Nuts & Bolts of Complete Streets Design

Matthew Vail – Principal Engineer – Highway Design
Craig Babowicz – TSP – Project Coordination Unit
Mike Cherpak – TSE – Highway Design
Sal Aresco – TSE – Highway Design
Scott Bushee – TSE – Highway Design

Agenda

Introductions

Design Guidance

Bike/Ped Reviews

Complete Streets – In Practice

1

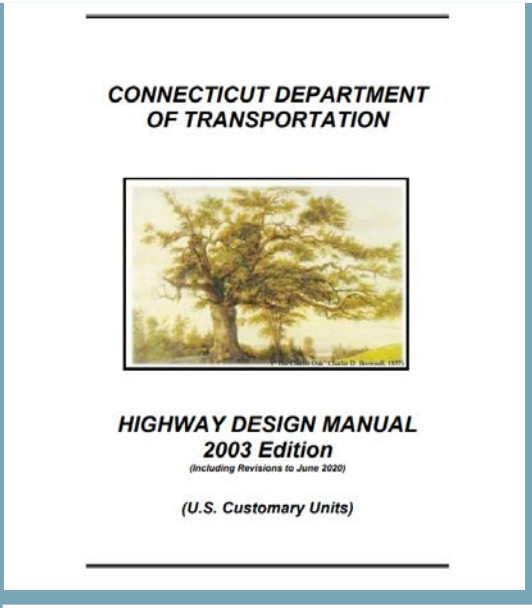
State of CTDOT's Design Guidance

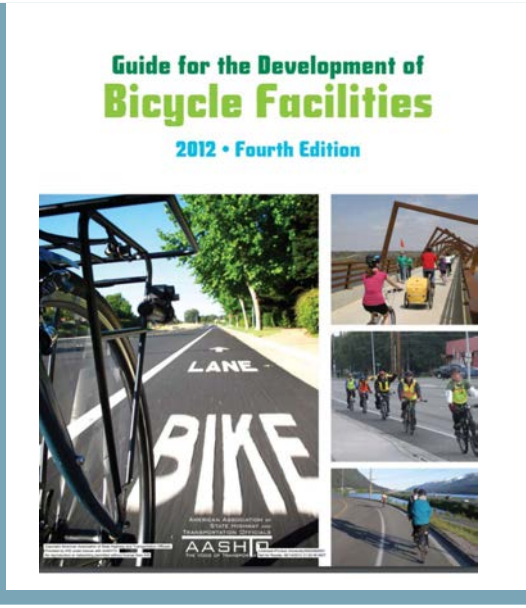
Where does CTDOT look for Design Guidance?

Matthew Vail, P.E.
Principal Engineer – CTDOT Highway Design Unit

Source Materials & CTDOT

- CT DOT Highway Design Manual
- AASHTO Guide for Development of Bicycle Facilities
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- FHWA Planning, Design, and Maintenance of Pedestrian Facilities
- FHWA Manual on Uniform Traffic Control Devices
- CT DOT The Connecticut Strategic Highway Safety Plan
- NACTO Urban Bikeway Design Guide





DRAFT

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Bicycle Facility Selection and Design Guide 2020

Figure 17: Charter Oak Greenway, Manchester, CT. Image Credit: FHI

8.2 DESIGN GUIDANCE

8.2.1 Width

Table 15 below provides guidance on the recommended shared use path width based upon projected peak hour bike and pedestrian traffic.

Table 15: Recommended Shared Use Path Width

Users per Peak Hour	Minimum Width	Recommended Width
<200	8 feet*	10 feet
200-500	10 feet	12 feet
>500	12 feet	14 feet

* Shared use paths may have a minimum width of 8 feet where the following conditions prevail:

- Pedestrian use of the facility is expected to be occasional only.
- For a short distance due to a physical constraint such as an environmental feature, bridge abutment, utility structure fence and such.
- Horizontal and vertical alignments provide frequent, well-designed passing and resting opportunities.
- The path will not be regularly subjected to maintenance vehicle loading conditions that would cause pavement damage.

Figure 15: Typical Buffered Bike Lane, West Hartford, CT. Image Credit: FHI

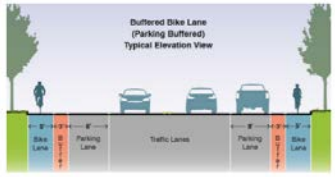


Figure 10: Typical Parking Buffered Bike Lane

ACTIVECT

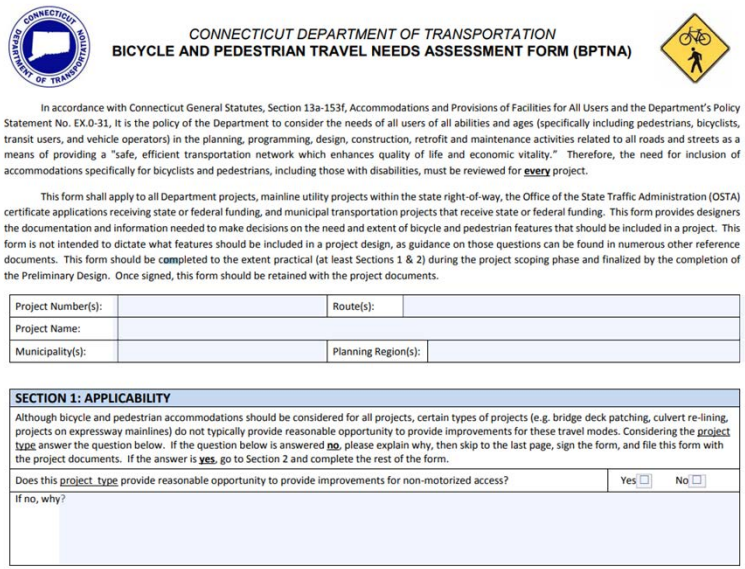
2

Complete Streets Project Reviews

Craig Babowicz
Transportation Supervising Planner – CTDOT Project Coordination Unit

Complete Streets Project Reviews

Bicycle & Pedestrian Travel Needs Assessment form



CONNECTICUT DEPARTMENT OF TRANSPORTATION
BICYCLE AND PEDESTRIAN TRAVEL NEEDS ASSESSMENT FORM (BPTNA)

In accordance with Connecticut General Statutes, Section 13a-153f, Accommodations and Provisions of Facilities for All Users and the Department's Policy Statement No. EX.0-31, It is the policy of the Department to consider the needs of all users of all abilities and ages (specifically including pedestrians, bicyclists, transit users, and vehicle operators) in the planning, programming, design, construction, retrofit and maintenance activities related to all roads and streets as a means of providing a "safe, efficient transportation network which enhances quality of life and economic vitality." Therefore, the need for inclusion of accommodations specifically for bicyclists and pedestrians, including those with disabilities, must be reviewed for **every** project.

This form shall apply to all Department projects, mainline utility projects within the state right-of-way, the Office of the State Traffic Administration (OSTA) certificate applications receiving state or federal funding, and municipal transportation projects that receive state or federal funding. This form provides designers the documentation and information needed to make decisions on the need and extent of bicycle and pedestrian features that should be included in a project. This form is not intended to dictate what features should be included in a project design, as guidance on those questions can be found in numerous other reference documents. This form should be completed to the extent practical (at least Sections 1 & 2) during the project scoping phase and finalized by the completion of the Preliminary Design. Once signed, this form should be retained with the project documents.

Project Number(s):		Route(s):	
Project Name:			
Municipality(s):		Planning Region(s):	

SECTION 1: APPLICABILITY		
Although bicycle and pedestrian accommodations should be considered for all projects, certain types of projects (e.g. bridge deck patching, culvert re-lining, projects on expressway mainlines) do not typically provide reasonable opportunity to provide improvements for these travel modes. Considering the project type answer the question below. If the question below is answered **no**, please explain why, then skip to the last page, sign the form, and file this form with the project documents. If the answer is **yes**, go to Section 2 and complete the rest of the form.		
Does this project type provide reasonable opportunity to provide improvements for non-motorized access?	Yes ☐	No ☐
If no, why?		

