

# PBIC Webinar

## Bicycle RSAs: How to Conduct Road Safety Audits and How to Use Them to Promote Bicyclist Safety



Dan Nabors, PE, VHB

Bill DeSantis, PE, VHB

**Sept. 26, 2013, 2 pm**



Pedestrian and Bicycle  
Information Center



# Today's Presentation

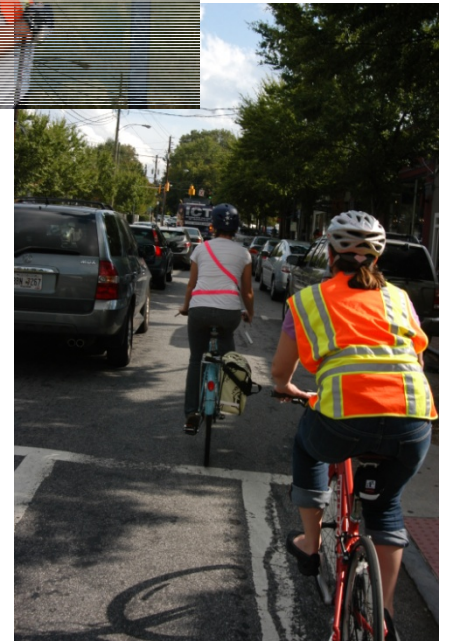
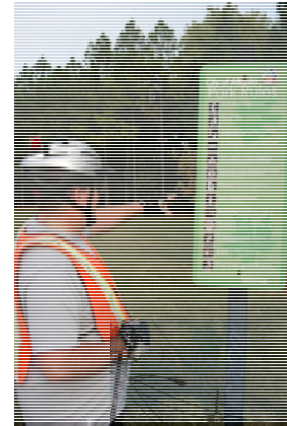
---

- ⇒ **Introduction and housekeeping**
- ⇒ **Audio issues?**  
Dial into the phone line instead of using “mic & speakers”
- ⇒ **PBIC Trainings and Webinars**  
[www.walkinginfo.org](http://www.walkinginfo.org)
- ⇒ **Registration and Archives at**  
[walkinginfo.org/webinars](http://walkinginfo.org/webinars)
- ⇒ **PBIC News and updates on Facebook**  
[www.facebook.com/pedbike](http://www.facebook.com/pedbike)
- ⇒ **Questions at the end**



# Topics Covered in this Presentation

- What is an RSA?
- What is the purpose of a bicycle RSA guide?
- Review bicycle RSA guide content
- RSA process
- Case studies in applying RSAs to improve accommodations for bicyclists

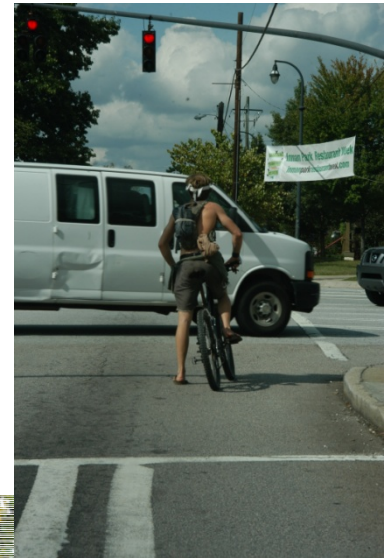


# Cycling in the United States

- An effective method for travel and the primary means of transportation for many.
- An integral part of transportation plans since the passage of the ISTEA in 1991.

However....

- Bicycle trips are more likely to result in a fatality or injury than motor vehicle trips



# 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 multidisciplinary RSA team.





# Why an RSA Guide?

- RSAs may not adequately consider cyclists.
- RSAs can be used to address cyclists' issues.
- Crash data typically does not tell the whole story.
- People bike in almost every environment.



# Purpose of the Guidelines

- To provide transportation agencies and RSA teams with a better understanding of the safety of cyclists in the transportation system when conducting an RSA.
- Emphasizes a “behind the handlebars” perspective.



# Scope of Guidelines

- All elements of the roadway and pathway network where cyclists are permitted:



- On-road accommodations (e.g., shared roadways and roads with designated bicycle facilities, like marked bicycle lanes)

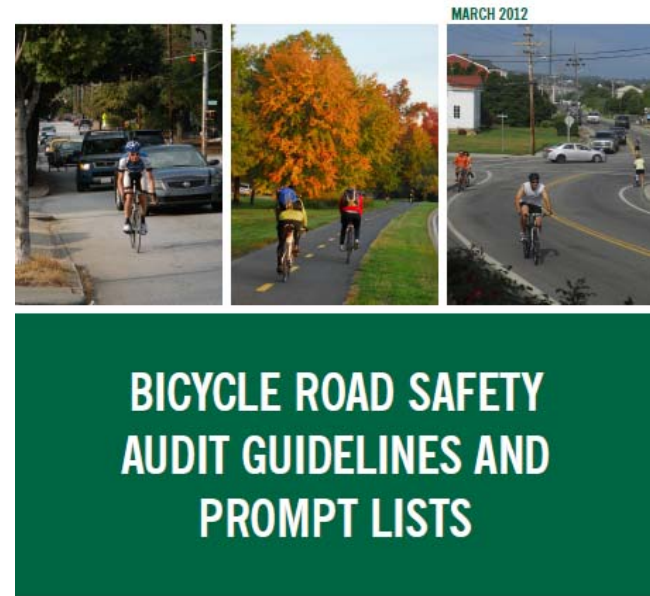


- Off-road cycling facilities (e.g., shared used paths and separated bike facilities)



# Bicycle RSA Guide Outline

- 1 Introduction
- 2 Principles of Bicyclist Safety
- 3 Bicyclists in the RSA Process
- 4 Using the Prompt Lists
- 5 Prompt Lists



 U.S. Department of Transportation  
Federal Highway Administration  SafeRoads for a Safer Future  
www.fhwa.gov/saferoads  RSA  
Roadside Your Roadside Safety  FHWA-SA-12-018

[http://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/fhwasa12018/](http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa12018/)

**PBIC Webinar** [www.pedbikeinfo.org](http://www.pedbikeinfo.org)



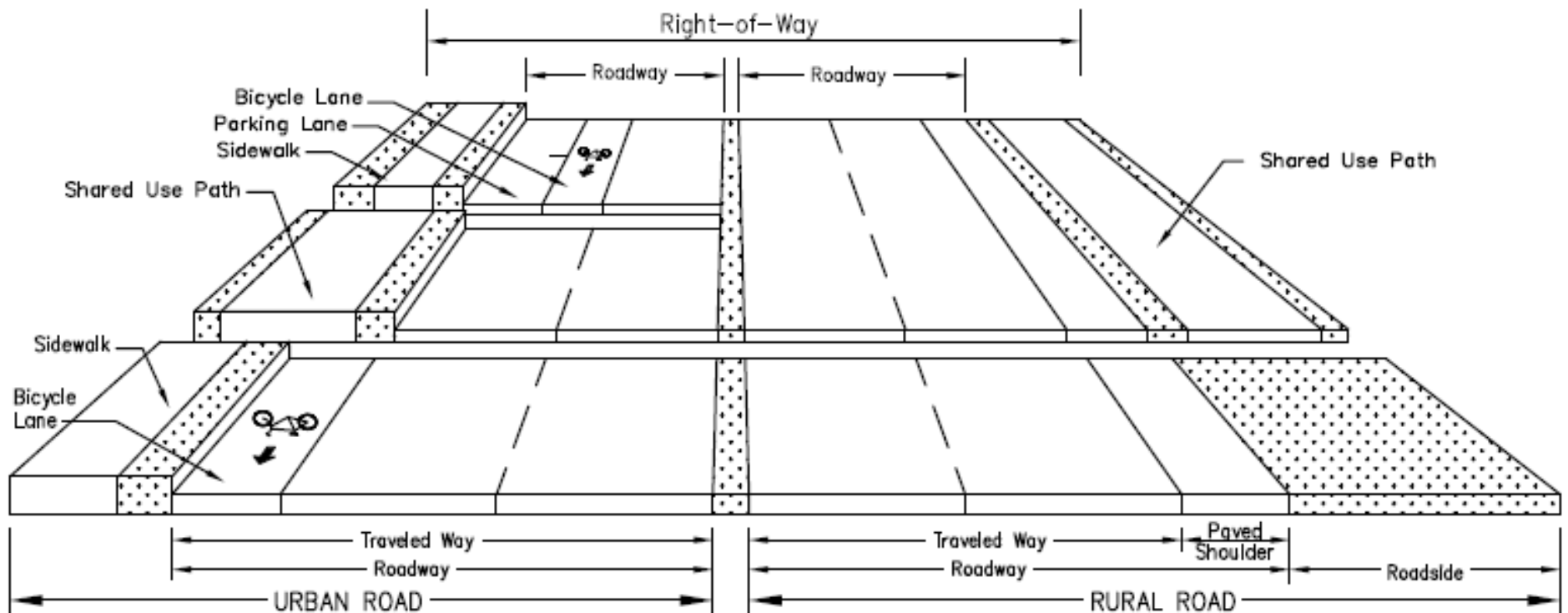
# 1 Introduction

## Knowledge Base

- Standards/Guidelines
- Successful Practices/Guides
- Safety Resources
- State Resources
- RSA Guidance
- Quantitative Assessment Tools

