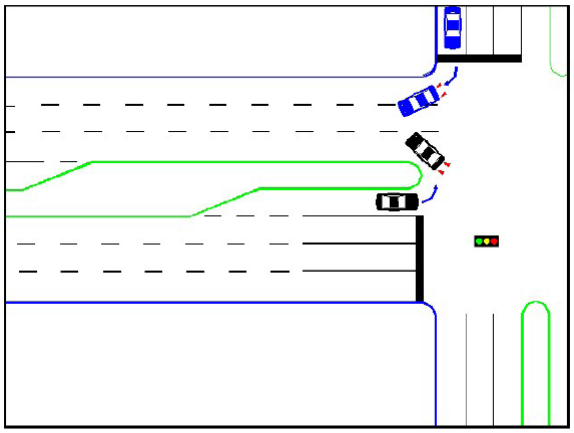
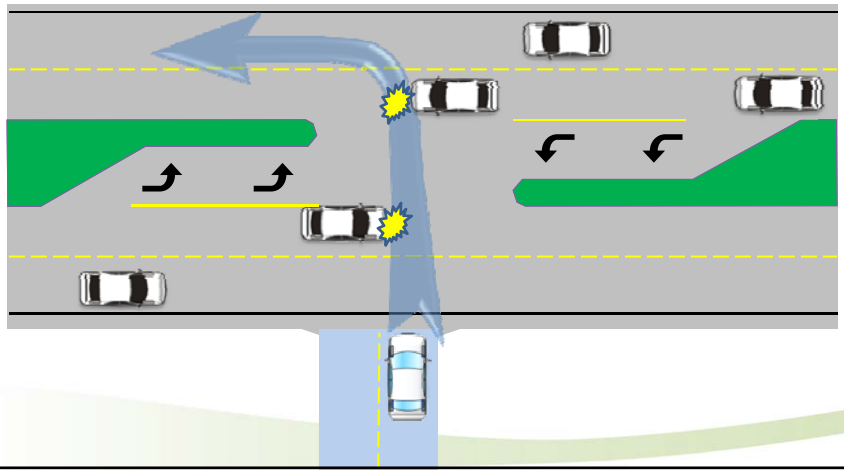


Figure 3.5 U-turn and right turn across the street (C5)

Left turns out are the most dangerous low-speed driving maneuver you can make from an unsignalized driveway