Complete Streets Project Reviews

Project Design Milestone Reviews

- 30% - Preliminary Design
- 60% - Semi-Final Design
- 90% - Final Design

Study Phase for Larger Projects

Complete Streets Project Reviews

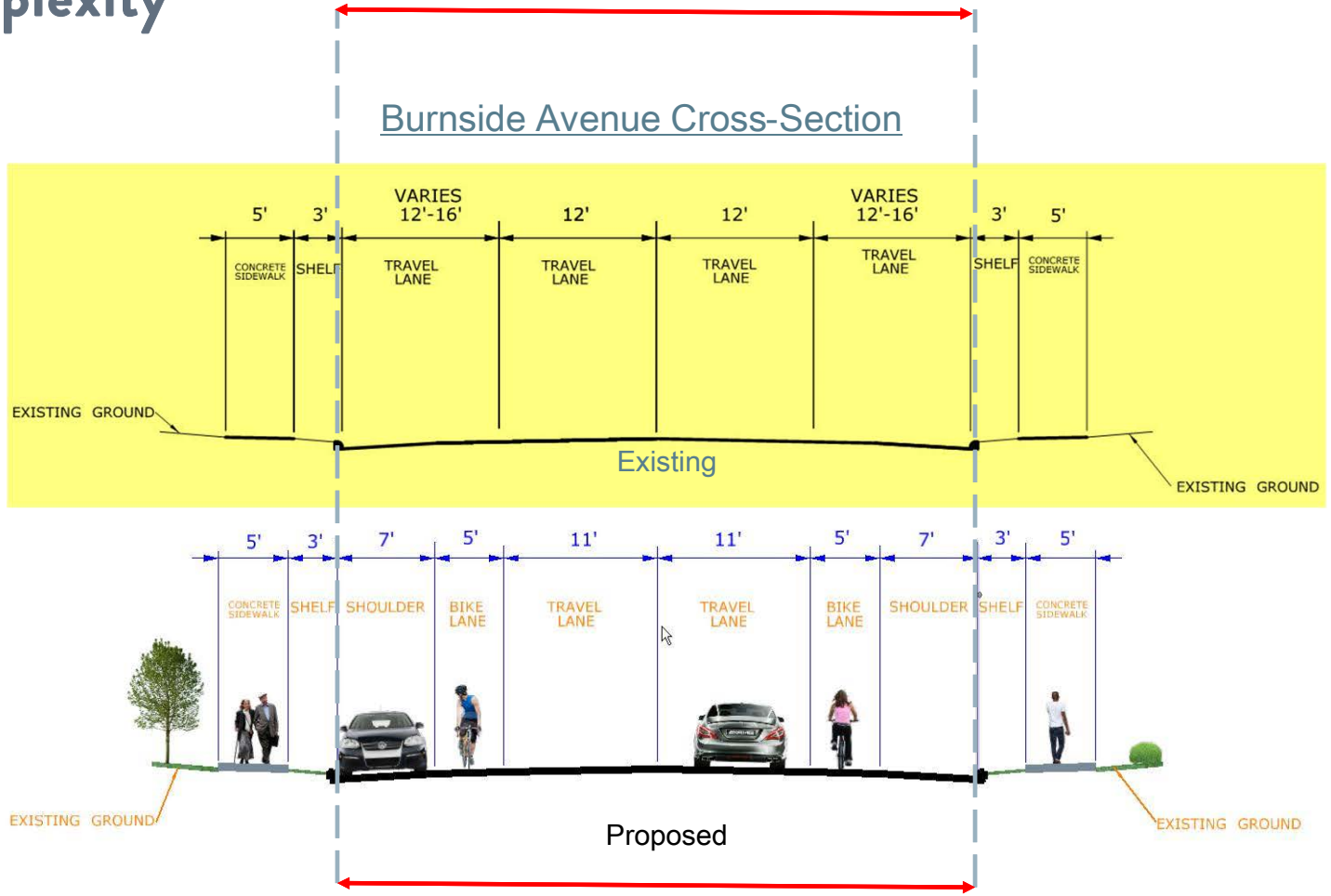
Other Opportunities

Provide Design Support and Guidance for those "Tricky" situations
See projects from a high level and in relation to others

Adoption of Complete Streets Over Time

Increased level of awareness by designers
Less need to provide comments regarding Complete Streets

Constraints and Complexity



Michael Cherpak

Transportation Supervising Engineer – CTDOT Highway Design

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Constraints and Complexity

Michael Cherpak

Transportation Supervising Engineer – CTDOT Highway Design

https://www.google.com/maps/@41.670437,-72.9364974,3a,90y,99h,57.54t/data=!3m6!1e1!3m4!1s9ti5JlsAo4R3DwzIL_80ig!2e0!7i16384!8i8192

3

Complete Streets – In Practice

How CTDOT is applying Complete Streets fundamentals

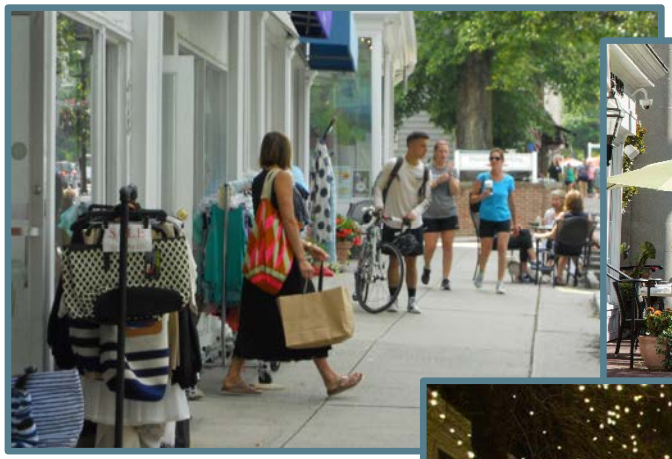
Sal Aresco, P.E.
Transportation Supervising Engineer – CTDOT Highway Design