# 1 Introduction

## Roadway Elements that Relate to Cyclists

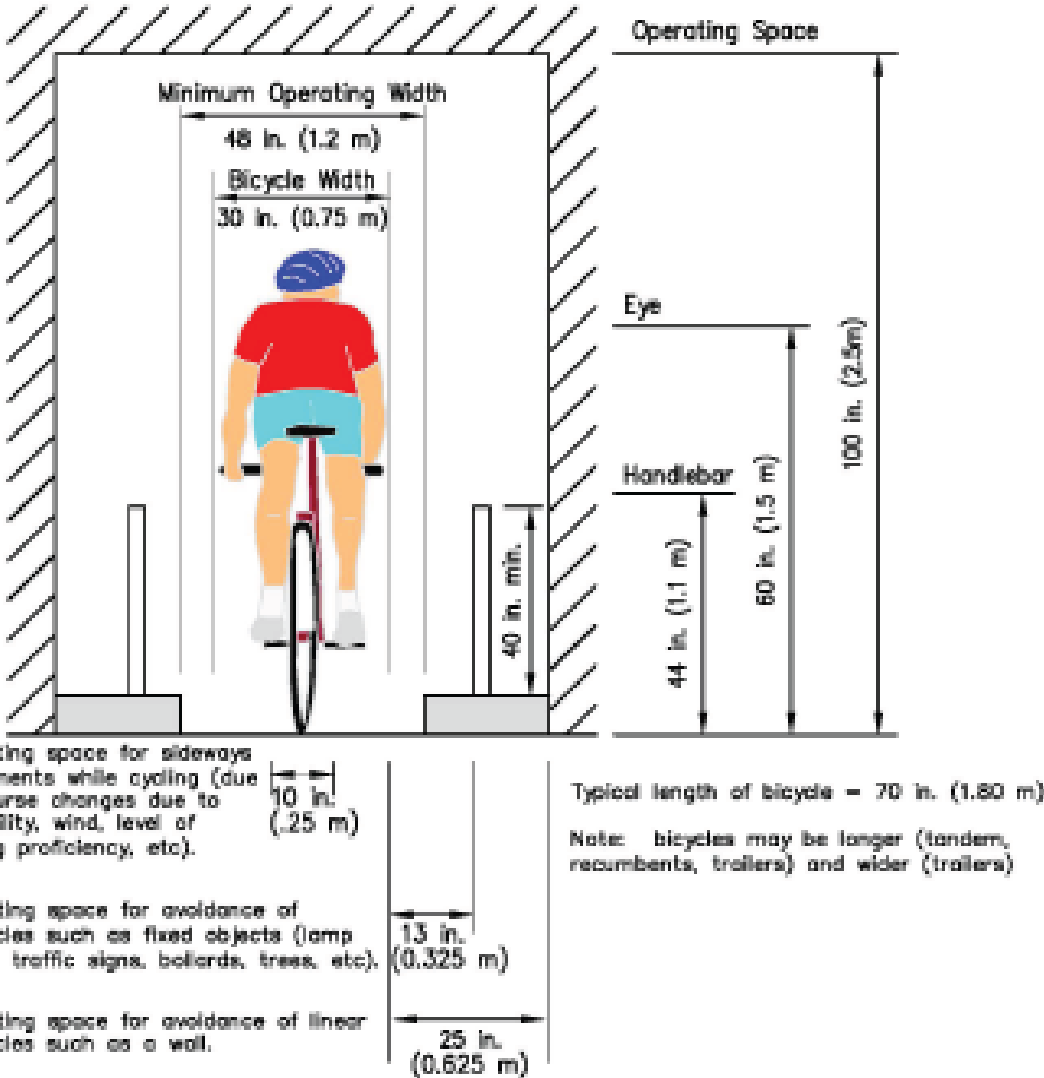


# 2

## Principles of Bicyclist Safety

### The Characteristics of Cyclists

- Space
- Length
- Stability
- Speed
- Vulnerability



## 2

# Principles of Bicyclist Safety

## The Characteristics of Cyclists

- Space
- Length
- Stability
- Speed
- Vulnerability





## 2 Principles of Bicyclist Safety

### The Cycling Network

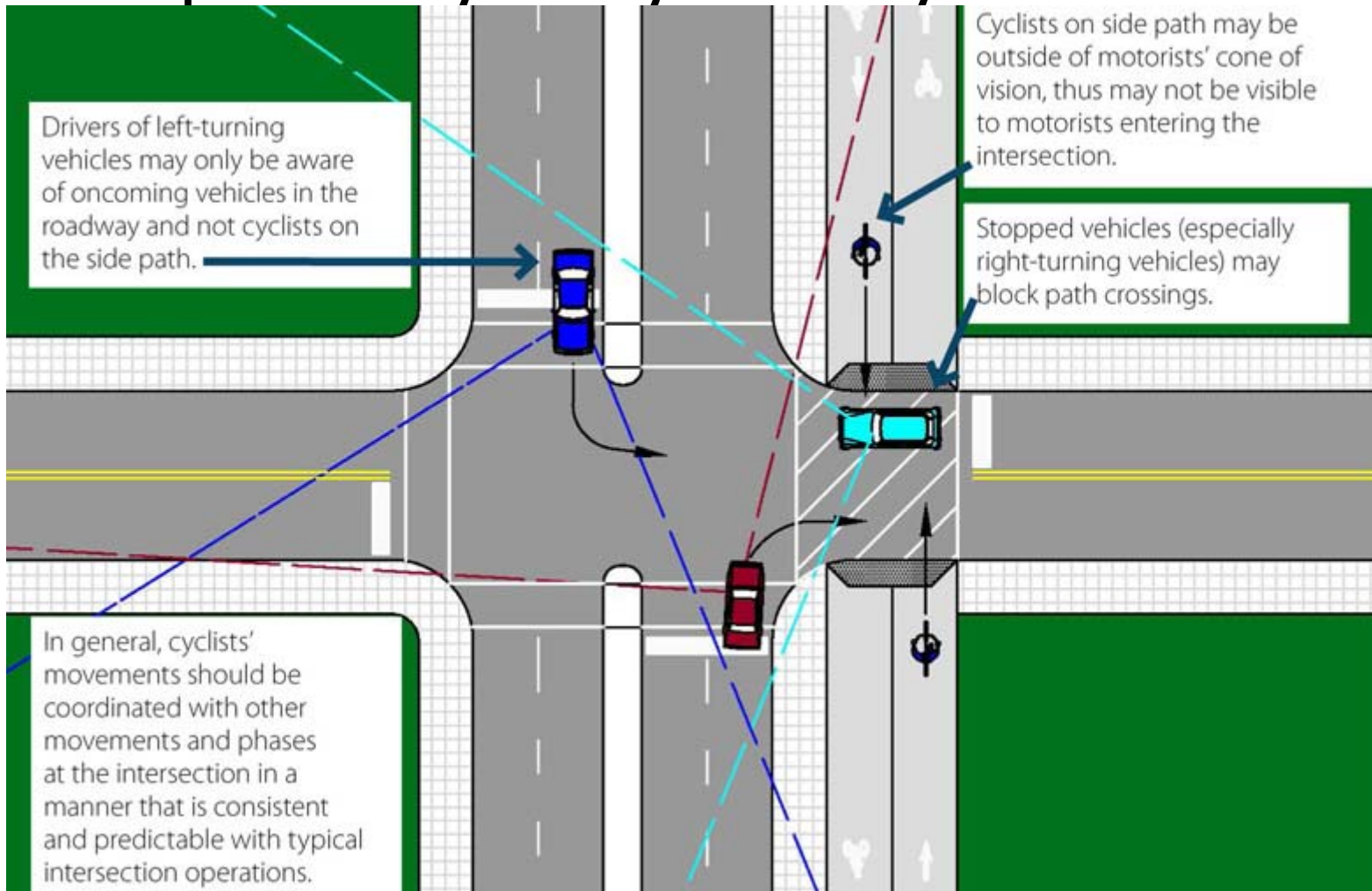
- Directness
- Continuity and Connectivity
- Comfort



## 2

# Principles of Bicyclist Safety

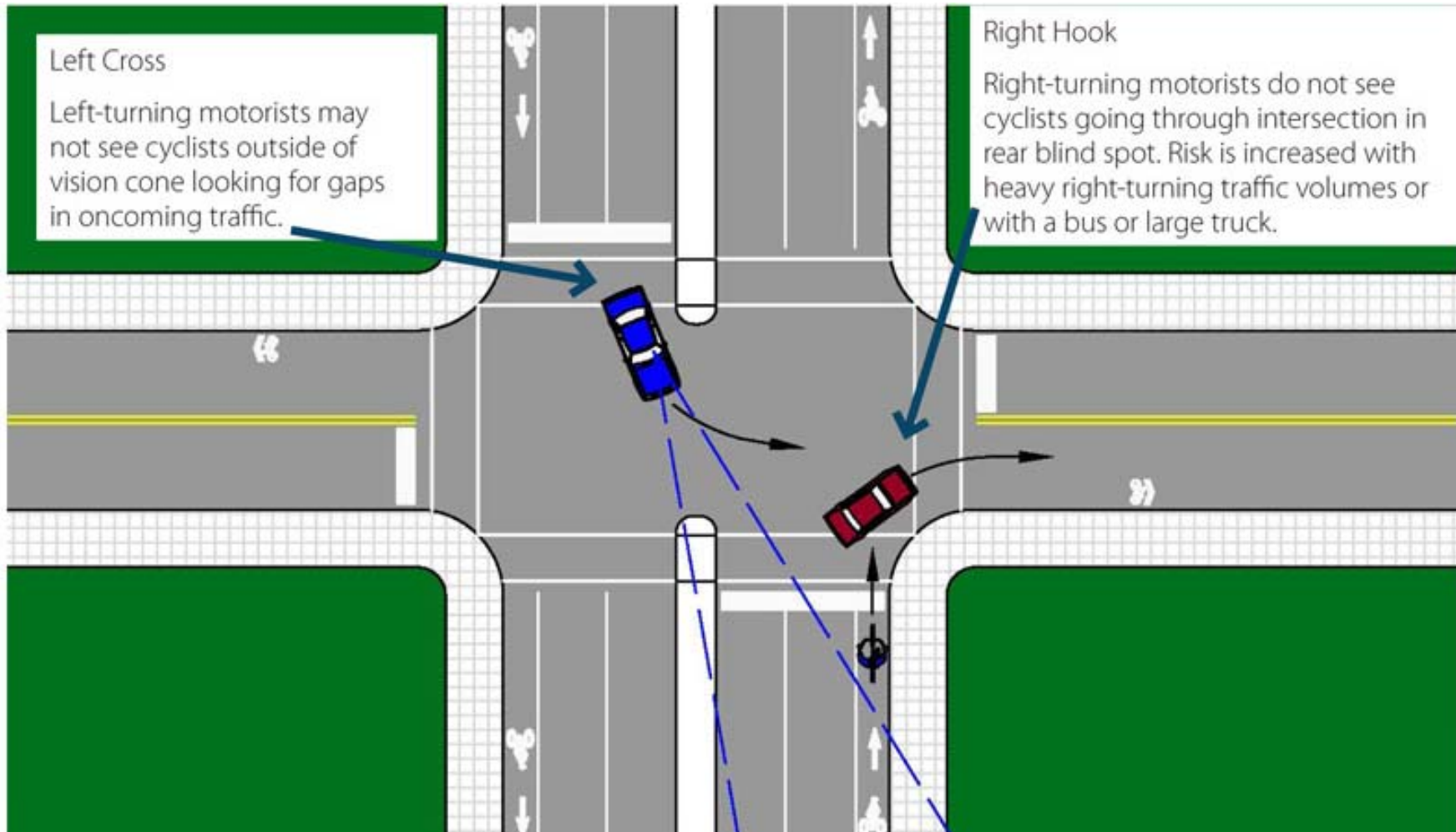
## Expectancy of Cyclists by Motorists



## 2

# Principles of Bicyclist Safety

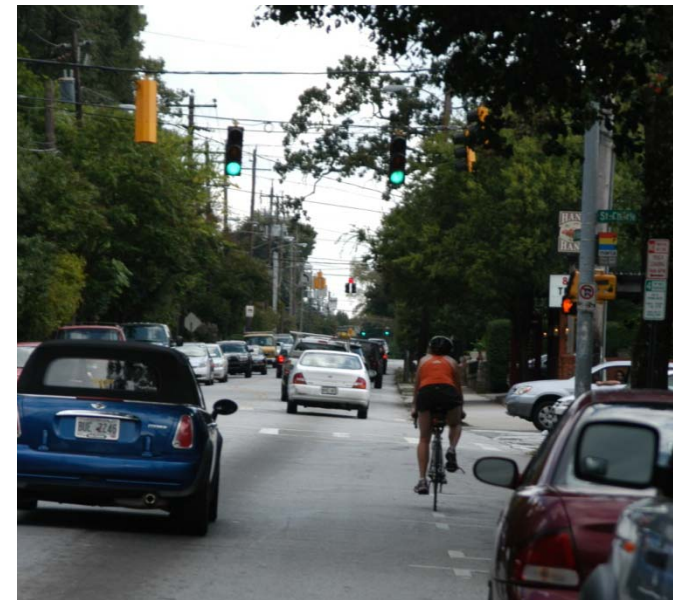
## Expectancy of Cyclists by Motorists



## 2 Principles of Bicyclist Safety

# Factors that Contribute to Bicycle Crashes: Location

- A majority of bicycle-motor vehicle collisions (**approximately 70 percent**) occur in **urban areas**
- 51 percent intersection-related
- 22 percent at junctions with commercial and private driveways or alleys
- 27 percent occurred on roadway segments