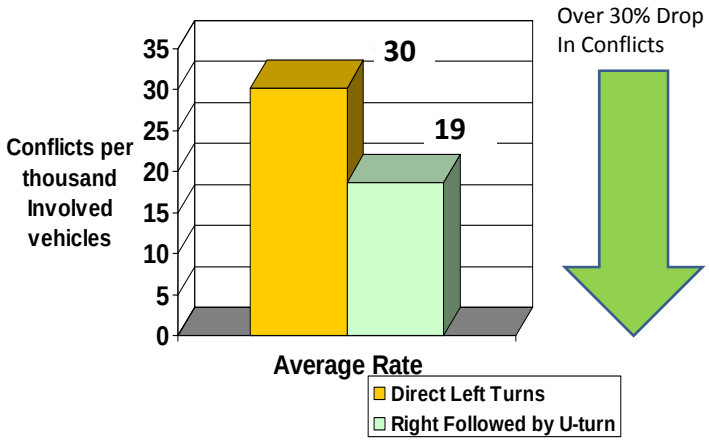


Left Turn Driver is in Most Danger

Actually it's the Pedestrian that is Most Vulnerable

Source: Orlando Sentinel

Conflict Rates for Direct Lefts vs. Right Turn followed by U turn

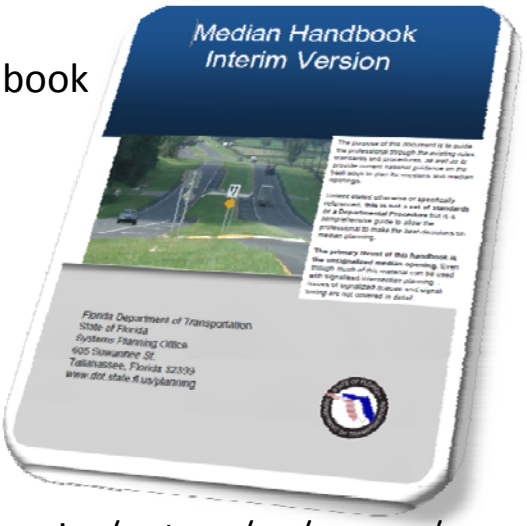


University of South Florida - 2001

- Handbooks
- Access Management Committees in every District

Create Clear Guidance for Staff, Developers, and Consultants

- The Median Handbook



www.dot.state.fl.us/planning/systems/sm/accman/

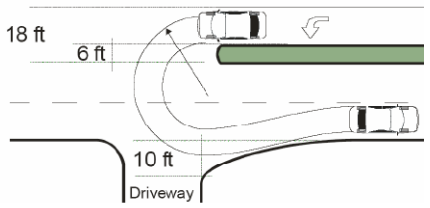
Median Handbook

Median Handbook

MEDIAN HANDBOOK

5

Special U-Turn Considerations



SPECIAL U-TURN CONSIDERATIONS

5.1

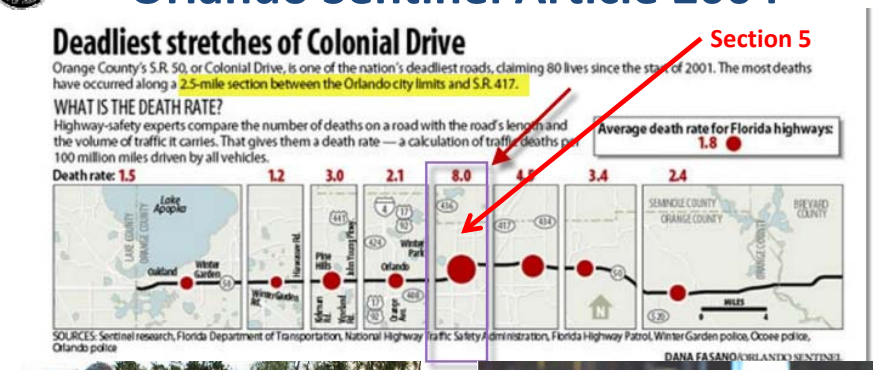
Before: BayMeadows Rd.

After: BayMeadows Rd.

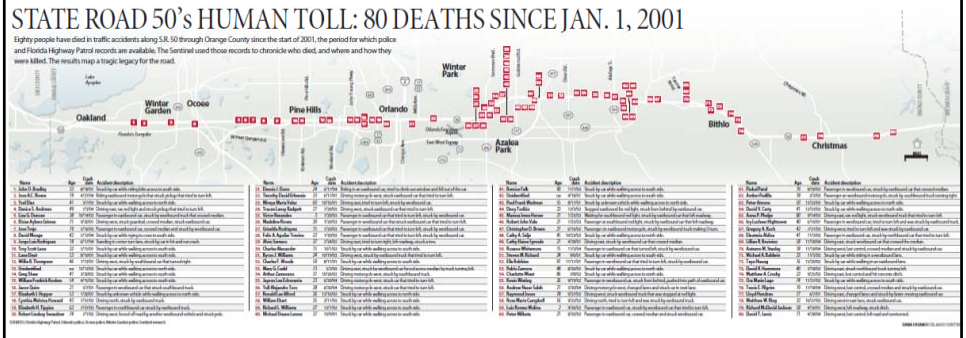
Some Advice

- Concentrate on medians as a **safety** and basic traffic operational benefit
- You have the authority to medians anywhere – ***but don't act like it***
  - Carefully work with **business managers** and **lessees** (not just the land owners)
  - Don't depend on **legalistic** public hearings
- **Look in your own organization** for people already doing good work