Scott Bushee, P.E.
Transportation Supervising Engineer – CTDOT Highway Design

State Project No. 117-159

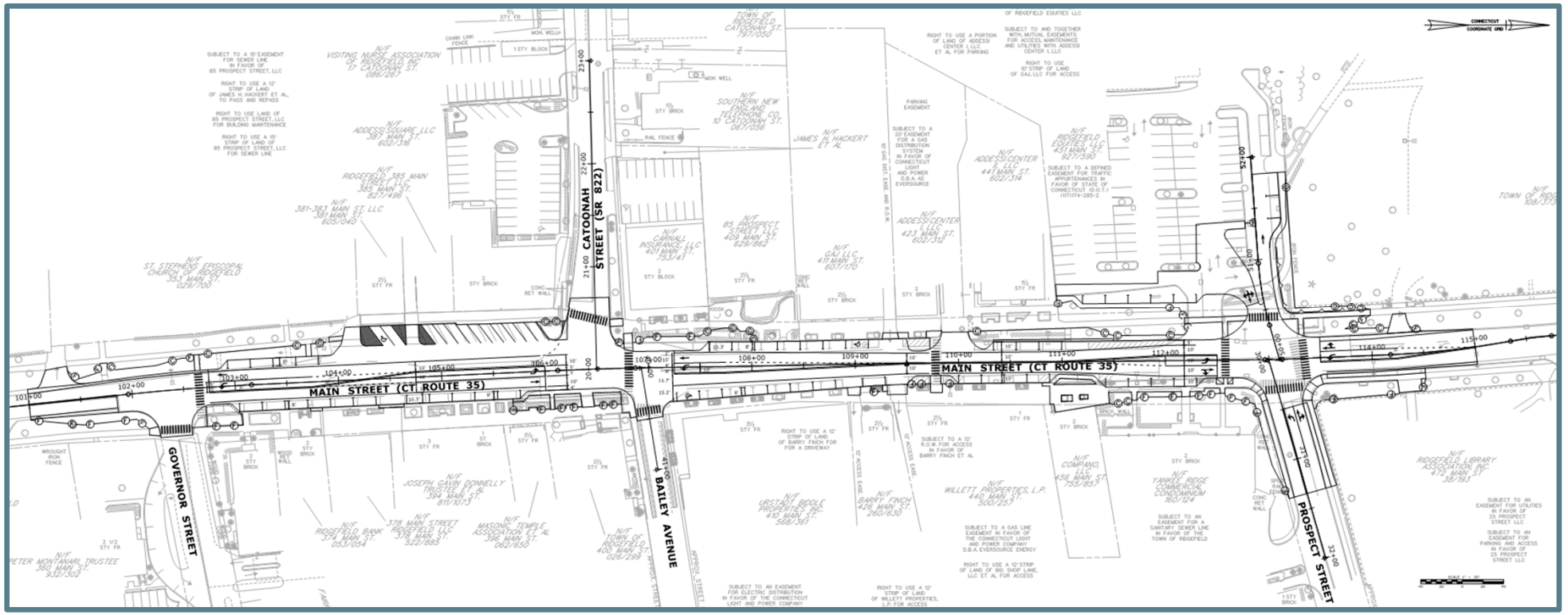
Sal Aresco, P.E. – CTDOT

State Project No. 117-159
Main Street Improvements

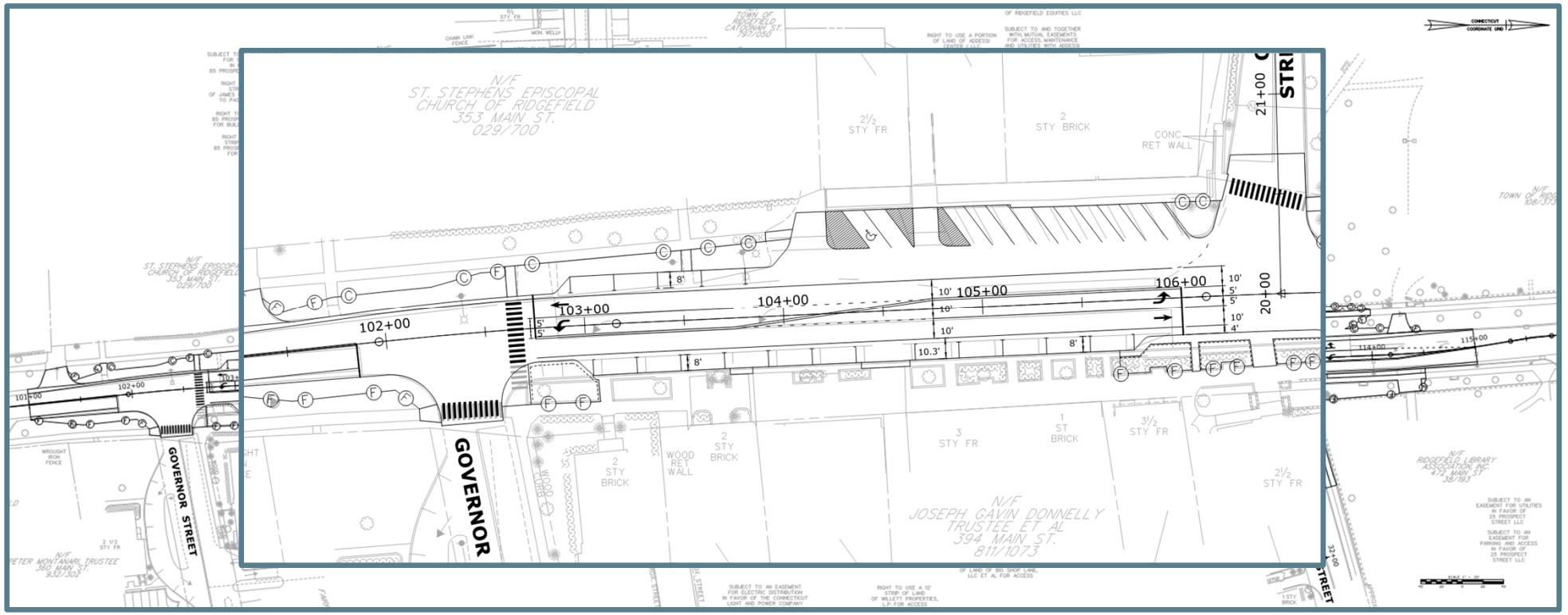


ACTIVECT

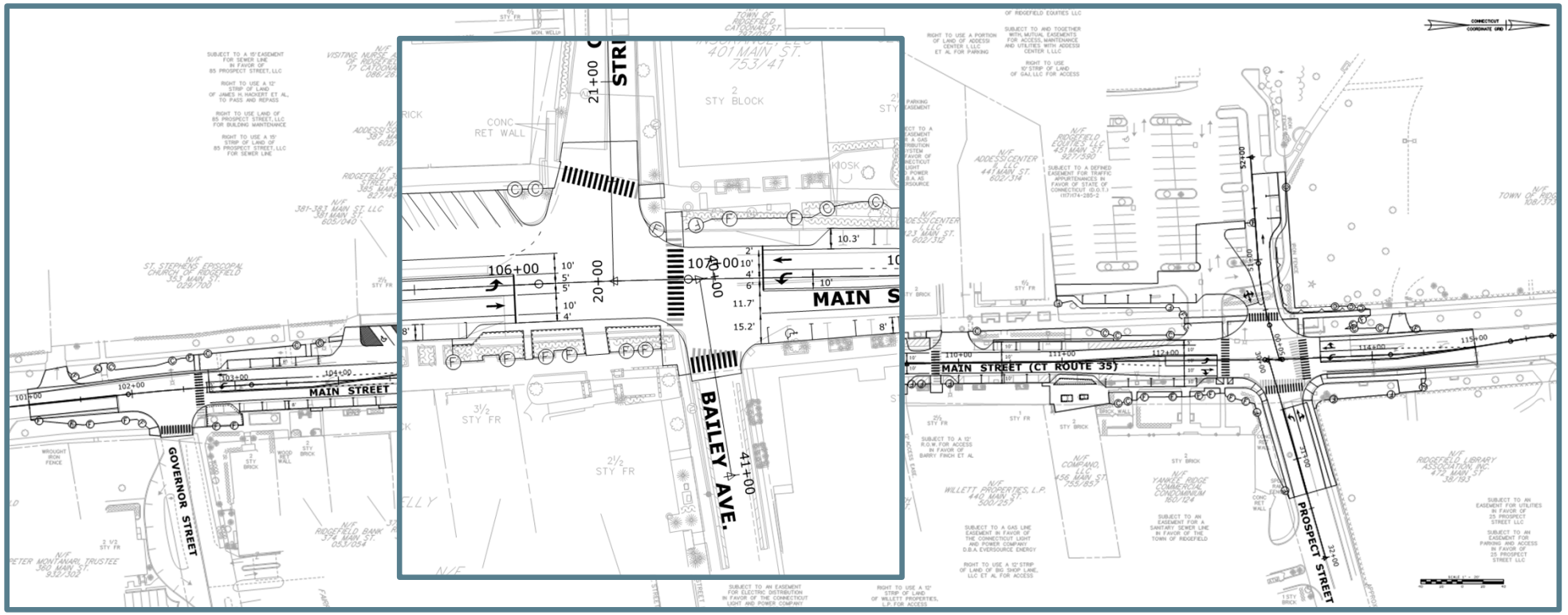
State Project No. 117-159
Main Street Improvements



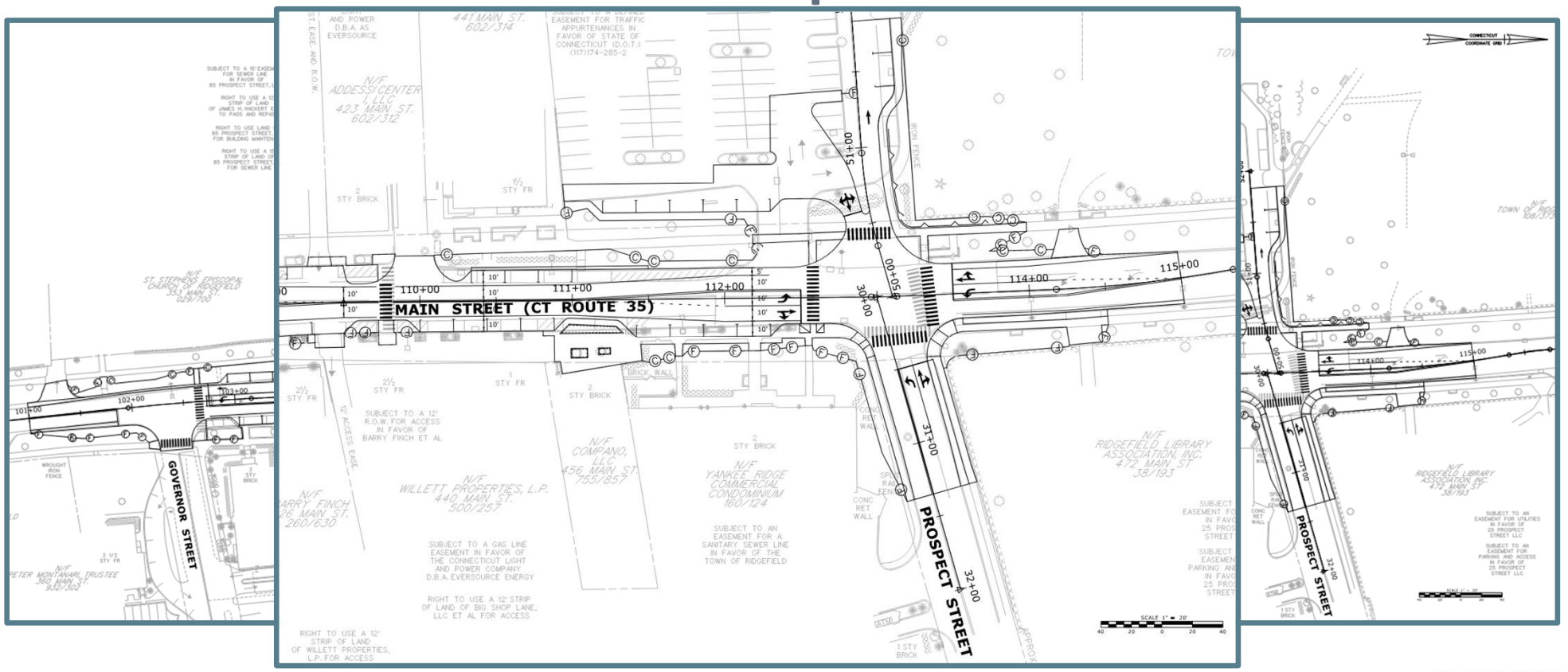
State Project No. 117-159
Main Street Improvements



State Project No. 117-159
Main Street Improvements



State Project No. 117-159
Main Street Improvements



State Project No. 117-159
Main Street Improvements

COMPLETE STREETS – IN PRACTICE

SAFETY FOR ALL USERS

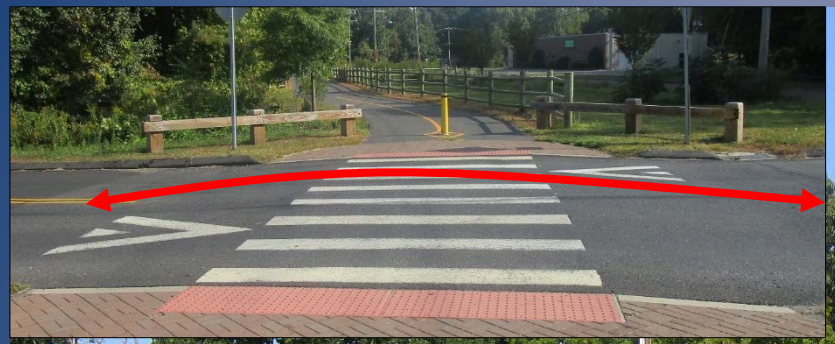
- Trail Crossings

- Arterial Roadways

- Roundabouts

PRESENTER: SCOTT BUSHEE, P.E.
CT DOT – HIGHWAY DESIGN

TRAILS - LOCAL STREET CROSSINGS



- Signing
- Speed Tables - elevated pavement markings

TRAILS - LOCAL STREET CROSSINGS

- Signing
- Visual Cues
- Textural Cues

TRAILS - LOCAL STREET CROSSINGS

- Success:
  - Maintenance of Sight lines
  - Signs
  - Pavement Markings
  - User Responsibility / Public Education

TRAILS - LOCAL STREET CROSSINGS

- Success!!

TRAILS – ARTERIAL ROADWAY CROSSINGS

- Signing
- Traffic Calming
- Pedestrian Signals or Beacons

TRAILS – ARTERIAL ROADWAY CROSSINGS

- Dual Crosswalk Signing

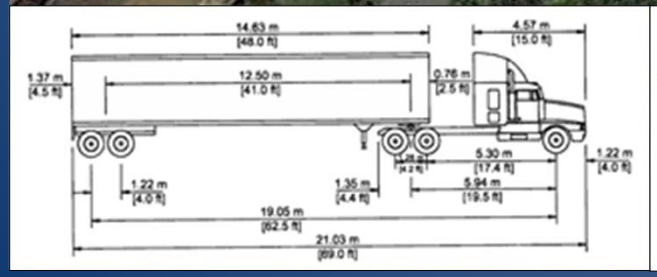
TRAILS – ARTERIAL ROADWAY CROSSINGS

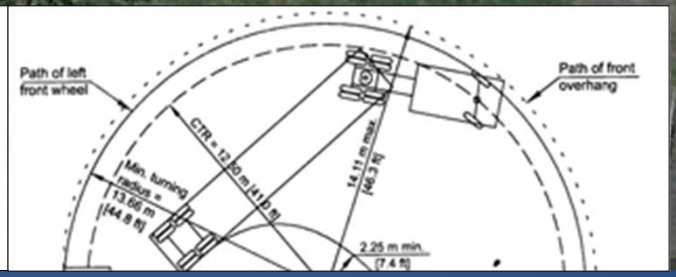
- Trail signing

TRAILS – ARTERIAL ROADWAY CROSSINGS

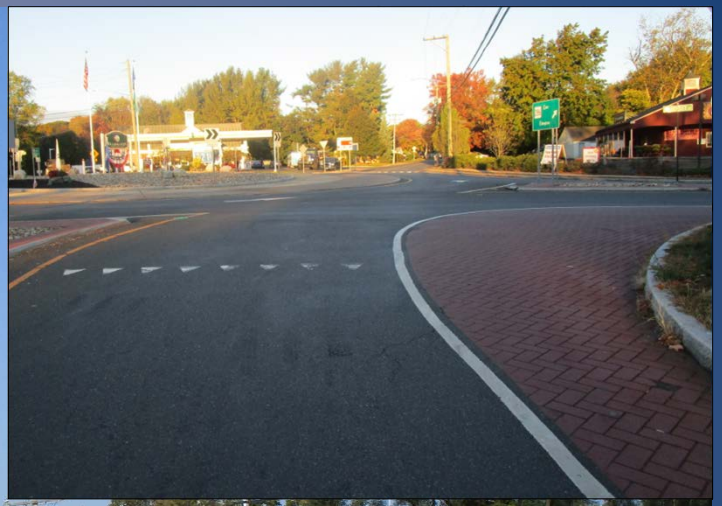
- **Traffic Calming**
- *Visually Narrowing the Roadway*