# 2

## Principles of Bicyclist Safety

### Bicycle-Motor Vehicle Crash Types

from FHWA's Six-State Study, North Carolina, and Orlando, Florida Metropolitan Planning Organization (MPO)

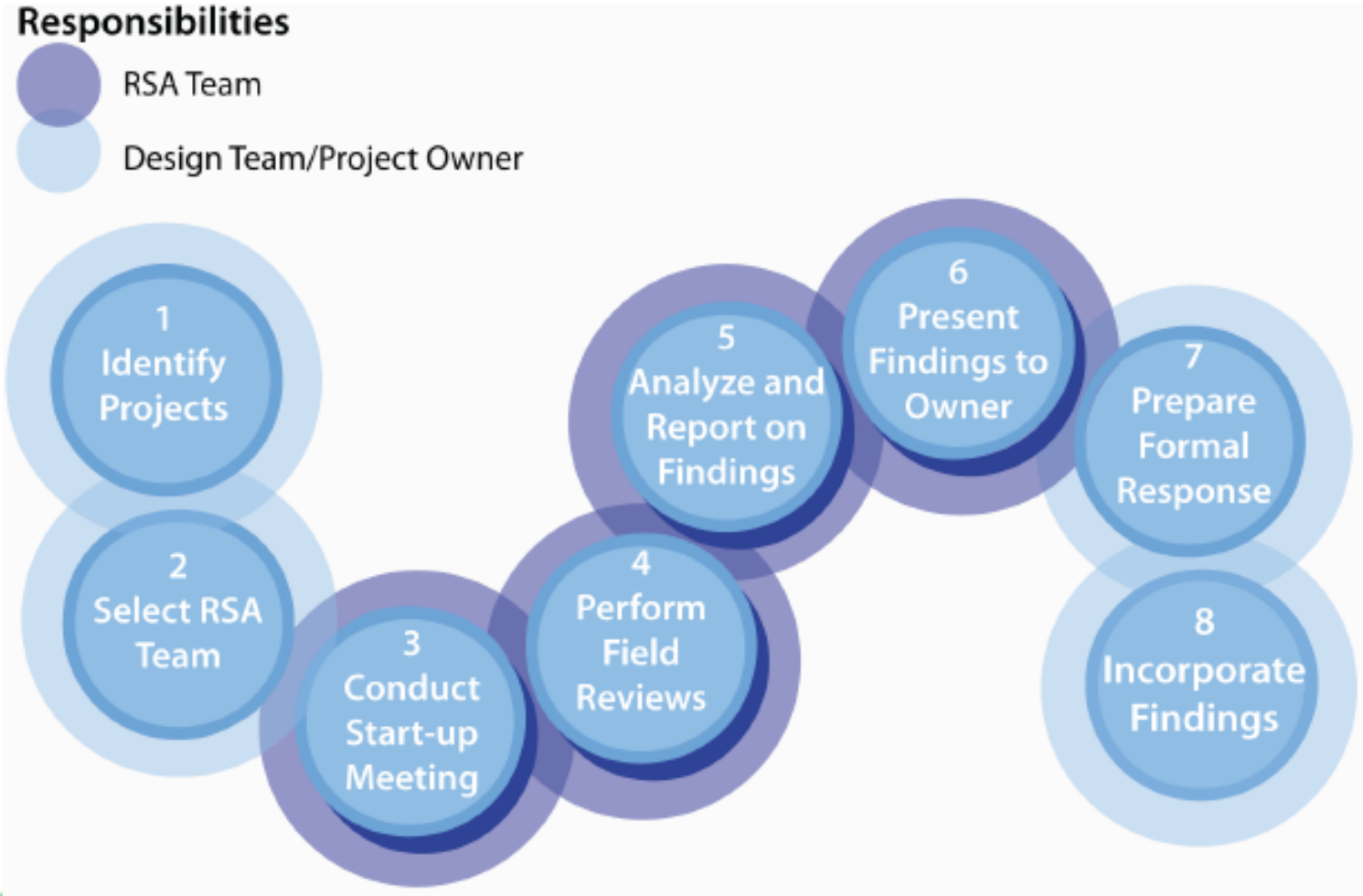
Bicycle Crash Type Groups	Percentage of Crashes			
	FHWA (early '90s)	North Carolina Urban ('04-'08)	North Carolina Rural ('04-'08)	Orlando Metropolitan Area ('03-'04)
<b>CROSSING PATHS</b>				
Motorist failure to yield – intersection	14.4	13.9	5.5	14.0
Bicyclist failure to yield – intersection	16.8	15.3	7.9	14.0
Bicyclist failure to yield – midblock	11.7	8.6	10.8	9.3
Motorist failure to yield – midblock (driveway/alley)	6.9	8.5	3.0	10.1
Turning errors – bicyclist and motorist	1.4	1.5	1.7	2.7
Bicyclist failure to clear intersection	1.4	1.3	0.2	0.0
<b>Crossing Path Total</b>	<b>52.6</b>	<b>49.1</b>	<b>29.1</b>	<b>50.1</b>
<b>PARALLEL PATHS</b>				
Motorist turned/merged into path of bicyclist	12.1	13.2	6.9	8.1
Motorist overtaking bicyclist	8.6	8.9	29.3	8.1
Bicyclist turned/merged into path of motorist	7.3	6.8	16.9	5.4
Bicyclist overtaking motorist	2.7	1.6	0.7	0.6
Operator wrong side/head-on (motorist or bicyclist)	2.8	2.1	5.6	2.5
Motorist loss of control	0.6	0.3	0.5	0.3
Bicyclist loss of control	1.8	2.2	1.3	1.0
<b>Parallel Path Total</b>	<b>35.9</b>	<b>35.1</b>	<b>61.2</b>	<b>26</b>
<b>Total for Common Crash Types Listed</b>	<b>88.5</b>	<b>84.2</b>	<b>90.3</b>	<b>76.1</b>