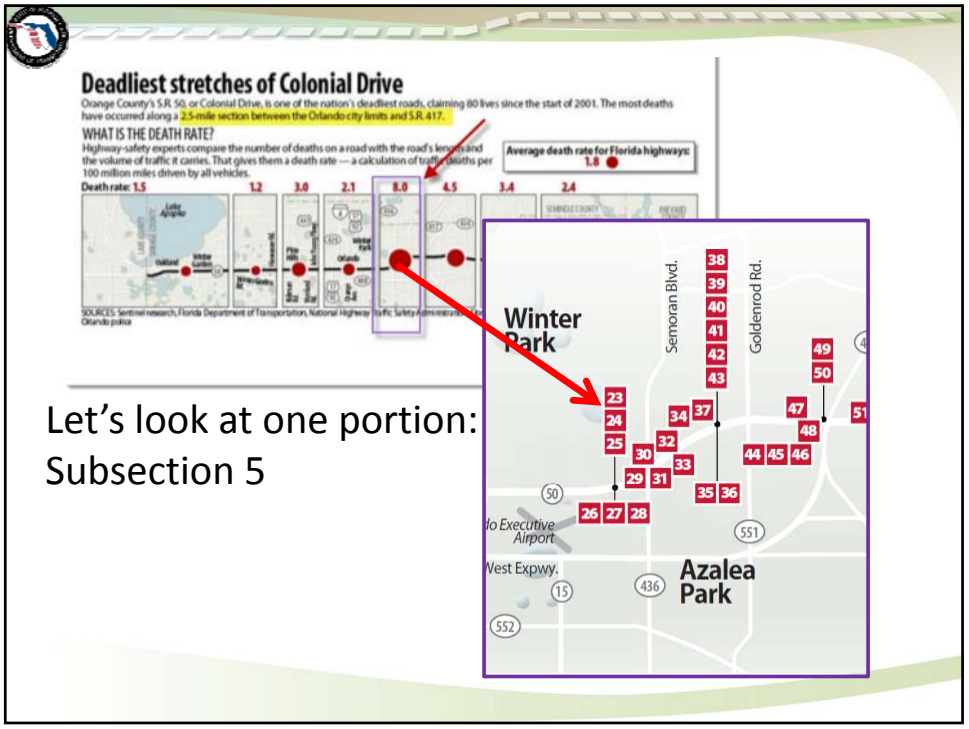
Orlando Sentinel Article 2004



Deaths Reported for Entire Section Studied (2000-2004)



Each red spot is a death



Medians Might Have helped Prevent Some of These Deaths by Protecting left turns and Pedestrians.

Subsection 5 Activity Leading to Death

	Name	Age	Crash date	Accident description
23.	Mireya Maria Velez	60	10/16/01	Driving east, tried to turn left, struck by westbound car.
24.	Tracee Lanay Badgett	21	1/20/03	Driving west, struck eastbound car that tried to turn left.
25.	Victor Resendes	3	1/20/03	Passenger in eastbound car that tried to turn left, struck by westbound car.
26.	Madeline Rivera	30	1/20/03	Passenger in westbound car that struck eastbound car that tried to turn left.
27.	Griselda Rodriquez	15	1/20/03	Passenger in eastbound car that tried to turn left, struck by westbound car.
28.	Felix A. Aguilar Trevino	22	1/20/03	Passenger in eastbound car that tried to turn left, struck by westbound car.
29.	Alvin Serrano	37	7/24/02	Driving east, tried to turn right, left roadway, struck a tree.
30.	Charles Alexander	15	10/1/02	Struck by car while walking across to south side.
31.	Byron J. Williams	24	10/19/03	Driving west, struck by eastbound truck that tried to turn left.
32.	Charles F. Woods	59	8/11/01	Struck by car while walking across to south side.
33.	Mary G. Cudd	73	5/2/03	Driving east, struck by westbound car forced across median by truck turning left.
34.	Arthur Zamorano	31	10/26/02	Driving motorcycle west, struck by southbound truck.
35.	Jayson Lee Echevarria	23	6/30/04	Driving motorcycle west, struck car that tried to turn left.
36.	Yull Alejandro Toro	28	6/30/04	Driving motorcycle west, struck car that tried to turn left.
37.	Ronald Lee Alford	36	12/16/02	Struck by car while walking across to north side.
38.	William Ehart	35	3/11/03	Struck by car while walking across to south side.
39.	Richard L. Williams	27	12/1/02	Struck by car while walking across to south side.
40.	Michael Duane Larson	37	10/9/01	Struck by car while walking across to south side.
41.	Bernice Falk	90	11/7/03	Struck by car while walking across to south side.
42.	Unidentified	na	4/18/01	Struck by car while walking across to south side.
43.	Paul Frank Wadman	55	8/17/01	Struck by unknown vehicle while walking across to north side.
44.	Dany Toribio	23	12/2/02	Stopped eastbound for red light, struck from behind by eastbound car.
45.	Marissa Irene Herzer	21	1/25/03	Waiting for southbound red light, struck by eastbound car that left roadway.
46.	Robert John Vale	21	1/25/03	Passenger at southbound red light, struck by eastbound car that left roadway.
47.	Christopher D. Brown	21	6/16/02	Passenger on eastbound motorcycle, struck by westbound truck making U-turn.
48.	Cathy A. Selje	45	10/23/02	Struck by car while walking across to north side.
49.	Cathy Elaine Sproule	21	4/28/01	Driving east, struck by westbound car that crossed median.
50.	Roxane Whitemore	15	11/3/04	Passenger in eastbound car that turned left, struck by westbound car.