WB – 62 Truck Accommodations- w/ all users





TRAILS – ARTERIAL ROADWAY CROSSINGS



Traffic Calming

- *Narrowing the Roadway*
- *<u>Visually</u> Narrowing the Roadway*

TRAILS – ARTERIAL ROADWAY CROSSINGS

TRAILS – ARTERIAL ROADWAY CROSSINGS

TRAILS – ARTERIAL ROADWAY CROSSINGS

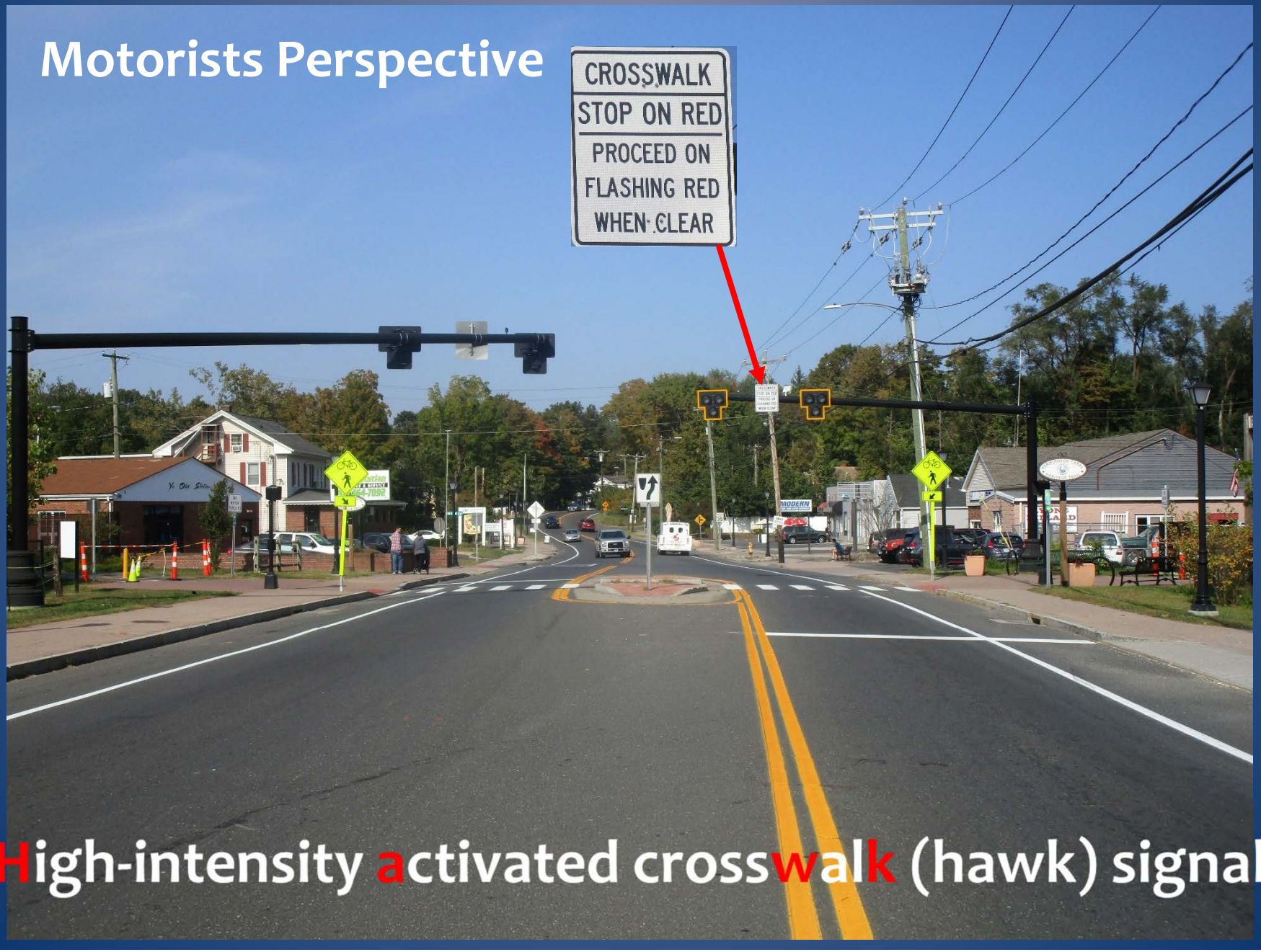
High-intensity activated crosswalk (hawk) signal

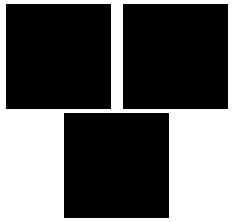
TRAILS – ARTERIAL ROADWAY CROSSINGS

From the Trail Users Perspective

High-intensity activated crosswalk (hawk) signal

TRAILS – ARTERIAL ROADWAY CROSSINGS

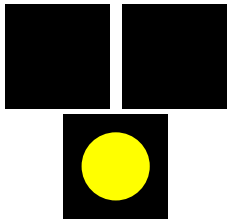




1. Dark Until Activated

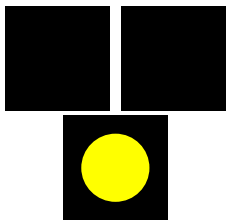
Action Required

Proceed If No Users In Crosswalk



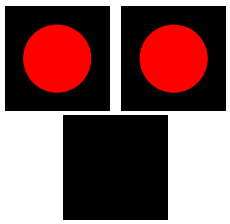
2. Flashing Yellow Upon Activation

Prepare To Stop



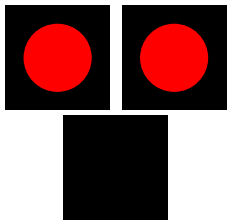
3. Steady Yellow

Stop if Possible



4. Steady Red

Stop; Do Not Proceed

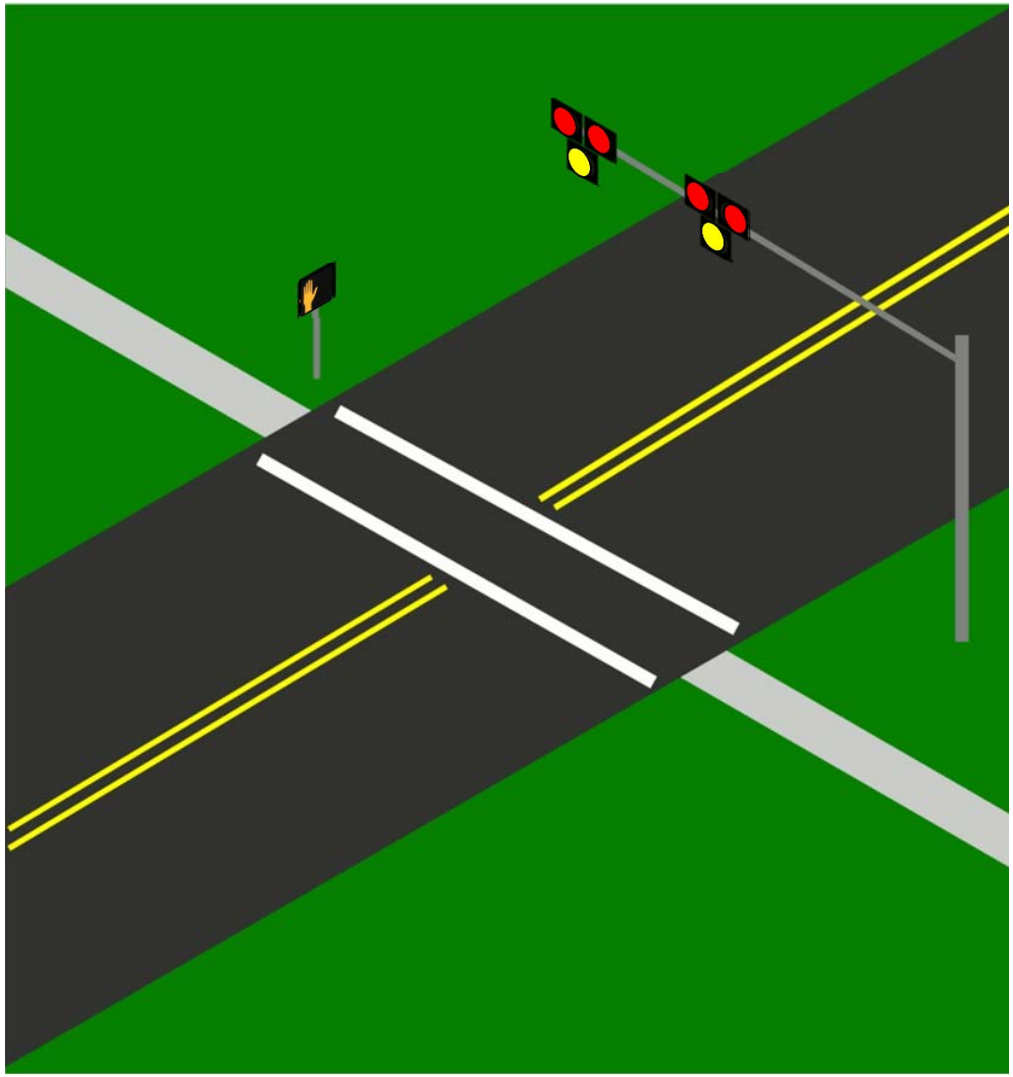


5. Flashing Red

Stop; Then Proceed If Clear

Pedestrian Hybrid Beacon

"HAWK Signal"



Pedestrian Hybrid Beacon

"HAWK Signal"

TRAILS – ARTERIAL ROADWAY CROSSINGS

High-intensity activated crosswalk (hawk) signal

TRAILS – ARTERIAL ROADWAY CROSSINGS

- Using of the Device???
- Love it !!!!!