# 3

## Bicyclists in the RSA Process

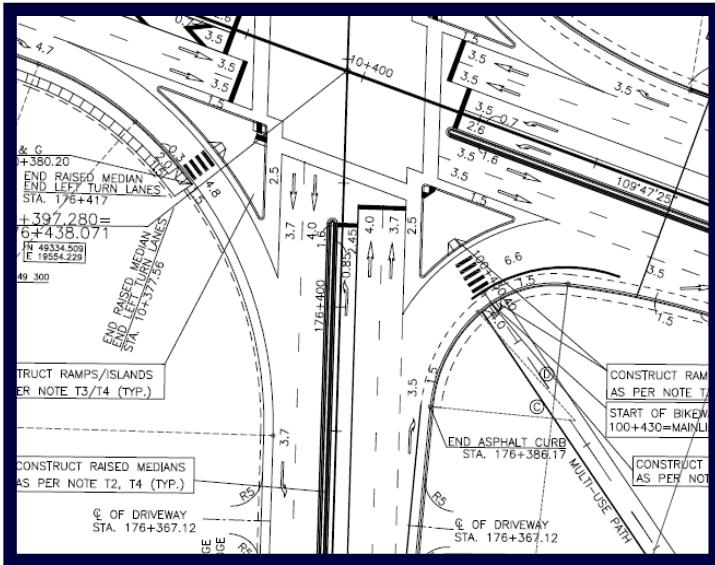
# The 8-Step RSA Process



# 3

## Bicyclists in the RSA Process

# RSA Step 1: Identify the Project



Design stage project

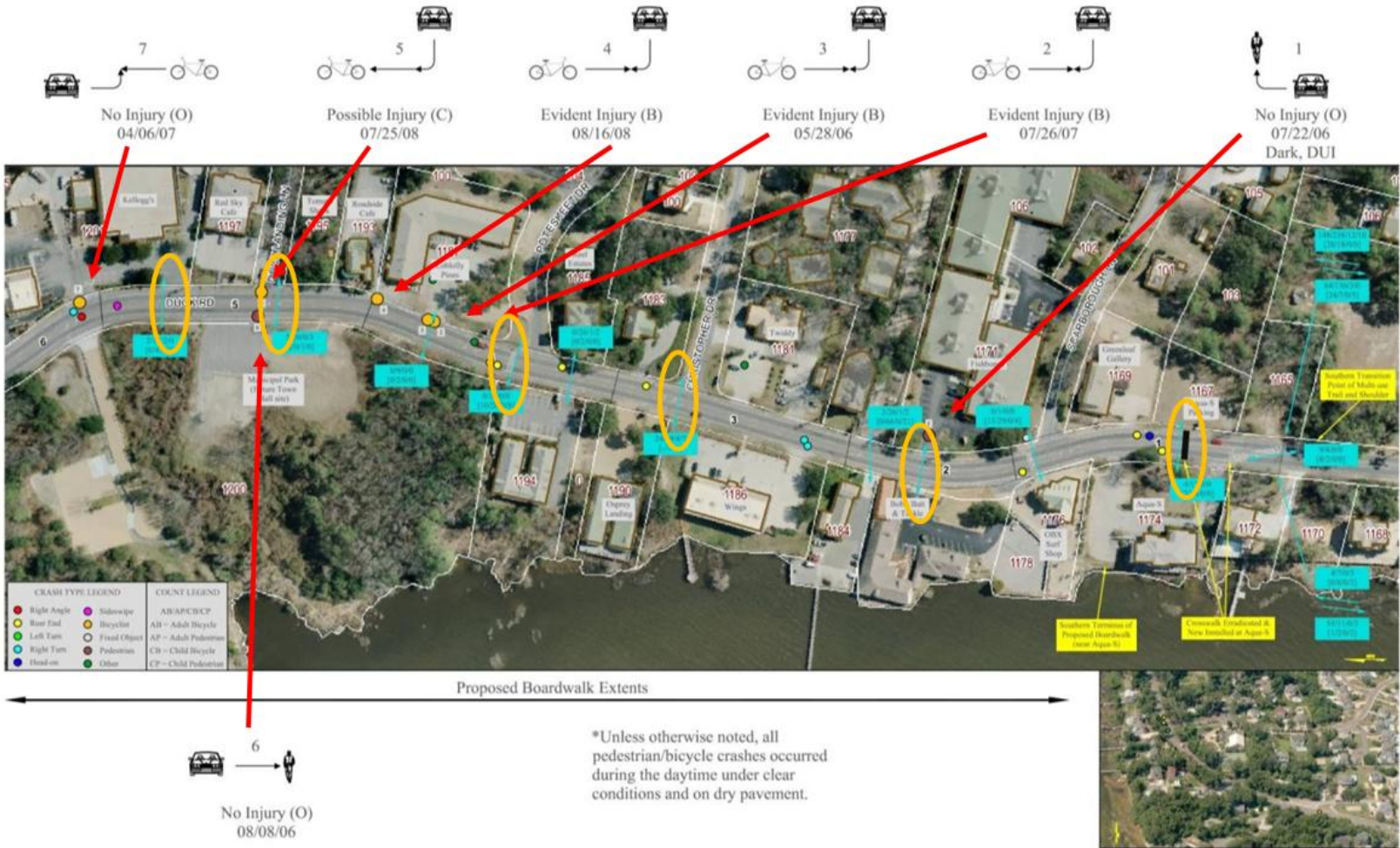


In-service project

# 3

## Bicyclists in the RSA Process

# RSA Step 1: Identify the Project

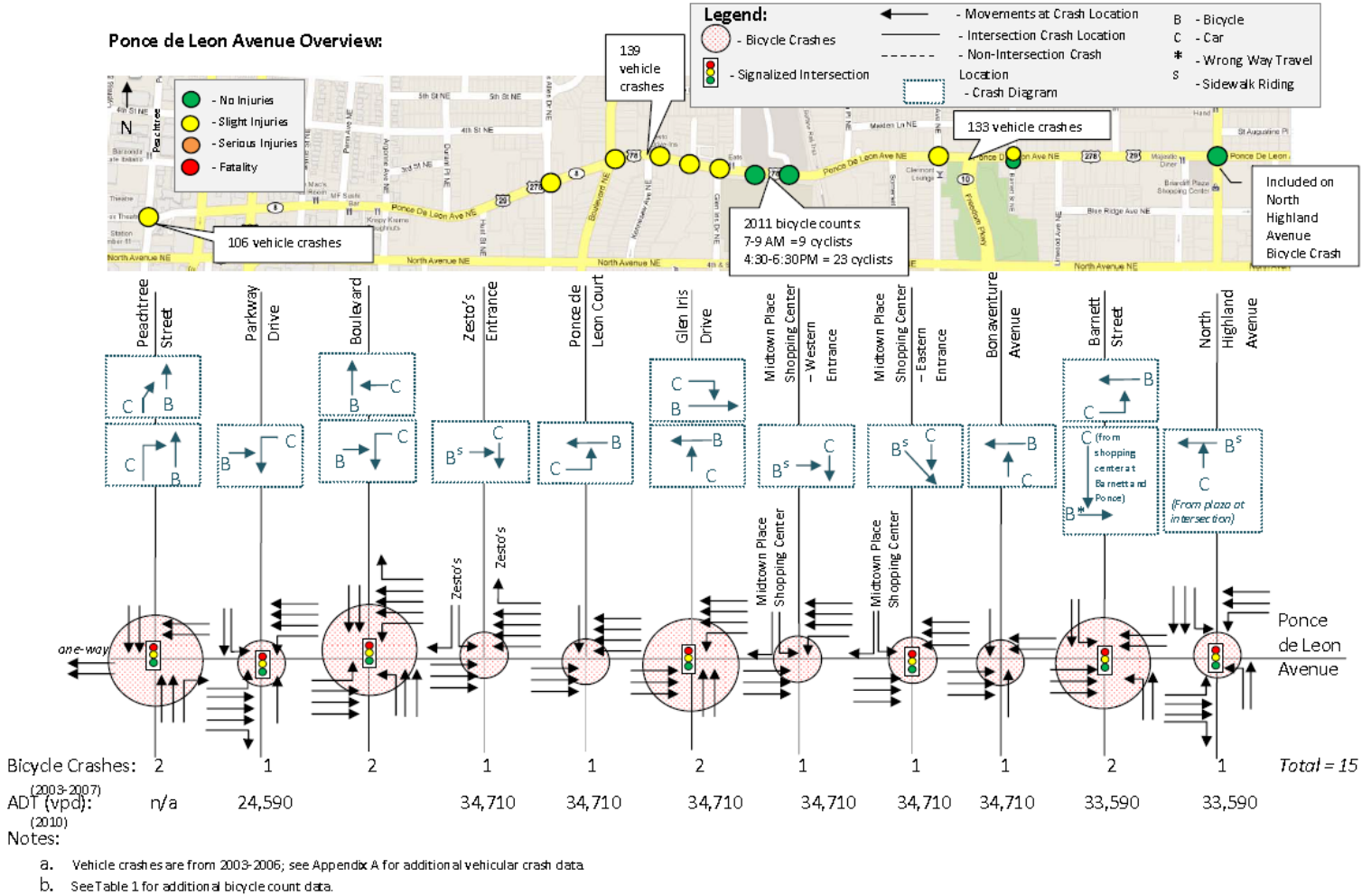




# 3

## Bicyclists in the RSA Process

# RSA Step 1: Identify the Project



# 3

## Bicyclists in the RSA Process

### RSA Step 1: Identify the Project

#### Post-construction or In-service RSA Candidates



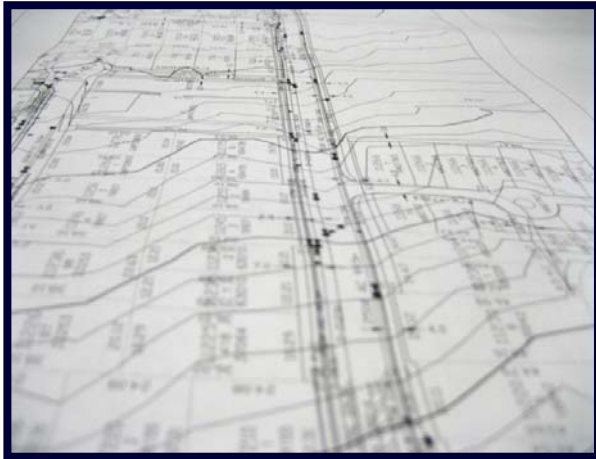
- High-collision sites
- High-profile
- Sites at which traffic characteristics have changed
- Unusual or new features
- Context-sensitive design
- Seasonal changes in traffic



# 3

## Bicyclists in the RSA Process

### RSA Step 1: Identify the Project Design Stage RSAs



- Opportunity to enhance safety of design
- Follows same process
- The earlier the better

# 3

## Bicyclists in the RSA Process

### RSA Step 2: Select the RSA Team Core Skills

#### Operations



#### Geometric



#### Road users/human factors

#### Supplementary Skills:

- Human factors
- Specialists
- Enforcement
- Maintenance

# 3

## Bicyclists in the RSA Process

### RSA Step 2: Select the RSA Team



- Independent
- Experienced
- Multidisciplinary

# 3

## Bicyclists in the RSA Process

### RSA Step 3: Conduct Start-up Meeting

#### Agenda

- Introductions
- Project objectives
- RSA process
- Schedule
- Exchange of information

RSA Agenda	
Day 1	Date
9.00 – 9.30 AM	Introduction to RSA process
9.30 – 10.00 AM	Project objectives/background
10.00 – 12.00 PM	Initial site visit by car
12.00 – 1.00 PM	Lunch
1.00 – 5.00 PM	Detailed site review
5.00 – 6.30 PM	Peak hour review
6.30 – 8.30 PM	Dinner
8.30 – 9.30 PM	Nighttime site review
Day 2	Date
7.30 – 9.30 AM	Continue detailed site review
10.00 – 12.00 PM	Individual assignments
12.00 – 1.00 PM	Lunch
1.00 – 3.00 PM	RSA team develops workshop summary/
3.30 – 4.30 PM	Preliminary findings meeting

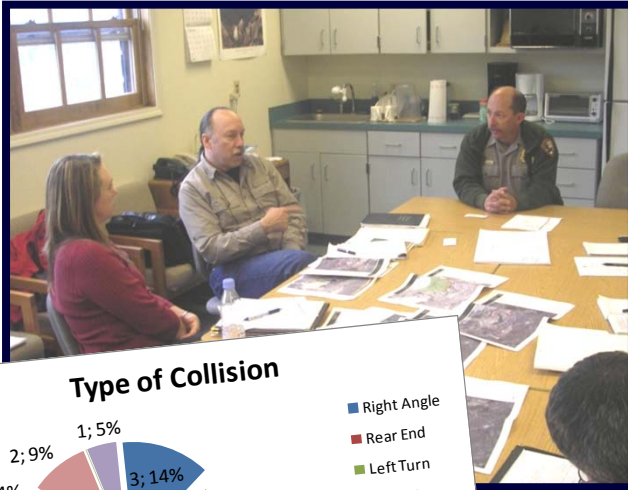
**General meeting** – all need to attend especially “roadway owners” i.e., persons responsible for development of plans and/or facility owner  
 **RSA team activity** – all who are interested in participating in the site visits and developing suggestions (excluding roadway owners)  
 **Optional RSA team activity** – FHWA anticipates doing this work on their own, but welcomes all who are interested in participating