Contact Information

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http://www.dot.state.fl.us/planning/systems/sm/accman/default.shtm

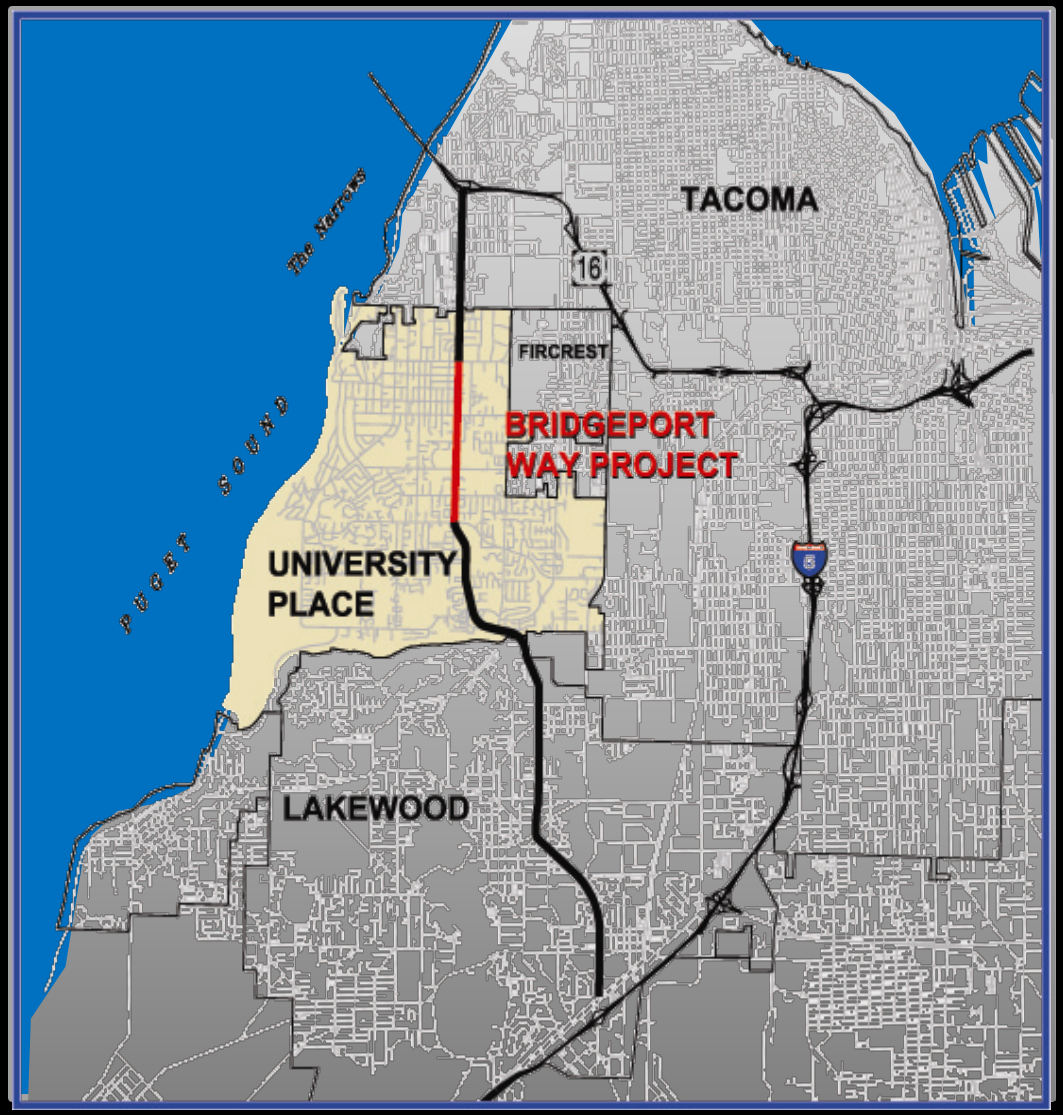
Give death a holiday - drive safe, sober and buckled up.

University Place
Bridgeport Way Case Study

University Place
WASHINGTON

Washington State

University Place



University Place, WA

- Located SW of Tacoma
- On Puget Sound
- Incorporated: August 31, 1995
- Population: 31,140
- Median Age: 36.5
- Elevation: Sea Level to 500 Ft
- 5 % Undeveloped