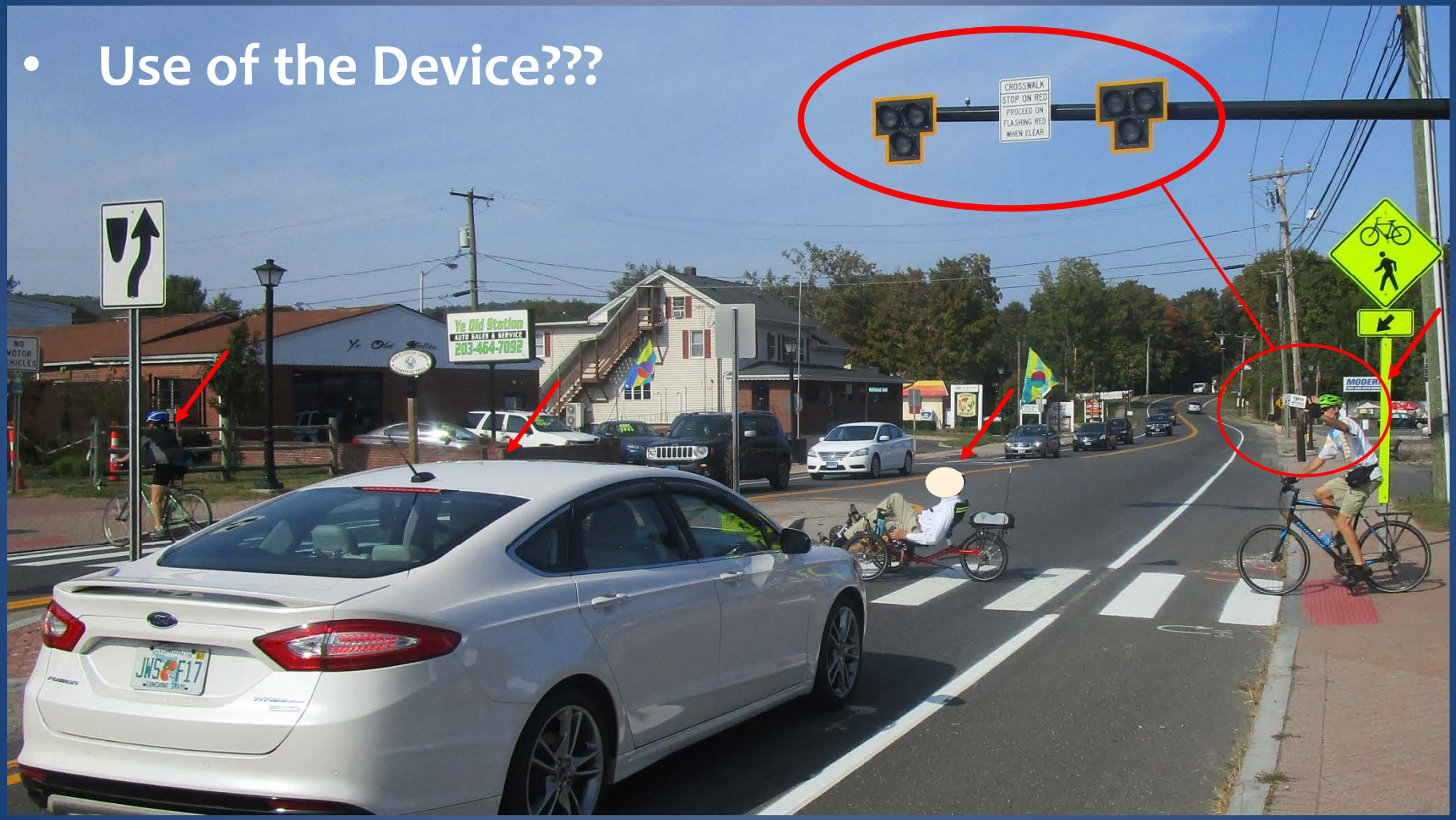
TRAILS – ARTERIAL ROADWAY CROSSINGS

- Use of the Device???

High-intensity **a**ctivated cross**w**al**k** (hawk) signal

TRAILS – ARTERIAL ROADWAY CROSSINGS

- Use of the Device???



High-intensity activated crosswalk (hawk) signal

TRAILS – ARTERIAL ROADWAY CROSSINGS

TRAILS – ARTERIAL ROADWAY CROSSINGS

Not wanting to activate the *HAWK*

HAWK *non-Users*:

- not wanting to wait for the walk phase
- not wanting to delay traffic

- HAWK vs RRFB - ?

TRAILS – ARTERIAL ROADWAY CROSSINGS

- Further Safety Considerations

TRAILS – ARTERIAL ROADWAY CROSSINGS

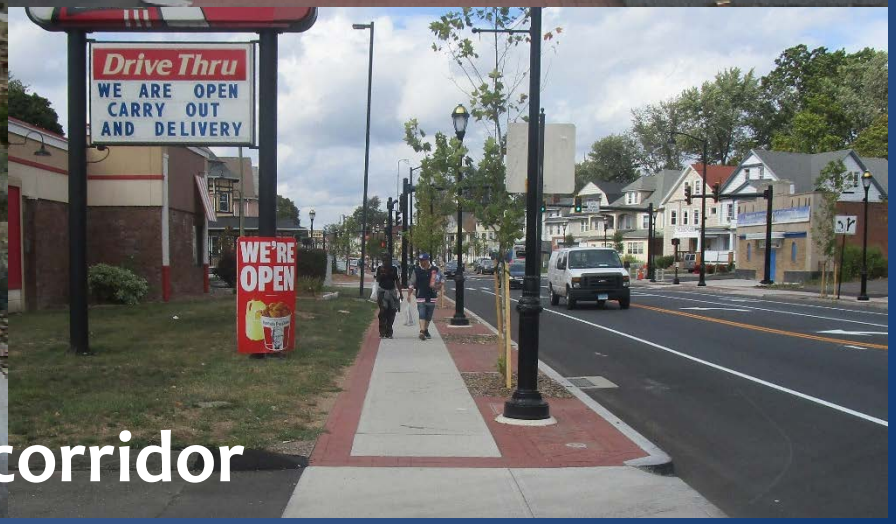
- Further Safety Considerations

COMPLETE STREETS

ARTERIAL ROADWAYS AND DOWNTOWN

- Cars
- Buses
- Bicycles
- Pedestrians
- Neighborhoods
- Businesses
- ***Community***

ARTERIAL ROADWAYS AND DOWNTOWN



- **Defining the pedestrian corridor**

ARTERIAL ROADWAYS AND DOWNTOWN

Defining the pedestrian corridor:

- **Roadway / Pedestrians/ Parking**
- **Traffic Calming**

ARTERIAL ROADWAYS AND DOWNTOWN

- **Protecting the Pedestrian Corridor**
- **Street Trees Provide Traffic Calming**

ARTERIAL ROADWAYS AND DOWNTOWN

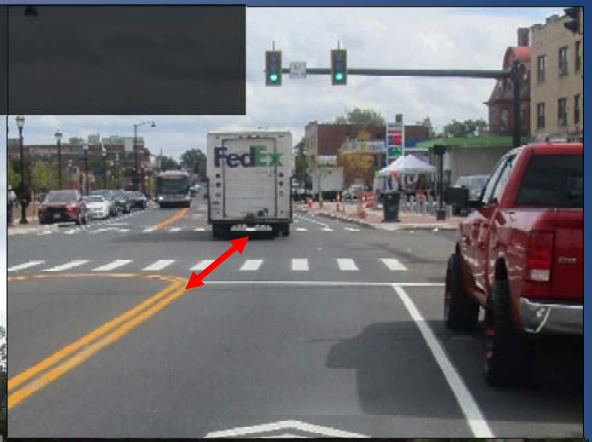
- **Bus Pull Outs / Pads / Shelters**
- **Personal Responsibility and Public Education**