# 3

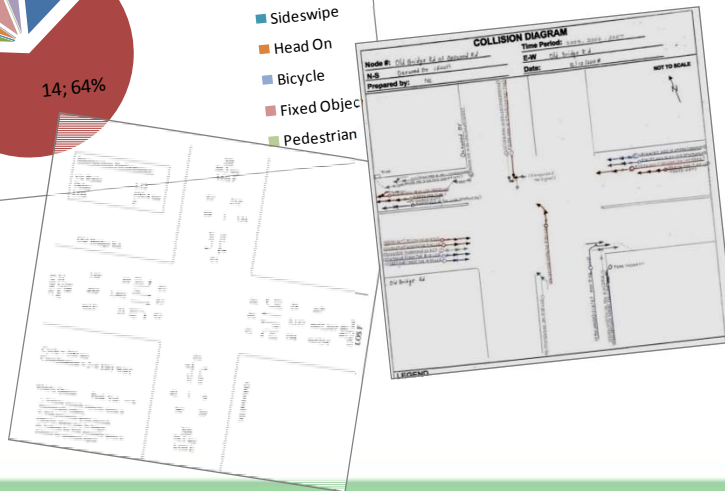
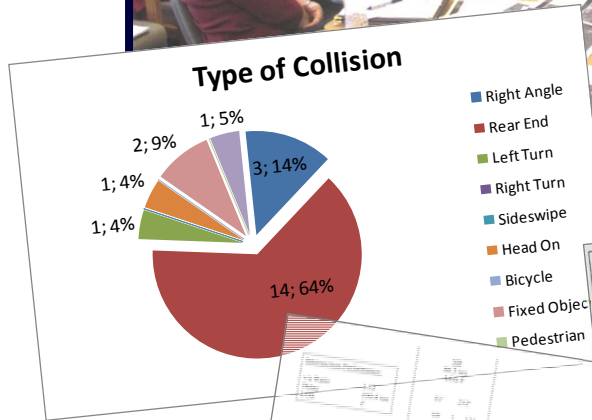
## Bicyclists in the RSA Process

### RSA Step 3: Conduct Start-up Meeting



## Project Information

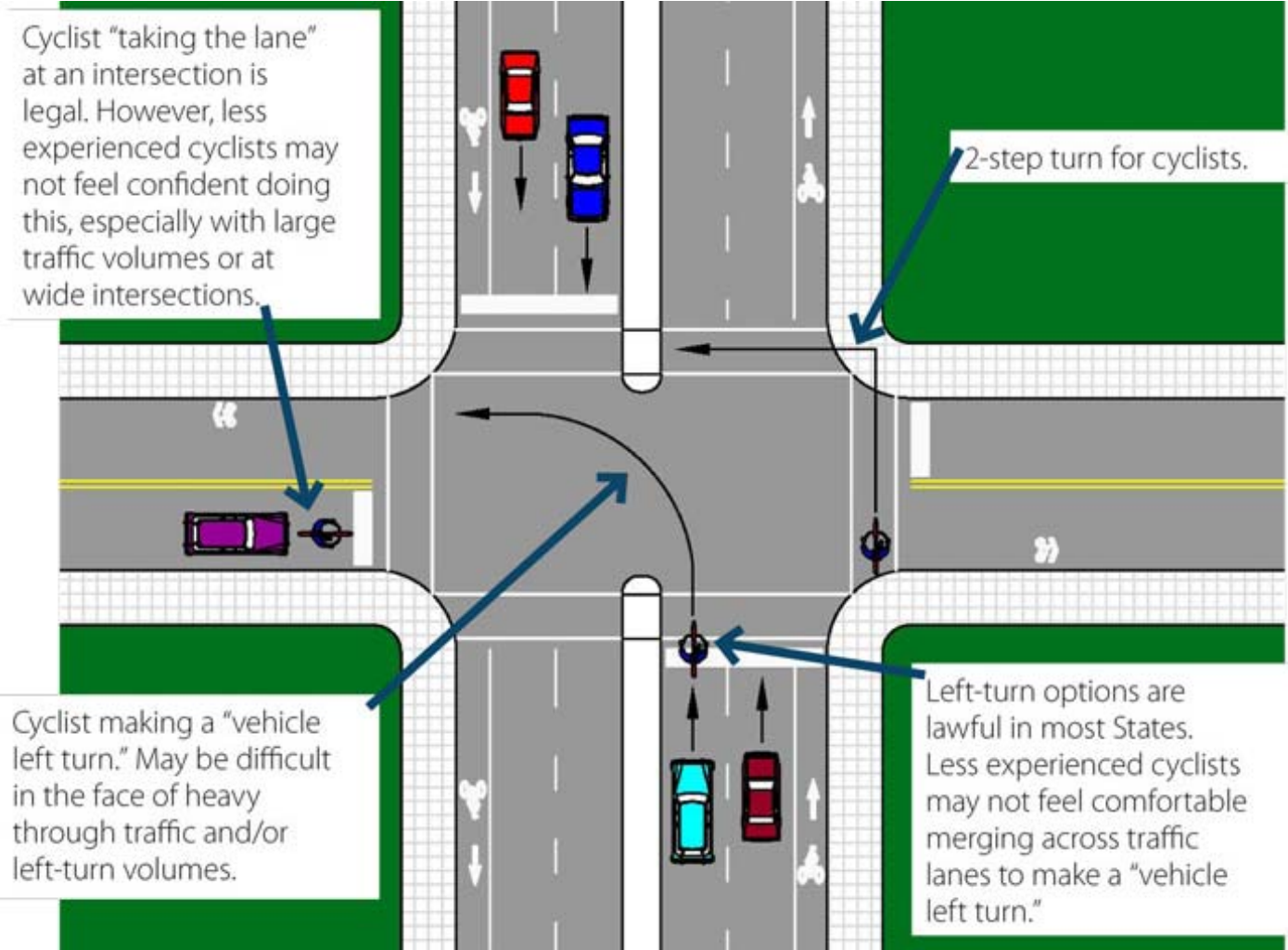
- Crash history
- Traffic volumes
- Aerial photographs
- Design drawings
- Background reports
  - Plans
  - Policies
  - Standards
  - Local laws/statutes



# 3

## Bicyclists in the RSA Process

### RSA Step 3: Discuss Legal Movements for Cyclists



# 3

## Bicyclists in the RSA Process

### RSA Step 4: Perform Field Reviews

- Observe road user behaviors.
- Observe roadway characteristics.
- Designate secretary and photographer.





3

# Bicyclists in the RSA Process

## RSA Step 4: Perform Field Reviews

### Observe Variable Conditions:



Walk the RSA site.



Drive the RSA site.





# 3

## Bicyclists in the RSA Process

### RSA Step 4: Perform Field Reviews

#### **Bike the RSA site.**



# 3

## Bicyclists in the RSA Process

### RSA Step 5: Conduct RSA Analysis

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



# 3

## Bicyclists in the RSA Process

### RSA Step 5: Conduct RSA Analysis

- Identify and prioritize safety concerns
- Develop suggestions for reducing the degree of risk

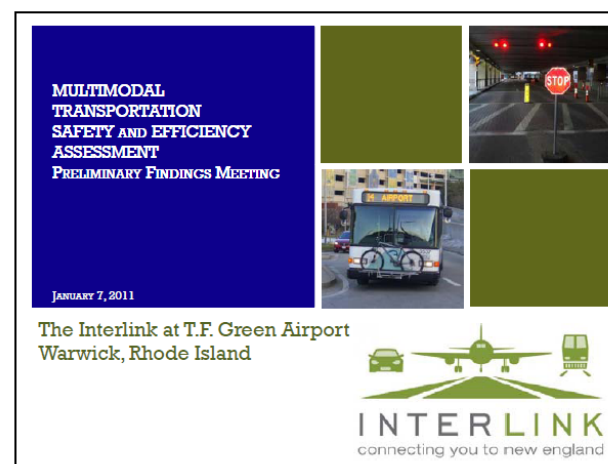
Frequency of Crashes	Severity of Crashes			
	Possible/Minor Injury	Moderate Injury	Serious Injury	Fatal
Frequent	Moderately High	High	Highest	Highest
Occasional	Middle	Moderately High	High	Highest
Infrequent	Low	Middle	Moderately High	High
Rare	Lowest	Low	Middle	High

# 3

## Bicyclists in the RSA Process

### RSA Step 6: Present Findings to Owner

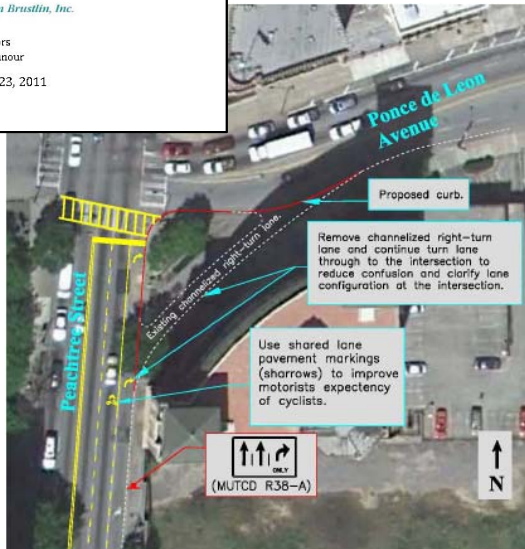
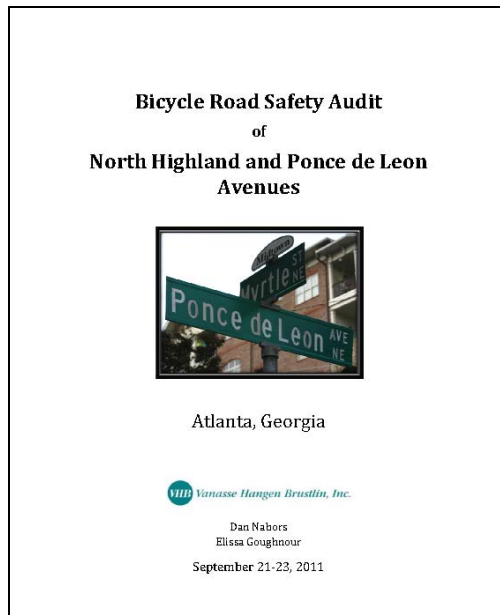
- RSA team, design team, owner
- Discuss preliminary findings and possible solutions
- Use results to write RSA report