University Place

University Place

University Place

University Place

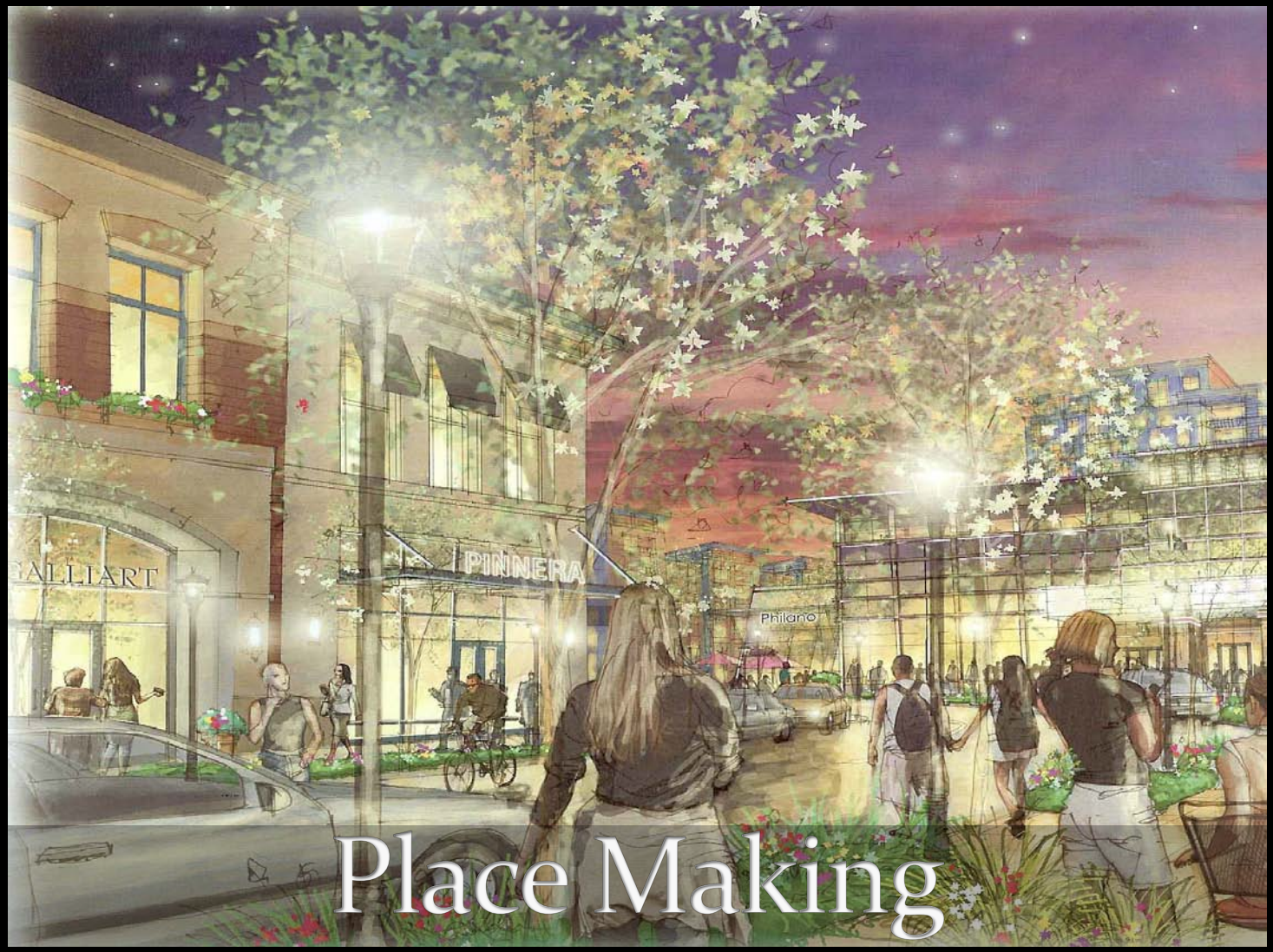
City Vision

Make University Place a safe attractive city that provides a supportive environment for all citizens to work, play, get an education and raise families.

City Vision

- Create a Sense of Place

- Establish City Identity that Embodied the Community Values



Place Making

It Starts with the Street

University Place
WASHINGTON

Bridgeport Way

Create a Main Street and Town Center that Provides Residents and Visitors a Comfortable, Convenient, Efficient, Safe, Secure and Welcoming Place to Shop, Play, Work and Live.

Timeline

- Aug 1995-City Incorporation
- Aug 1996-City Vision Statement Adopted
- Nov 1996-Bridgeport Way Charrette
- Feb 1999-Bridgeport 1A (35th-40th) Complete
- Feb 2000-Bridgeport 1B (27th-35th) Complete
- Jun 2002-Bridgeport 2 (40th-Cirque) Complete
- August 2010-Bridgeport 3 (Cirque-54th) Complete

Objectives

- Improve Safety For Motorists, Pedestrians and Bicyclists.
- Improve Mobility Of Children, Adults, Disabled and Seniors.
- Create Welcoming Public Spaces.
- Provide Choice in Transportation.
- Provide for Economic Growth.
- Provide a Walkable, Transit, Bicycle and Pedestrian Friendly Community.