ARTERIAL ROADWAYS AND DOWNTOWN

- **Safety Achieved?**

ARTERIAL ROADWAYS AND DOWNTOWN

Cross walks & Pavement Markings



ARTERIAL ROADWAYS AND DOWNTOWN

- **Sharrows remind motorists of cyclists**

ARTERIAL ROADWAYS AND DOWNTOWN

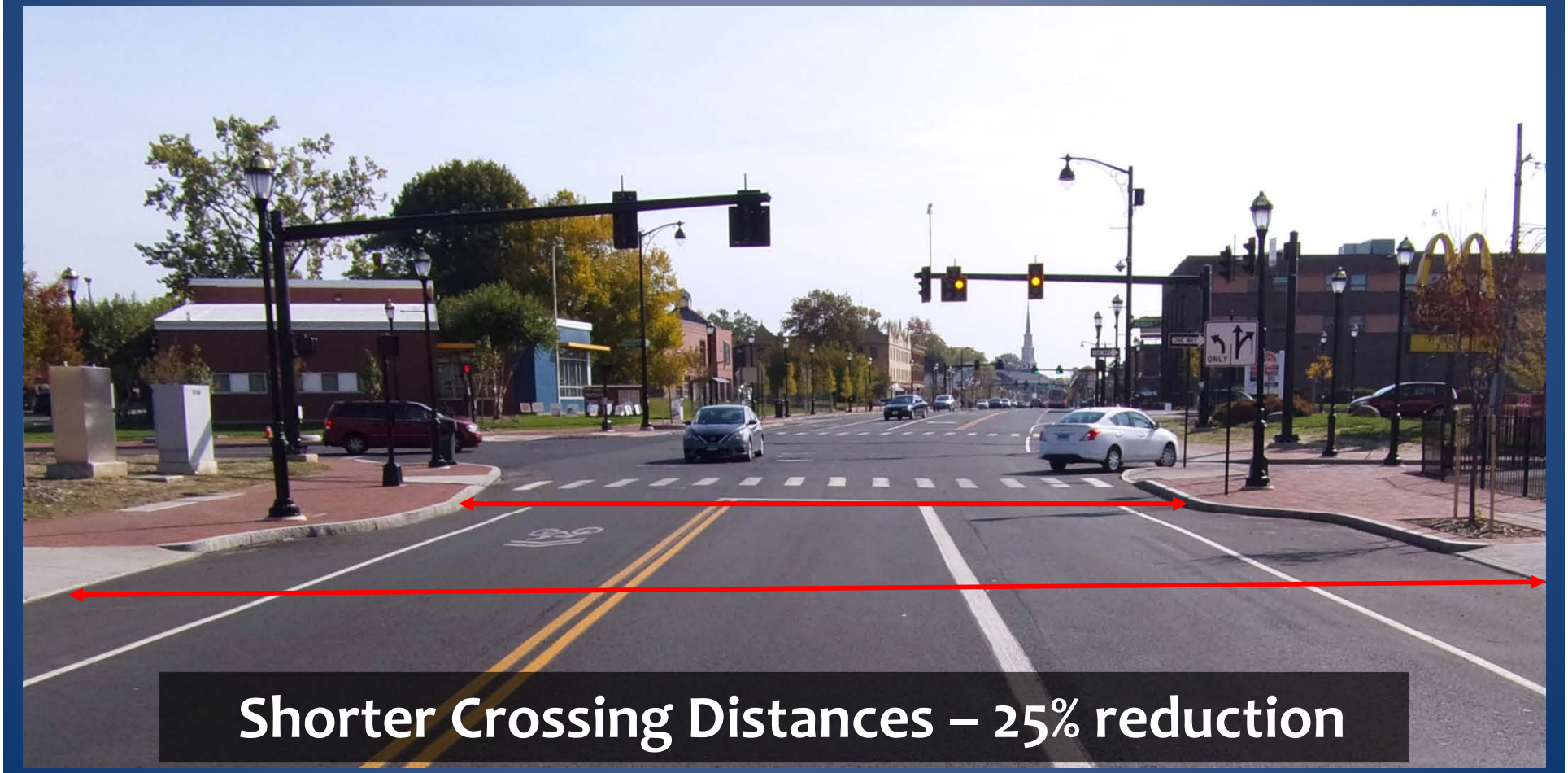
- **Bump outs improve safety**

ARTERIAL ROADWAYS AND DOWNTOWN

- **Bump outs improve safety**

ARTERIAL ROADWAYS AND DOWNTOWN

- **Bump outs improve safety**



ARTERIAL ROADWAYS AND DOWNTOWN

- **Pedestrian Corridor During Construction**

COMPLETE STREETS

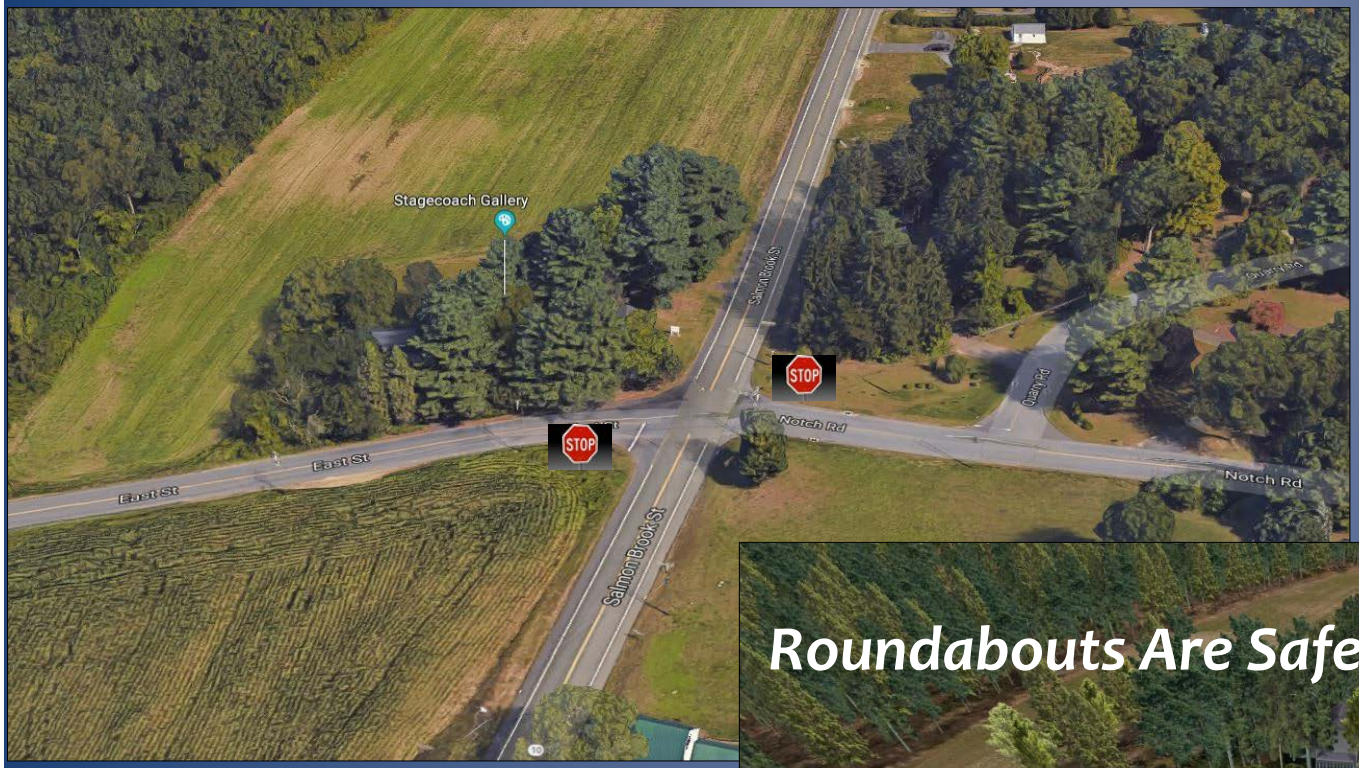
ARTERIAL ROADWAYS AND DOWNTOWN

- ***Learn the Community***
  - Cars
  - Buses
  - Bicycles
  - Pedestrians
  - Neighborhoods
  - Businesses
- ***Community = Customer***

CONNECTICUT DEPARTMENT OF TRANSPORTATION

COMPLETE STREETS

ROUNDABOUTS



Like

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ROUNDABOUTS

Roundabouts Are Safer

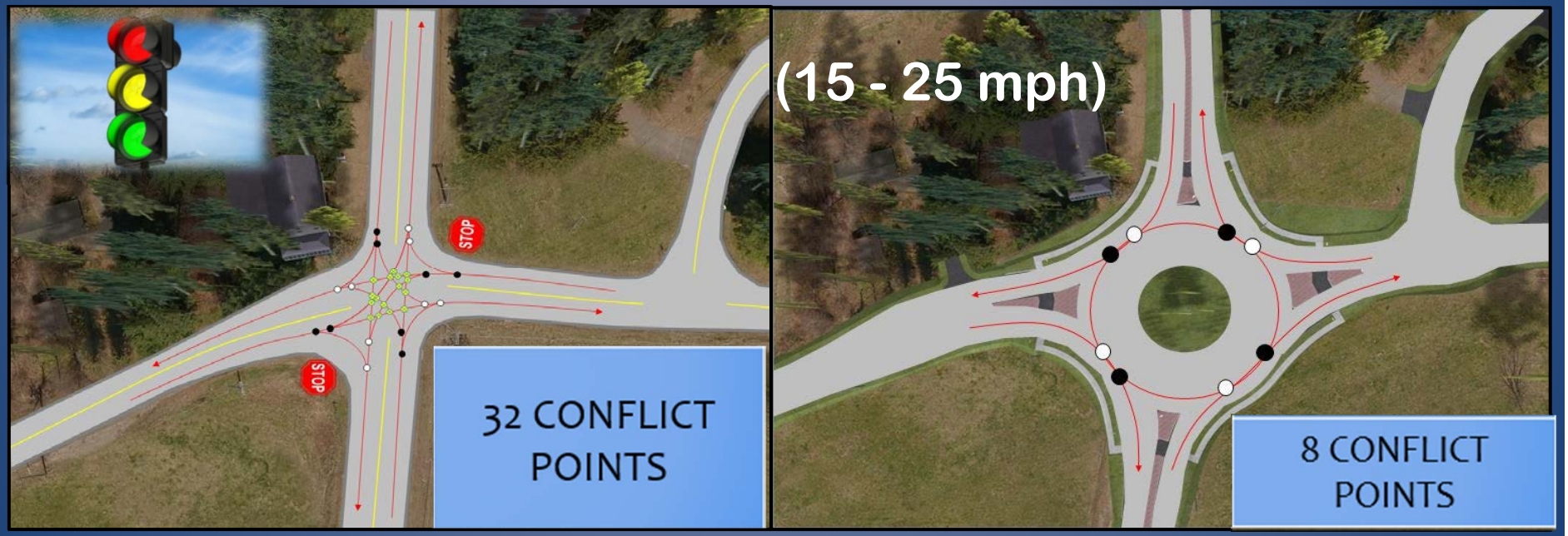
- Low speed (15 - 25 mph)
- No Left Turns / Fewer Decisions
- ***Drivers Don't Run Roundabouts***

ROUNDABOUTS

ROUNDABOUTS

ROUNDABOUTS

Roundabouts Are Safer

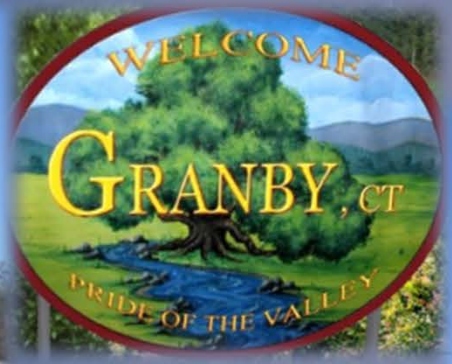


- **75% Reduction in Conflict Points**
- **40-50% Reduction in speed**

ROUNDABOUTS

Gate Way Opportunities

Roundabouts Are Safer



- ***Visual Strength***
- ***Safety***

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ROUNDABOUTS

Roundabouts are Safer

ROUNDABOUTS

Traffic Signal to Roundabout - 2012

Traffic Signal

- 22.3 crashes w/ 8.7 injuries / yr.