# 3

## Bicyclists in the RSA Process RSA Step 6: Present Findings to Owner



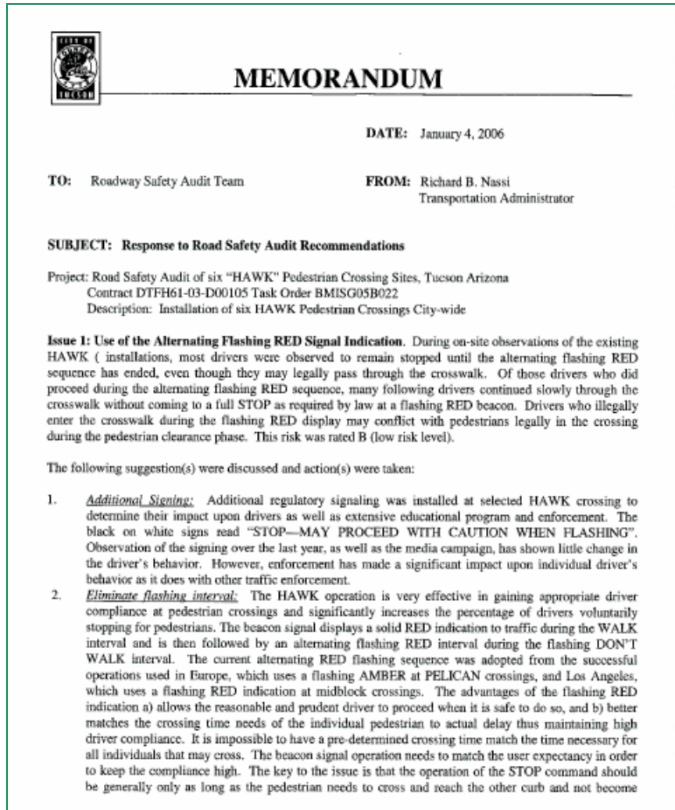
### The Formal Report:

- Summarizes the project
- Identifies team
- Documents site visits
- Documents results
- Identifies and prioritizes safety concerns
- May include suggestions for improvements

## 3

# Bicyclists in the RSA Process

## RSA Step 7: Prepare a Formal Response



**MEMORANDUM**

DATE: January 4, 2006

TO: Roadway Safety Audit Team FROM: Richard B. Nassi  
Transportation Administrator

SUBJECT: Response to Road Safety Audit Recommendations

Project: Road Safety Audit of six "HAWK" Pedestrian Crossing Sites, Tucson Arizona  
Contract DTFH61-03-D00105 Task Order BMISG05B022  
Description: Installation of six HAWK Pedestrian Crossings City-wide

**Issue 1: Use of the Alternating Flashing RED Signal Indication.** During on-site observations of the existing HAWK (installations, most drivers were observed to remain stopped until the alternating flashing RED sequence has ended, even though they may legally pass through the crosswalk. Of those drivers who did proceed during the alternating flashing RED sequence, many following drivers continued slowly through the crosswalk without coming to a full STOP as required by law at a flashing RED beacon. Drivers who illegally enter the crosswalk during the flashing RED display may conflict with pedestrians legally in the crossing during the pedestrian clearance phase. This risk was rated B (low risk level).

The following suggestion(s) were discussed and action(s) were taken:

- Additional Signing:** Additional regulatory signaling was installed at selected HAWK crossing to determine their impact upon drivers as well as extensive educational program and enforcement. The black on white signs read "STOP—MAY PROCEED WITH CAUTION WHEN FLASHING". Observation of the signing over the last year, as well as the media campaign, has shown little change in the driver's behavior. However, enforcement has made a significant impact upon individual driver's behavior as it does with other traffic enforcement.
- Eliminate flashing interval:** The HAWK operation is very effective in gaining appropriate driver compliance at pedestrian crossings and significantly increases the percentage of drivers voluntarily stopping for pedestrians. The beacon signal displays a solid RED indication to traffic during the WALK interval and is then followed by an alternating flashing RED interval during the flashing DON'T WALK interval. The current alternating RED flashing sequence was adopted from the successful operations used in Europe, which uses a flashing AMBER at PELICAN crossings, and Los Angeles, which uses a flashing RED indication at midblock crossings. The advantages of the flashing RED indication a) allows the reasonable and prudent driver to proceed when it is safe to do so, and b) better matches the crossing time needs of the individual pedestrian to actual delay thus maintaining high driver compliance. It is impossible to have a pre-determined crossing time match the time necessary for all individuals that may cross. The beacon signal operation needs to match the user expectancy in order to keep the compliance high. The key to the issue is that the operation of the STOP command should be generally only as long as the pedestrian needs to cross and reach the other curb and not become

- Prepared by the local road agency (with possible input from designer)
- For each issue, identifies what action will (or will not) be taken with a brief explanation
- Part of the project record

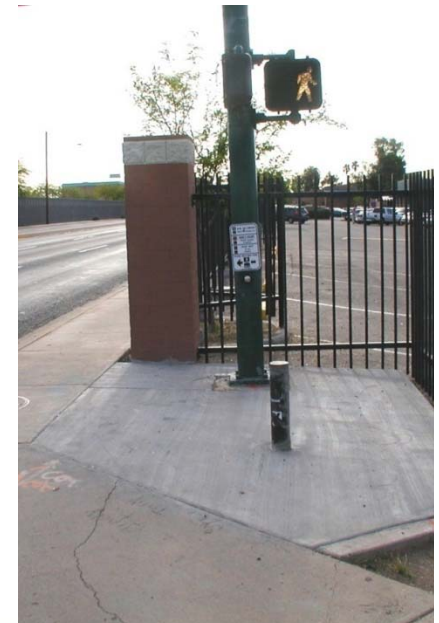
### 3

## Bicyclists in the RSA Process

### RSA Step 8: Incorporate Findings

Implementation - may depend on policy, manpower, and/or funding.

- Some improvements can be implemented relatively quickly
  - Short-Term
  - Intermediate
  - Long-Term



## 4 Using the Prompt Lists

# Prompt Lists: Content

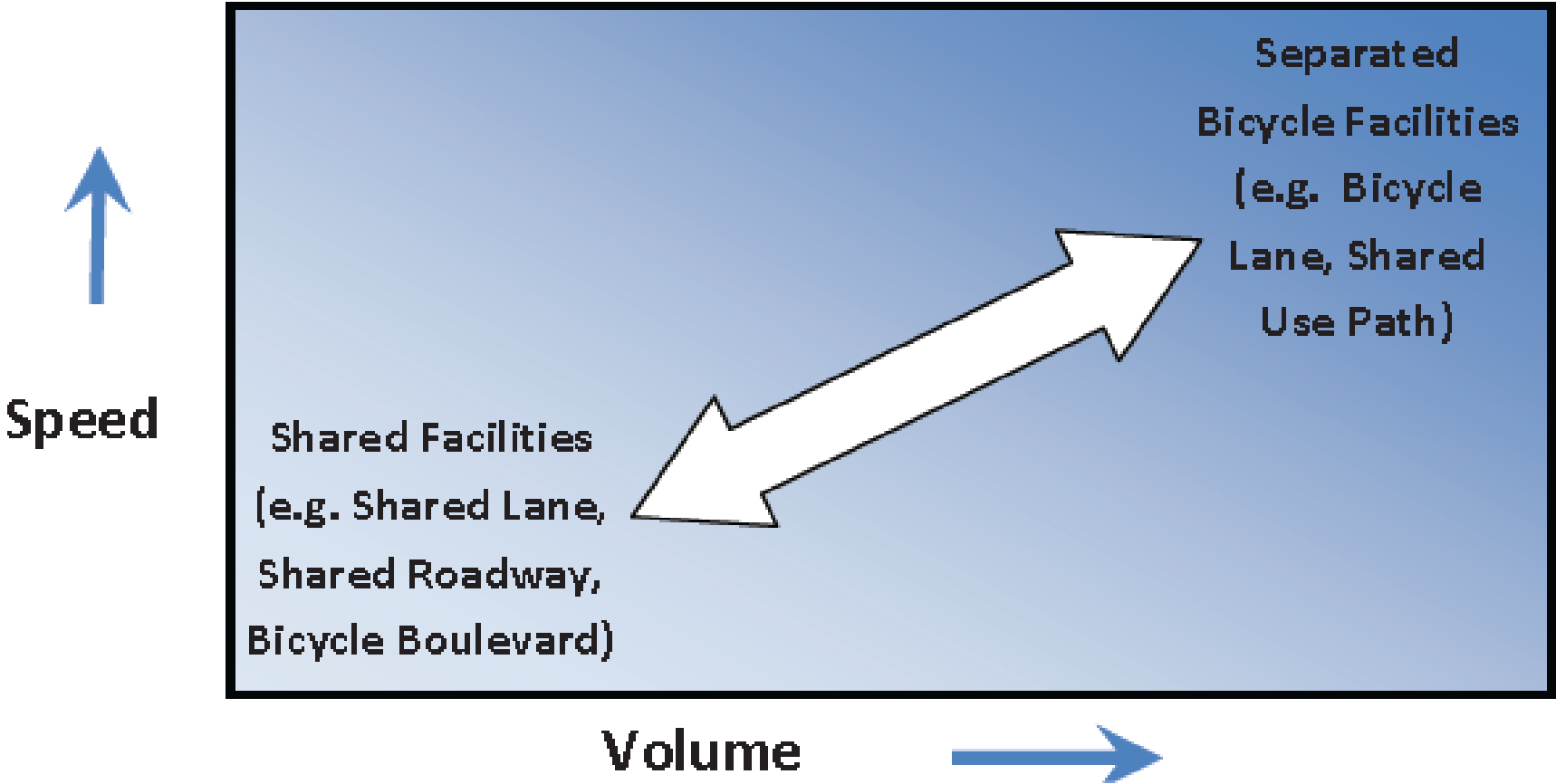
- Designed to assist RSA team members.
  - Context considerations
  - Behavioral considerations
  - Overall considerations in Master prompt list:
    - 12 major topic areas
    - 5 RSA zones
- } Each with an associated prompt



4

# Using the Prompt Lists

Context: General Bicycle Facility Utilization



# 4

## Using the Prompt Lists

### Prompts to Use when Assessing Cyclist and Other Road User Behavior

Watch for cyclists needing to merge and allow space for them to do so?

Stop at intersections when required to do so?

Yield to opposing bicycle traffic when turning left under a green signal?

Do roadway users look/scan for other travel modes?	
Are roadway/path users courteous to each other?	<p>Do motorists:</p> <ul style="list-style-type: none"> <li>Allow extra space or reduce speed as needed when overtaking or driving near bicyclists?</li> <li>Look for and yield to bicyclists before changing lanes, turning, parking or opening car doors?</li> <li>Avoid loud horn blasts when overtaking or driving near bicyclists?</li> <li>Watch for cyclists needing to merge and allow space for them to do so?</li> <li>Refrain from speeding?</li> </ul> <p>Do cyclist s:</p> <ul style="list-style-type: none"> <li>Give an alert call or signal (such as using a bell) when passing pedestrians or other bicyclists on shared use facilities?</li> <li>Ride at a safe speed and follow safe practices for the conditions?</li> <li>Slow down for pedestrians and wait for a safe passing opportunity?</li> <li>Stop at intersections when required to do so?</li> </ul> <p>Do pedestrians:</p> <ul style="list-style-type: none"> <li>Stay to the right?</li> <li>Avoid abrupt changes in direction?</li> <li>Avoid stepping out in front of cyclists without looking?</li> <li>Keep dogs on leashes and out of the way of other path users?</li> </ul> <p>Do all modes</p> <ul style="list-style-type: none"> <li>Use special lanes (eg., bus/bicycle-only lanes, drop-off zones, etc.) appropriately and safely?</li> </ul>
Do motorists follow traffic laws and rules of the road?	<p>Do motorists:</p> <ul style="list-style-type: none"> <li>Obey posted speed limits and local ordinances?</li> <li>Avoid unsafe overtaking or passing cyclists too closely?</li> <li>Check for and yield to through cyclists before turning right, either from a stopped position or after overtaking a bicyclist traveling to the right?</li> <li>Avoid passing left-turning cyclists on the left?</li> <li>Use proper signals to indicate intentions?</li> <li>Obey traffic controls including signs, signals, and pavement markings?</li> <li>Look in both directions and yield to bicyclists and other traffic when turning and entering and exiting the roadway?</li> <li>Avoid parking in bicycle lanes or double-parking?</li> <li>Yield to opposing bicycle traffic when turning left under a green signal?</li> </ul>

# 4

## Using the Prompt Lists

### Prompts to Use when Assessing Cyclist and Other Road User Behavior (cont.)

Travel with the flow of traffic?