Bridgeport Way

Design Elements

- Continuous Landscaped Median
- Sidewalks
- Bike Lanes
- Planter strips
- Streetlights
- U-Turn Pockets at intersections
- Mid-Block Pedestrian Crossings

Bridgeport Way

Critics

- Will Kill Business
- Waste of Money – No One Walks or Bikes
- Merely "Making it Pretty"
- Would "Clog-up" Traffic
- Unsafe

Is council moving too fast on Bridgeport?

By LINDA TARR
Editor

A discussion on where to

after Public Works Director Ben Yazici informed the council that it would be near impos-

should rely on research and the videos to answer questions, he said.

or a three-land thoroughfare with roundabouts. The council is scheduled to make that deci-

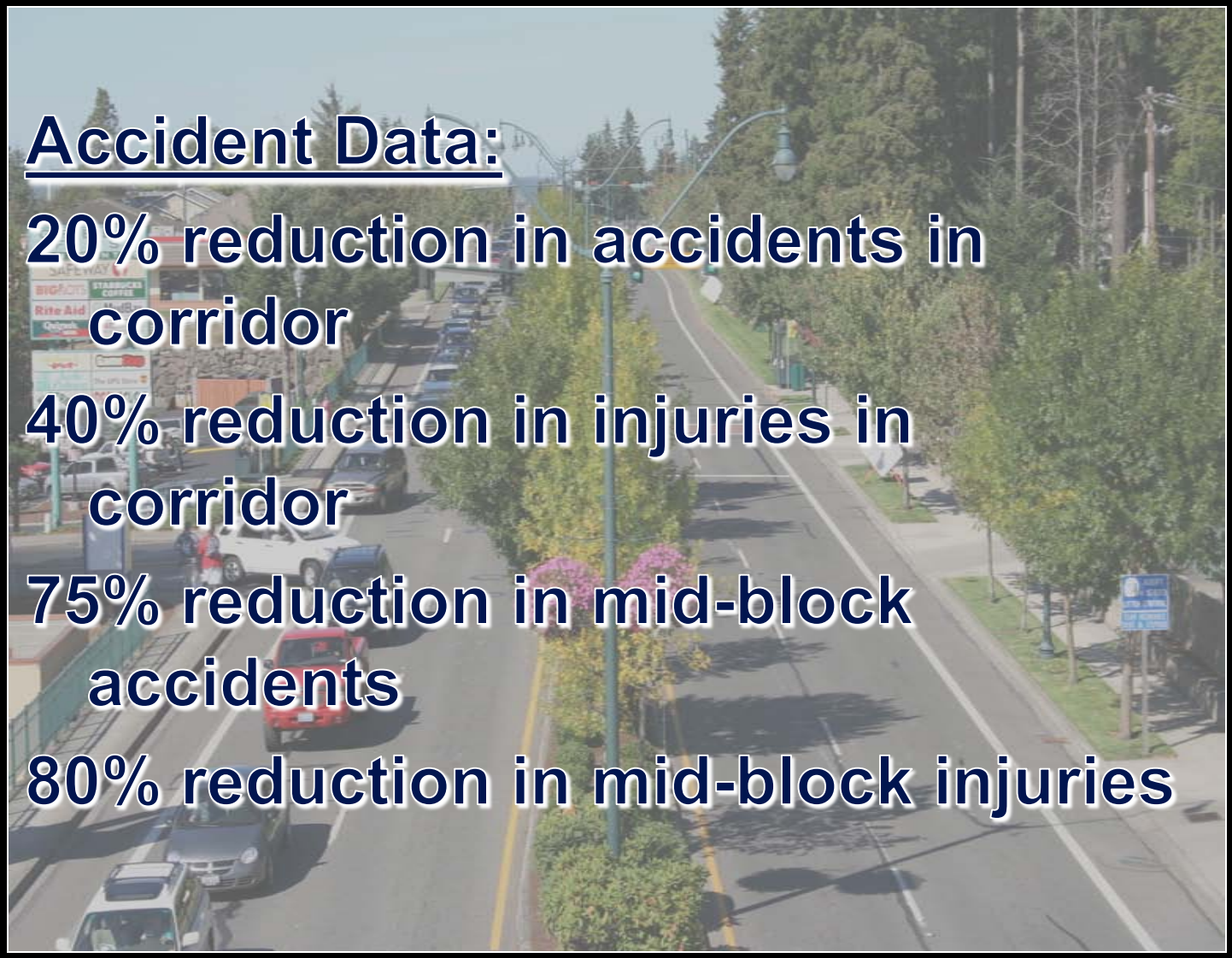
Council decides which fix for Bridgeport it wants to pursue.