Roundabout

- 10.0 crashes w/ 0.7 injuries / yr.

50% ↓ 90% ↓

CONNECTICUT DEPARTMENT OF TRANSPORTATION

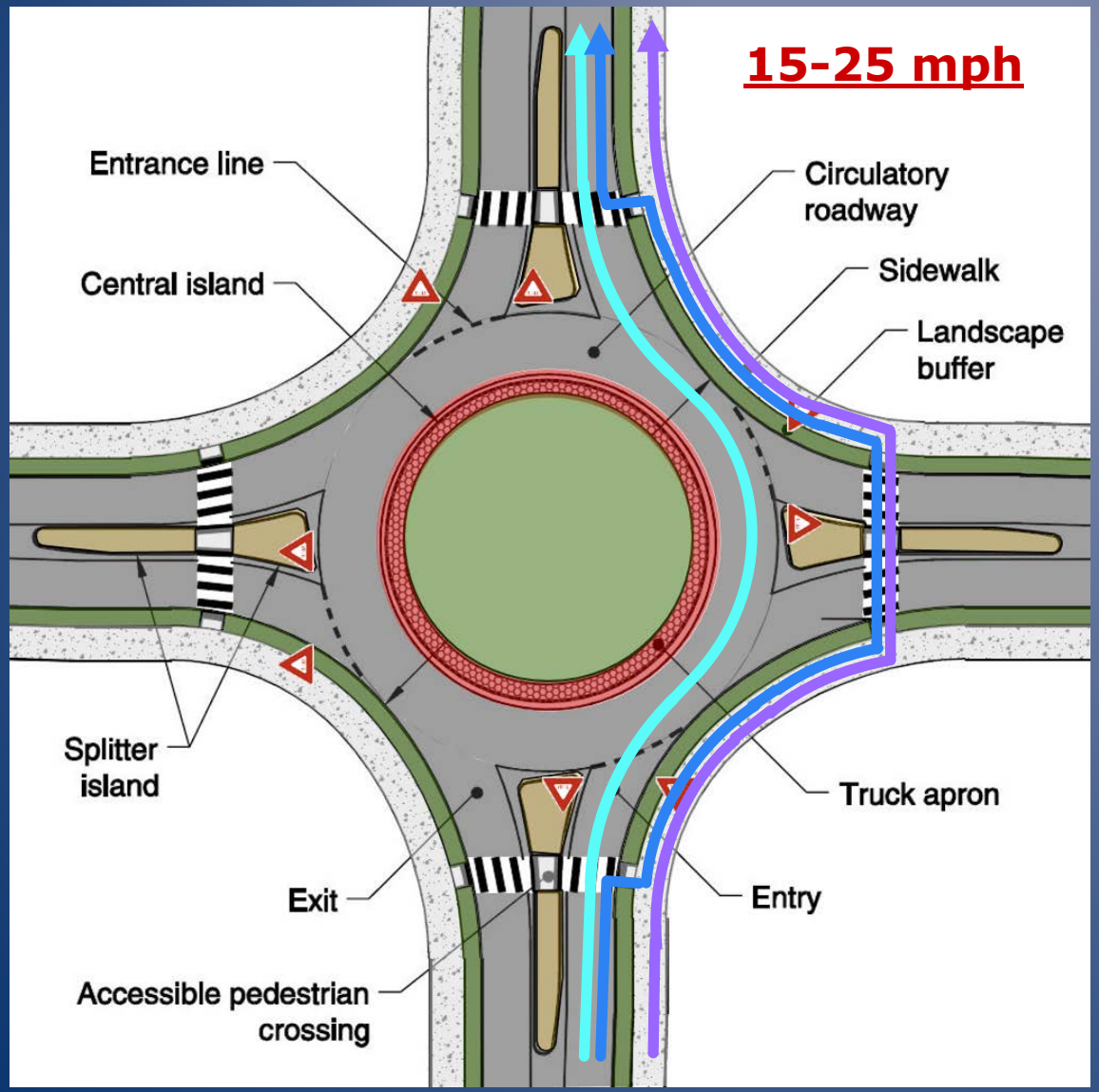
Roundabouts Are Safer

Lives Saved !!

Routes 82 & 85
Salem, CT

ROUNDABOUTS

SAFER FOR ALL USERS



Bicyclists stay on roadway

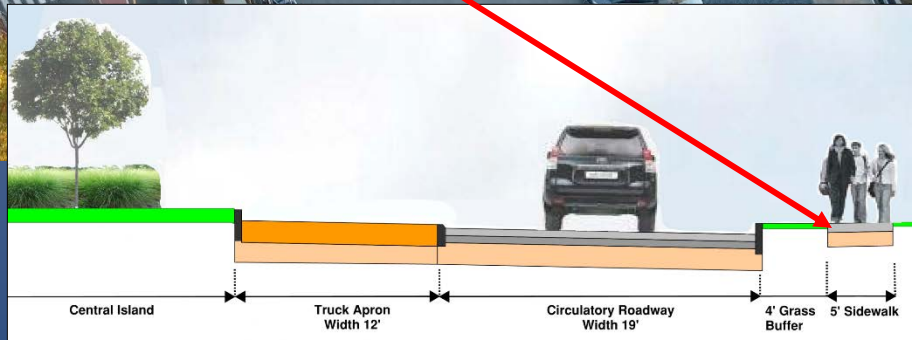
Bicyclists move to sidewalk *

Pedestrians travel on sidewalk

* If no bicycle ramp is present (common in CT), bicyclists may choose to dismount and use pedestrian ramp

ROUNDABOUTS

Safety for all users



CONNECTICUT DEPARTMENT OF TRANSPORTATION

Roundabouts Are Safer

ROUNDABOUTS

Safety for all users

Roundabouts Are Safer

ROUNDABOUTS

Safety for all users

Roundabouts Are Safer

ROUNDABOUTS

Safety for all users

ROUNDABOUTS

Safety for all users

Cross behind vehicle entering intersection

ROUNDABOUTS

Safety for all users

ROUNDABOUTS

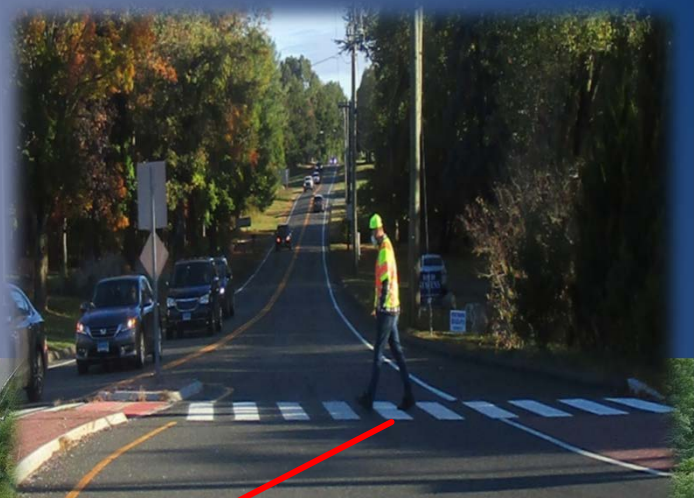
Look at Zack go!!

Roundabouts Are Safer

ROUNDABOUTS

Sidewalks ?

Roundabouts don't have shoulders

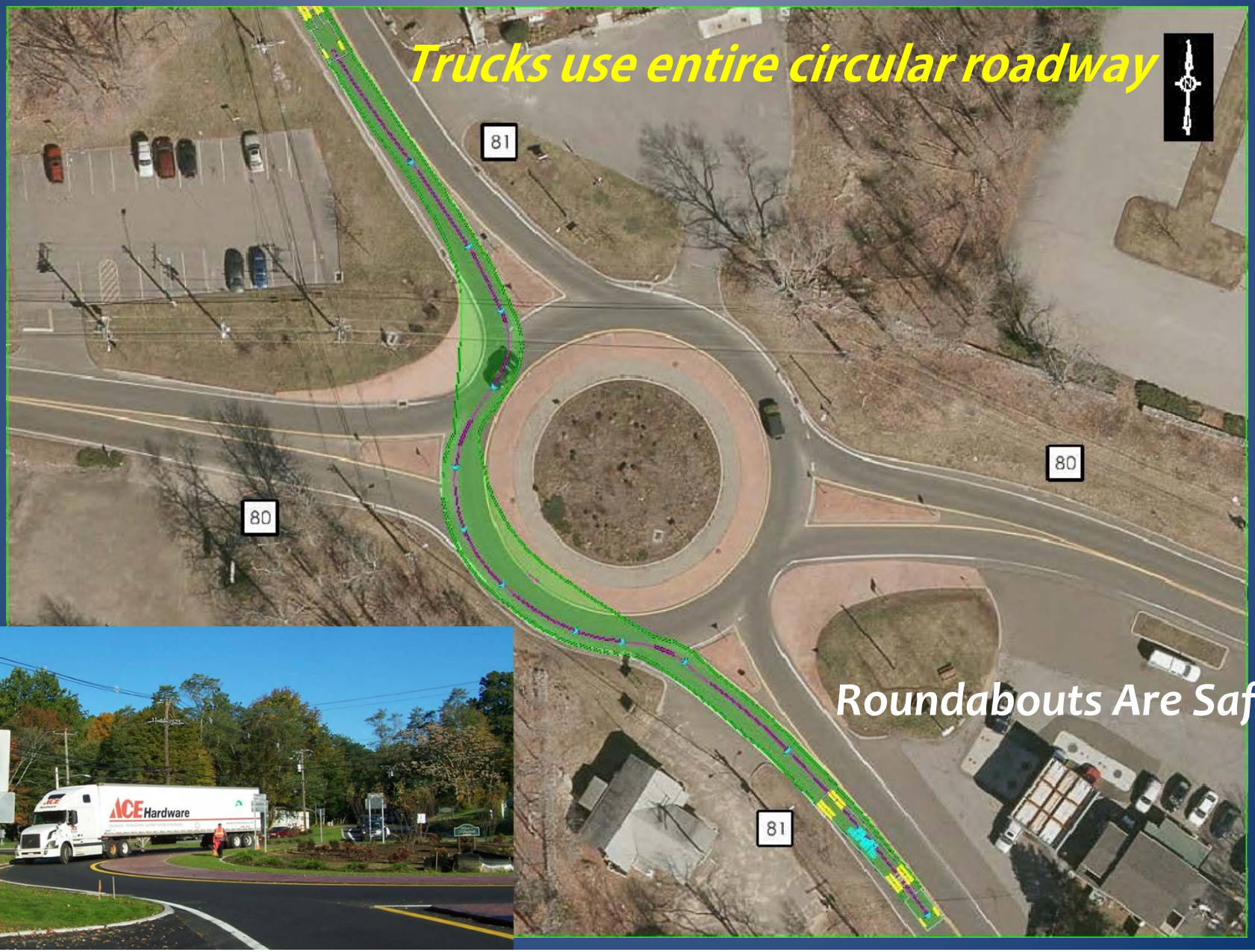


What about Zack?