Are bicycles and bicyclists properly equipped with active, white headlamps and rear, red taillights?

Do roadway users look/scan for other travel modes?	
Do bicyclists observe the rules of the road and other safe riding practices?	<p>Do bicyclists:</p> <ul style="list-style-type: none"> <li>Travel with the flow of traffic?</li> <li>Position themselves properly in the lane/path? Consider the conditions present, such as narrow lane widths, on-street parking, turning conflicts, poor sight lines, and pavement conditions?</li> <li>Make left turns from the appropriate lane?</li> <li>Check for approaching traffic, including pedestrians on walkways, and yield before entering/crossing a roadway at any type of junction (intersection, driveway, or shared use path)?</li> <li>Understand and obey the posted traffic control devices and local ordinances?</li> <li>Check behind for traffic before changing lanes or merging with traffic on a different traveled way?</li> <li>Use proper hand signals to indicate turning or stopping intentions?</li> <li>If bicycle restrictions are present, do cyclists adhere to those restrictions and only use permitted areas or facilities?</li> <li>Avoid passing traffic on the right and occupying blind spots where they may face conflicts with right-turning motorists?</li> <li>Transport children using proper child seats and helmets?</li> </ul>
Do bicyclists ride on the sidewalk?	<ul style="list-style-type: none"> <li>Does sidewalk riding contribute to conflicts with motor vehicles at intersections and driveways?</li> <li>Do cyclists dismount and avoid cycling on sidewalks in high-pedestrian traffic areas?</li> <li>Does sidewalk riding contribute to conflicts with pedestrians?</li> </ul>
Are bicyclists practicing methods to increase their conspicuity at night?	<ul style="list-style-type: none"> <li>Are bicycles and bicyclists properly equipped with active, white headlamps and rear, red taillights?</li> <li>Do bicyclists supplement required lighting and reflectors with retroreflective gear and clothing at night?</li> </ul>



# 5

## Prompt Lists

# Master Prompt List: Topics 1-5

- 1: Presence & Availability
- 2: Design & Placement
- 3: Operations
- 4: Quality & Conditions
- 5: Obstructions

RSA Zones				
A. Street or Path	B. Structures	C. Intersections, Crossings, and Interchanges	D. Transitions	E. Transit
<b>1. Presence &amp; Availability</b>				
Are cyclists accommodated?				
<b>2. Design &amp; Placement</b>				
Are design features present that adversely impact the use of the facility by cyclists?	Are bridges/tunnels designed with adequate bicycle accommodations on both sides?  Does the gradient of the cycling accommodations impact the use of the facility?	Are intersection/interchange accommodations designed to reduce conflicting movements and communicate proper bicycle positioning through the crossing?	Are transition areas designed with logical termini or do they end abruptly, potentially contributing to sudden and difficult merges, midblock crossings, or behaviors such as wrong-way riding?	Are transit facilities designed and placed to minimize conflicts with other modes?
<b>3. Operations</b>				
Are there suitable provisions for cyclists given the characteristics of the roadway or path (speed, volume, traffic, and functional classification)?  Do access management practices detract from cycling safety?		Do traffic operations (especially during peak periods) create a safety concern for cyclists?	Do shared roadway geometrics change substantially or frequently?	Are transit facilities designed and placed to minimize conflicts with other modes?
<b>4. Quality &amp; Conditions</b>				
Is the riding surface smooth, stable, and free of debris and is drainage adequate?  Are drainage grates designed for cyclists?	Is the grating/bridge surface designed for cyclists?  Is drainage adequate to accommodate bicyclists?  Are there longitudinal or transverse joints that may cause cyclists problems?	Are there any obstacles at crossings?  Are the manhole covers properly designed?	Is there an abrupt change in riding surface?	Are transit stops maintained during periods of inclement weather?
<b>5. Obstructions</b>				
Are there any horizontal or vertical obstructions (temporary or permanent) along the facility?	Is there adequate horizontal and vertical clearance?	If bollards or other physical terminal devices are used, is the risk of occasional motorized vehicles greater than the risk of a fixed object within the travel way?		Is the waiting area free of temporary/permanent obstructions that constrict its width or block access to the bus stop?



# 5

## Prompt Lists

# Master Prompt List: Topics 6-12

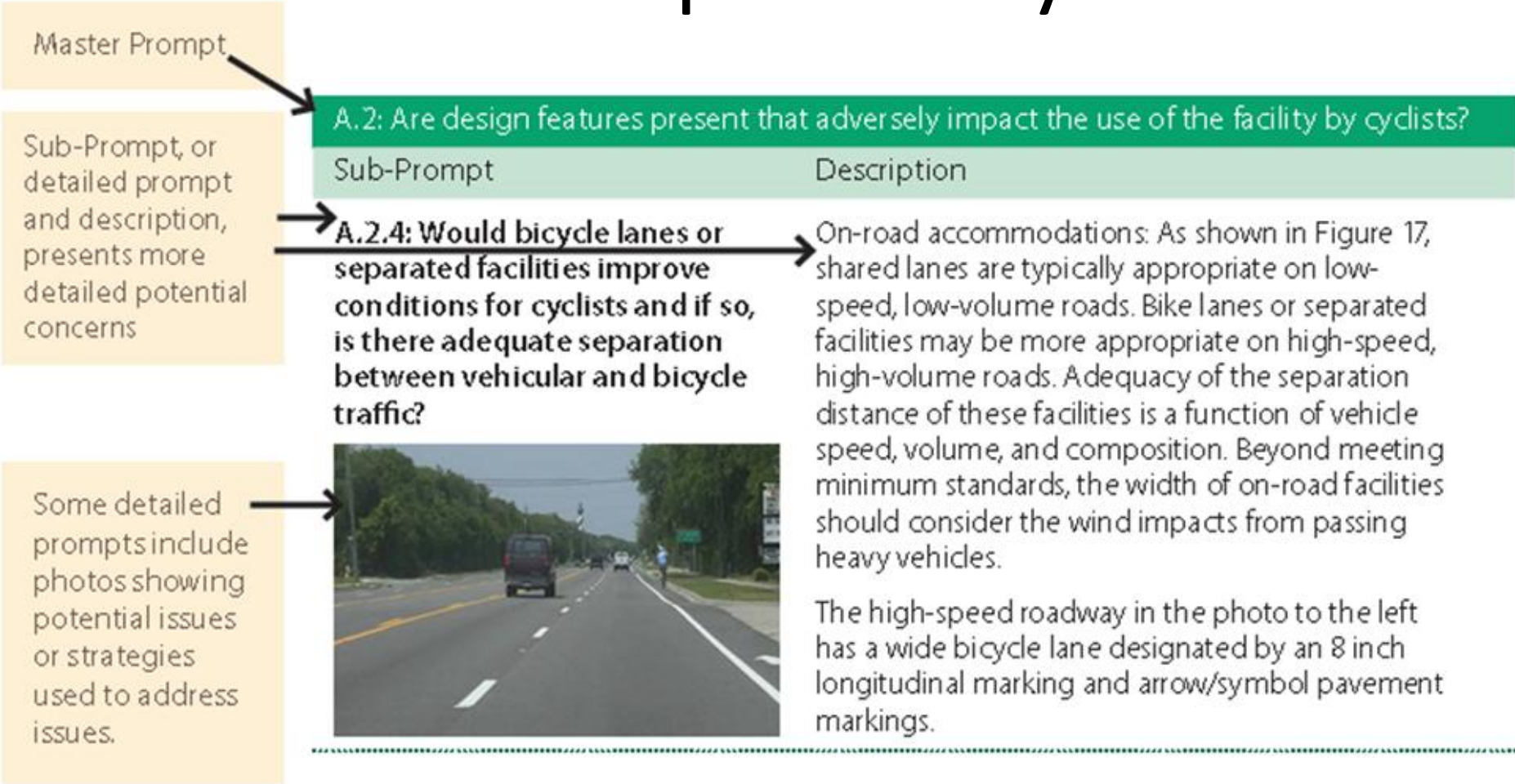
- 6: Roadside
- 7: Continuity & Connectivity
- 8: Lighting
- 9: Visibility
- 10: Signs & Pavement Markings
- 11: Signals
- 12: Human Factors/Behavior

RSA Zones				
A. Street or Path	B. Structures	C. Intersections, Crossings, and Interchanges	D. Transitions	E. Transit
<b>6. Roadside</b>				
Is the clear zone for cyclists' operating space adequate?	Are railings, guardrail, and/or parapets and other structures installed at an appropriate height and shy distance?	If bollards or other physical terminal devices are used, is the risk of occasional motorized vehicles greater than the risk of a fixed object within the travel way?		Are bicycle accommodations connected and convenient for transit users?
<b>7. Continuity &amp; Connectivity</b>				
Are bicycle accommodations continuous?  Do bicycle accommodations provide adequate connectivity to major destinations?	Are bicycle accommodations continuous, or do they end abruptly at bridge/tunnel crossings?	Are bicycle accommodations continuous, or do they end abruptly at crossings/intersections/interchanges?	Is there a safe way for cyclists from both directions to access connections or continue to other destinations along the street network?	Are crossings convenient and free of potential hazards for cyclists?
<b>8. Lighting</b>				
Is the riding surface adequately lit?	Are bridges and tunnels adequately lit?	Are the intersection/transition and paths leading to the transition adequately lit?		Are transit access ways and facilities adequately lit?
<b>9. Visibility</b>				
Is the visibility of cyclists using the facility adequate from the perspective of all road users?	Can cyclists see approaching vehicles/ pedestrians, and vice versa?	Can cyclists see approaching vehicles/ pedestrians at all legs of an intersection/ crossing, and vice versa?	Is the visibility of cyclists as they make the transition from one facility or roadway geometry to another adequate from the perspective of all road users?	Is the visibility of cyclists using the facility adequate from the perspective of all road users?
<b>10. Signs &amp; Pavement Markings</b>				
Are signs and markings along the riding surface visible, well-maintained, easily understood, and adequate?	Are adequate warning signs posted at entrances?	Do signs and markings along the cycling facility clearly indicate the cyclist path and right-of-way at intersections?	Are signs and markings at transition areas appropriate?	Are signs and markings at designated areas for cyclists using transit appropriate?
<b>11. Signals</b>				
If bicycle traffic signalization and detection are present, are they properly positioned, functioning, and effective? Does the traffic signal design accommodate all users?				
<b>12. Human Factors / Behavior</b>				
What are all roadway users (vehicles, bicyclists, pedestrians, transit, etc.) doing with regards to bicycle traffic, and vice versa?				