"It would be nice to have a

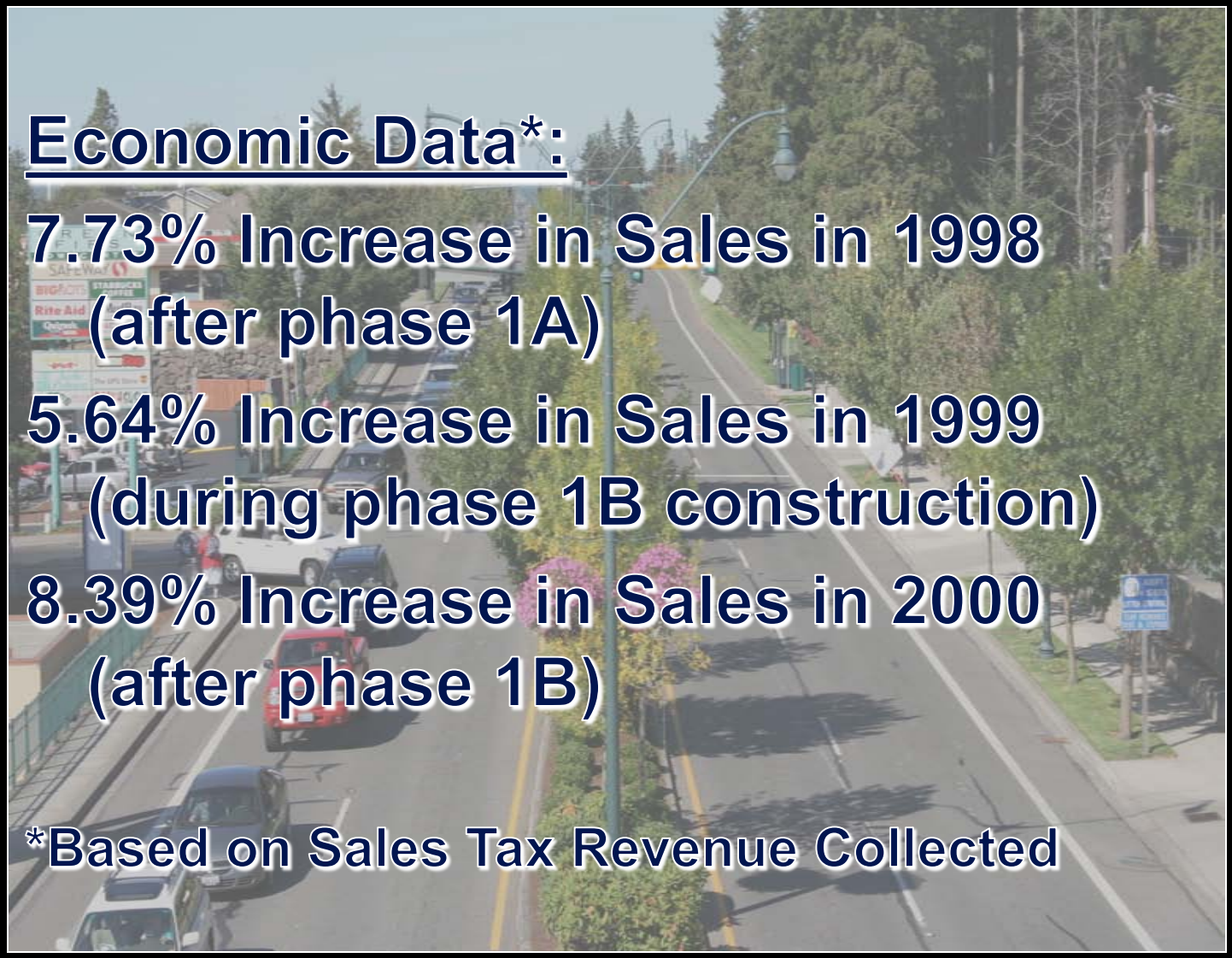
Bridgeport (Before)

Bridgeport (Now)

Bridgeport (Now)



Bridgeport (Now)