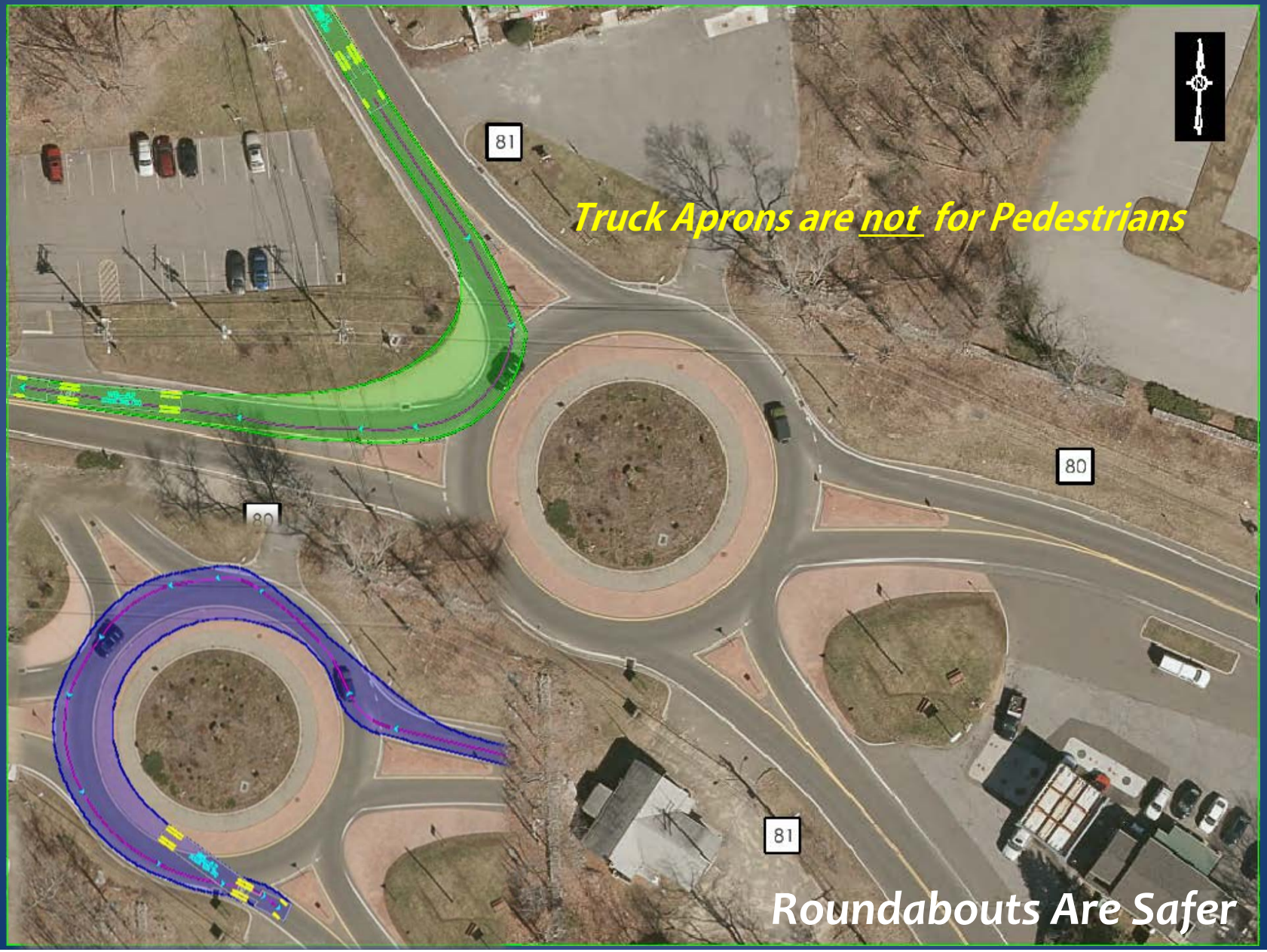
Routes 80 & 81
Killingworth, CT
2007

Roundabouts Are Safer

Roundabouts



ROUNDABOUTS



ROUNDABOUTS

**Always Consider Sidewalks at Roundabouts

Roundabouts Are Safer

ROUNDABOUTS

**Always Consider Sidewalks at Roundabouts

Roundabouts Are Safer

ROUNDABOUTS

Routes 80 & 81
Killingworth, CT

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Roundabouts Are Safer

ROUNDABOUTS

National Roadway Standard Award

Rotary to Roundabout - 2007

Rotary

- 6.3 crashes w/ 8.7 injuries / yr.

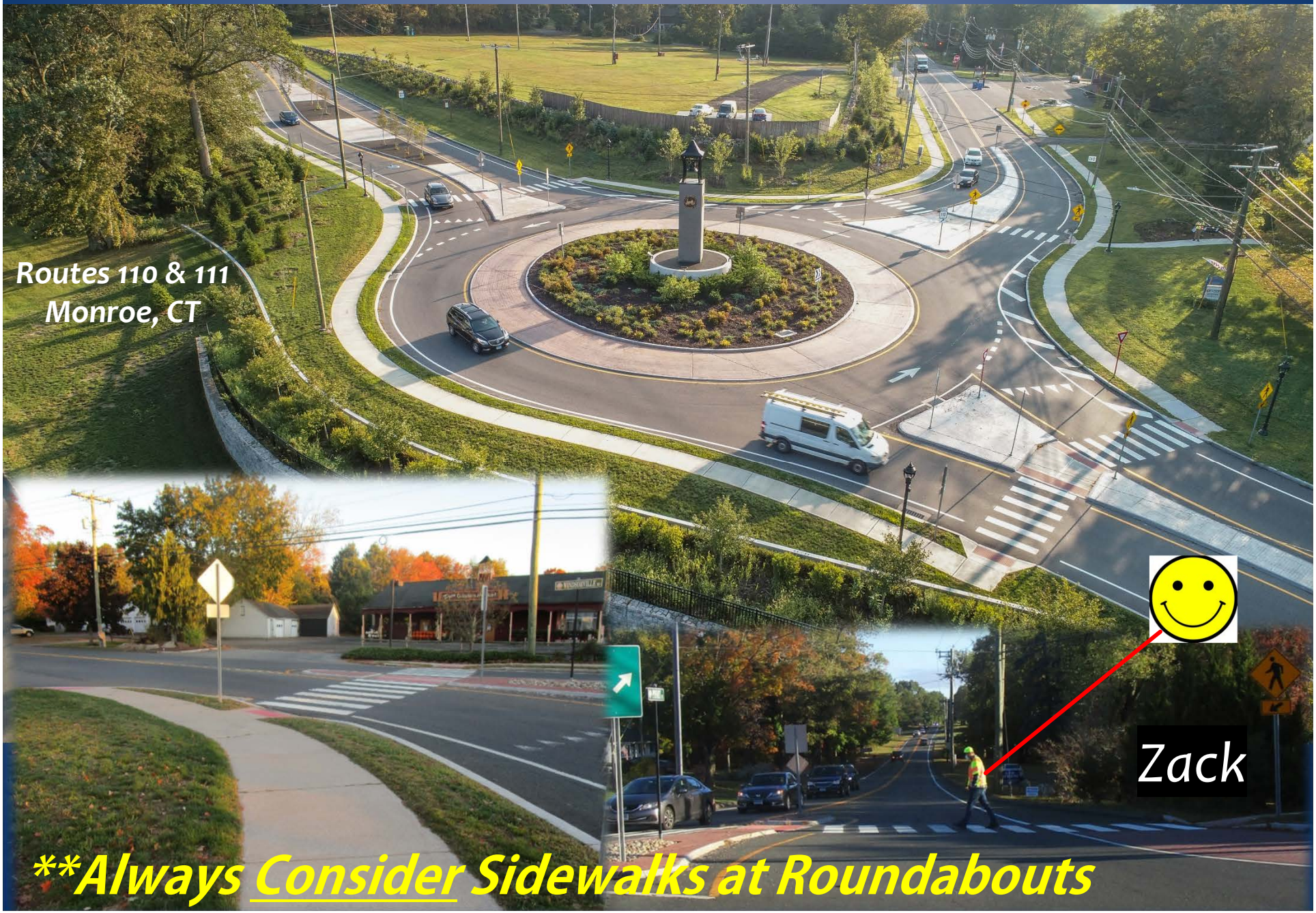
Roundabout

- 2.1 crashes w/ 0.8 injuries / yr.

70% ↓ 65% ↓

Roundabouts Are Safer

ROUNDABOUTS



****Always Consider Sidewalks at Roundabouts**

COMPLETE STREETS – *IN PRACTICE*

THANK YOU ☺

Roundabouts Are Safer

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