# 4

## Using the Prompt Lists

# Prompt List Key



5

# Prompt Lists





5

# Prompt Lists





5

# Prompt Lists



# Questions?



# RSA Applications to Address Bicyclists Needs

- Middletown, RI: RSA - Bicycle enhancements
- Newport, RI – RSA & public outreach
- Aquidneck Island, RI – RSA & Regional connections
- Providence, RI – Bike plan & initiating RSA



# RSA Bicyclist Enhancements

## RSA: Bicycle Enhancements Middletown, RI

### Project Purpose:

- Focus along roadways with heavy commercial/retail traffic volumes
- Possible route for regional traffic





# RSA: Bicycle Enhancements Middletown, RI

## Existing conditions:

- Four-lane roadway with wide outside lanes.
- High vehicle speeds.
- Lack of awareness of bicyclists needs.



# RSA: Bicycle Enhancements Middletown, RI

## RSA Team:

- RIDOT (state owned)
- City officials
- US Navy staff
- Police
- Local bike advocates
- Regional planning org



# RSA: Bicycle Enhancements Middletown, RI

## Data:

- Traffic volume
- Speed
- Roadway geometrics
- Crash history
  - Field review by RSA Team



# RSA: Bicycle Enhancements Middletown, RI

## Proposed Measures:

- Bike Lane-Retrofitting Existing Roadways with a Road Diet
  - Reduce number of travel lanes
  - Mark two-way left turn lane
  - Bike lanes with buffer





# RSA: Bicycle Enhancements Middletown, RI

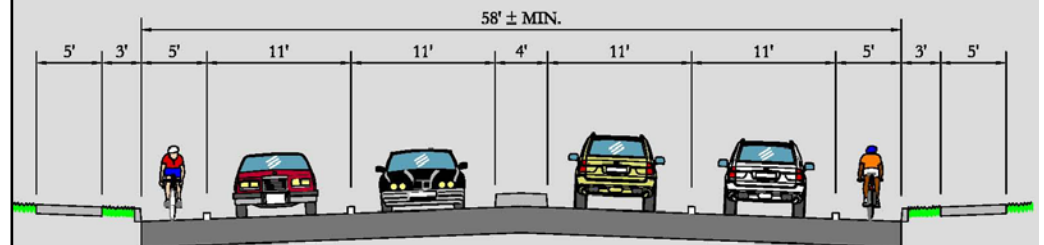
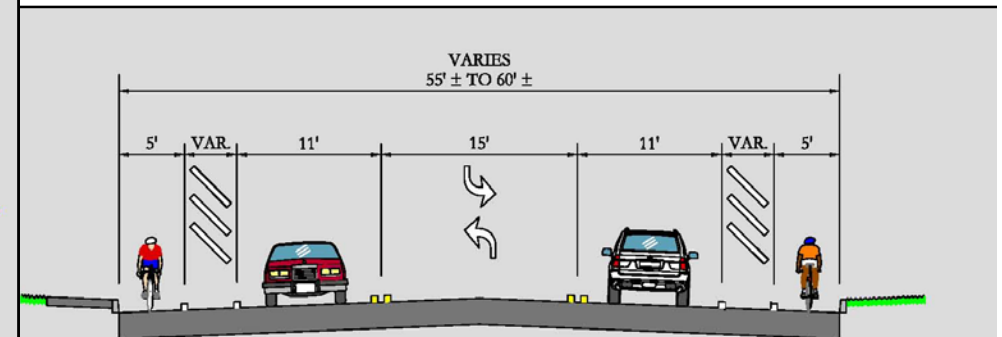
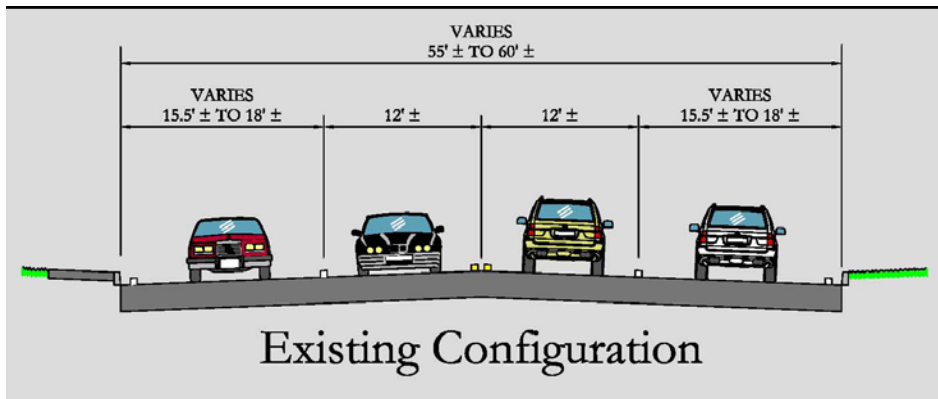
**Before**



**After**



# RSA: Bicycle Enhancements Middletown, RI



# RSA & Public Outreach Newport, RI

## Project Purpose:

- Improve bicycle accommodation in Newport, RI along roadways with heavy tourist traffic volumes



# RSA & Public Outreach

## Newport, RI

### Existing conditions:

- Multi-lane roadway
- Wide raised grassed median
- High vehicle speeds
- Lack of shoulders for bicycle travel
- On-street parking on one side
- Steep grades for bicycles.
- One bicycle fatality in 2012 (run down from behind)





# RSA & Public Outreach Newport, RI

## RSA Team included:

- RIDOT (state owned roadway)
- City officials
- Police
- Local bike advocates
- Regional planning org



# RSA & Public Outreach Newport, RI

## Data

- Traffic volume
- Speed
- Roadway geometrics
- Crash history

*Field review by RSA Team*



# RSA & Public Outreach Newport, RI

## Proposed Solution

- Public outreach and video demo
- Road Diet:
  - Reduce number of travel lanes
  - Mark left turn lanes
  - Bike lanes



# RSA & Public Outreach Newport, RI

Before



After





# RSA & Regional Connections Aquidneck Island, RI

Island Wide Bike Network



RSAs Identified Gap in Network



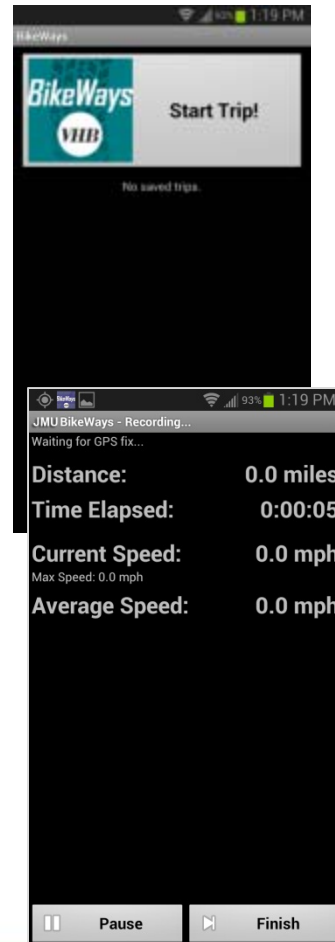
# Bike Plan & Initiating RSA Providence, RI

## Project Purpose:

- Identify problems and appropriate cost-effective solutions
  - Existing bikeways
  - Proposed bikeways



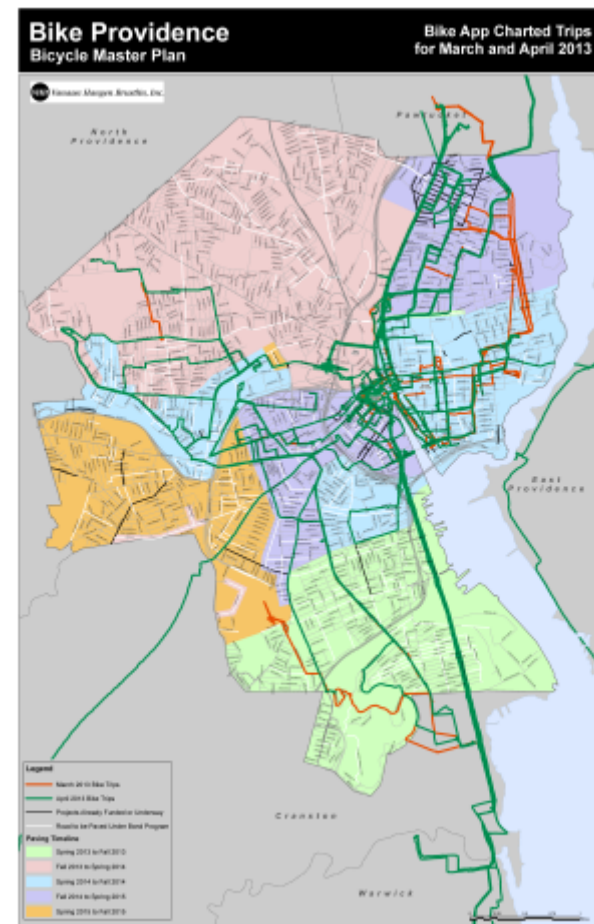
# Bike Plan & Initiating RSA Providence, RI



- Used GPS capability of smart phones to log routes cyclists were actually riding.
- Identified low-speed low-volume roadways cyclists were using to avoid roadways with large traffic volumes.

# Bike Plan & Initiating RSA Providence, RI

- Overlaid logged routes onto map of City-wide roadway resurfacing program.
- Completed RSAs on roadways deemed suitable alternate routes for bicycle travel.





# Thank You!

---

## ⇒ Archive at [www.walkinginfo.org/webinars](http://www.walkinginfo.org/webinars)

- Downloadable and streaming recording, transcript, presentation slides

## ⇒ Questions?

- **Dan Nabors**  
[dnabors@vhb.com](mailto:dnabors@vhb.com)
- **Bill DeSantis**  
[wdesantis@vhb.com](mailto:wdesantis@vhb.com)