Pedestrian Safety – Mid Block Crossings

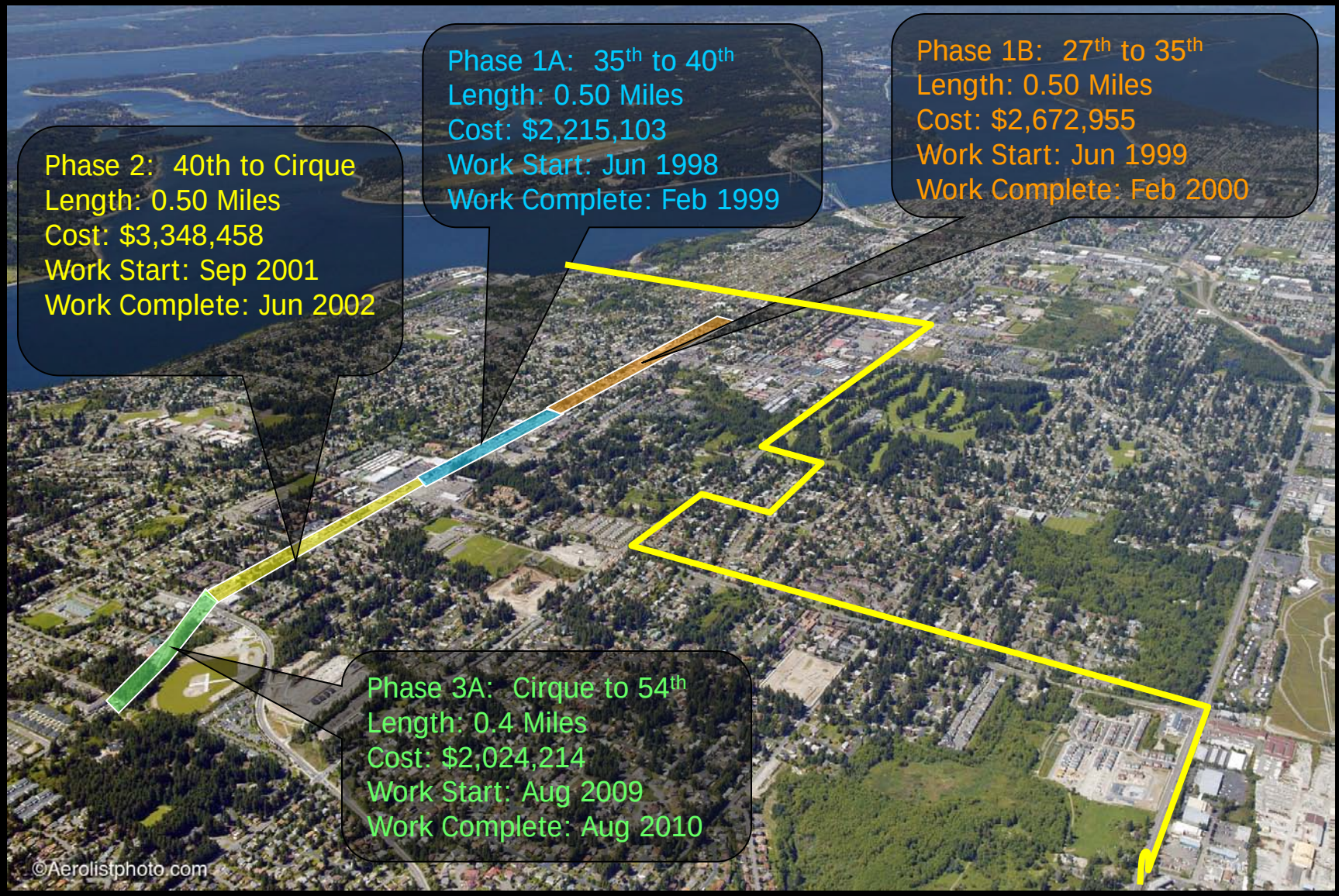
Emergency Vehicle Accommodations

Transportation Success

Transportation Success

- **Safety**
  - Mid-Block Crashes Reduced by 75 %
  - Separated Pedestrians from Vehicular Traffic
  - Streetlights Added
- **Business Access**
  - Sales Volume Increased
- **Mobility**
  - Reduced Side Friction from Cross Traffic
  - Added Bike Lanes which Increased Width
  - U-Turns at Signalized Intersections
  - Improved Bus Stop Locations

Bridgeport Way Project



Keys to Success

- Stay Dedicated to Vision
- Have the Courage to Implement Change
- Pay Attention to Details
- Build it

Thank you!

- Archive at
  - walkinginfo.org/training/pbic/pedfocus_webinars.cfm
  - **Downloadable and streaming recording and presentation slides**
- Questions?
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