FHWA Guidance Memo on Consideration and Implementation of Proven Safety Countermeasures

- Signed July 10, 2008 by FHWA Associate Administrator for Safety.
- Encourages state and local governments to consider 9 proven safety countermeasures.
- Highlights when and where countermeasures should be used.
Nine Proven Safety Countermeasures

1. Road Safety Audits
2. Rumble Strips and Rumble Stripes
3. Median Barriers
4. Safety Edge
5. Roundabouts
6. Left and Right Turn Lanes at Stop-Controlled Intersections
7. Yellow Change Intervals
8. Medians and Pedestrian Refuge Areas in Urban and Suburban Areas
9. Walkways
Webinar Overview

- Discussion of Median and Pedestrian Refuge Islands (20 – 25 minutes)
- Discussion of Walkways (20 – 25 minutes)
- Oregon DOT (10 minutes)
- Florida DOT (10 minutes)
- NY DOT (10 minutes)
- Summary/Question and Answer (20 minutes)
Guidance Statement/Application from FHWA Memorandum

Raised medians (or refuge areas) should be considered in curbed sections of multi-lane roadways in urban and suburban areas, particularly in areas where there are mixtures of a significant number of pedestrians, high volumes of traffic (more than 12,000 ADT) and intermediate or high travel speeds…
Guidance Statement/Application from FHWA Memorandum

…Medians/refuge islands should be at least 4 feet wide (preferably 8 feet wide for accommodation of pedestrian comfort and safety) and of adequate length to allow the anticipated number of pedestrians to stand and wait for gaps in traffic before crossing the second half of the street.
Median and Refuge Islands Definitions

The Median is the area between opposing lanes of traffic, excluding turn lanes. Medians can either be open (pavement markings only) or they can be channelized (raised medians or islands) to separate various road users.

GDOT: Benefits of Installing Raised Medians
Median and Refuge Islands
Definitions

*Pedestrian Refuge Areas* (or crossing islands)—also known as center islands, refuge islands, pedestrian islands, or median slow points—are raised islands placed in the street at intersection or midblock locations to separate crossing pedestrians from motor vehicles.
Medians and Pedestrian Refuge Areas in Urban and Suburban Areas

- Safety Benefits
  - 46% reduction in pedestrian crashes at crossings with marked crosswalks
  - 39% reduction in pedestrian crashes at unmarked crosswalk locations
  - 70% reduction in all fatal crashes
Median and Refuge Islands
Safety Benefits

- Simplified crossing for pedestrians
- Safer nighttime crossing for pedestrians
- Increased opportunity for gaps
- Safe access to bus stops

GDOT: Benefits of Installing Raised Medians
Median and Refuge Islands
Safety Benefits

- Reduced crashes for motorists (25%)
- Improved traffic flow
Medians and Pedestrian Refuge Areas in Urban and Suburban Areas

- Regional Case Study and Best Practices - led by implementing jurisdiction representative
  - Regional Case Study Problem (implementing agency representative will be asked to present their case study)
  - Case Study Proposed solution
  - Case Study Perceived/measured success of solution
Medians and Pedestrian Refuge Areas in Urban and Suburban Areas

- Regional Case Study and Best Practices - led by implementing jurisdiction representative
  - Best Practices of Oregon - promotes refuge islands at pedestrian crossings
  - Best Practices of Florida - requires the installation of medians
Walkways - Guidance Statement/Application from FHWA Memorandum

- Accessible sidewalks or pathways should be provided and maintained along both sides of streets and highways in urban areas, particularly near school zones and transit locations, and where there is frequent pedestrian activity.
Walkways / Paved shoulder Guidance Statement/Application from FHWA Memorandum

- Walkable shoulders (minimum of 4 feet stabilized or paved surface) should be provided along both sides of rural highways routinely used by pedestrians.
Pedestrian Walkways defined

Several types of pedestrian walkways have been defined:

- **Pedestrian Walkway (Walkway):** A continuous way designated for pedestrians and separated from motor vehicle traffic by a space or barrier.

- **Sidewalks:** Walkways that are paved and separated from the street, generally by curb and gutter.
Pedestrian Walkways defined

- **Shared Use Path:** A bikeway or pedestrian walkway physically separated from motorized vehicular traffic by an open space or barrier—either within a highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. Shared use paths also may be referred to as “trails” or “multiple-use trails.”
Pedestrian Walkways defined

- **Roadway Shoulder**: In rural or suburban areas where sidewalks and pathways are not feasible, gravel or paved highway shoulders provide an area for pedestrians to walk next to the roadway.

Photo credit: Michael Ronkin
Walkways – Crash reduction potential

- The presence of a sidewalk or pathway on both sides of the street corresponds to approximately an 88% reduction in “walking along road” pedestrian crashes.

- Providing paved, widened shoulders (minimum of 4 feet) on roadways that do not have sidewalks corresponds to approximately a 71% reduction in “walking along the road” pedestrian crashes.
Walkways – Crash reduction potential

- Walking along road” pedestrian crashes
  - typically are around 7.5% of all pedestrian crashes
  - about 37% of the 7.5% being fatal and serious injury crashes

Photo credit: Dan Burden
Walkways - Benefits

Crash reduction potential

Reductions of 29% for paved and 25% for unpaved shoulders have been found on 2-lane rural roads where the shoulder was widened by 4 feet.
Walkways – Benefits

Increase mobility

Up to 37 percent of the population in some States are reliant on walking and public transit. Other people might choose to walk if they had better accommodations.
Walkways – Benefits

Increased mobility

Providing sidewalks, widened paved shoulders, or stabilized shoulders — particularly when providing access to transit and schools — can increase the transportation options for these individuals.

Photo credit: Dan Burden
Walkways – Benefits

Healthier communities

- Research also indicates that people will walk for recreational purposes if a facility is provided. Recreational walking is one of the easiest ways for people to get the recommended allotment of physical exercise each day.
Shoulders – Benefits

Operational benefits

- Reduces numerous crash types including the following:
  - Head on crashes (15-75% reported reduction)
  - Sideswipe crashes (15-41%)
  - Fixed object crashes (29-49%)
  - Crashes involving pedestrians (walking along roadway crashes) (71%)
Shoulders – Benefits
Operational benefits, continued

• Improved roadway drainage
• Increased effective turning radii at intersections
• Reduces shoulder maintenance requirements
• Provides emergency stopping space for broken down vehicles
Shoulders – Benefits
Operational benefits, continued

- Provides space for maintenance operations and snow storage
- Provides space for variable message signs
- Provides an increased level of comfort for bicyclists

Photo credit: Ped/Bike Images Amy Lux
Regional Case Study and Best Practices - led by implementing jurisdiction representative Best Practices

- Regional Case Study Problem
- Case Study Proposed solution
- Case Study Perceived/measured success of solution
Shoulders

- *Regional Case Study and Best Practices*- led by implementing jurisdiction representative Best Practices
  - New York - cites pedestrians as a reason to provide shoulders
  - Oregon - promotes paved shoulders
Available Publications

- Safety Benefits of Walkways, Sidewalks, and Paved Shoulders
  - Tri-fold -
    http://safety.fhwa.dot.gov/ped_bike/tools_solve/walkways_trifold/
  - Brochure -
    http://safety.fhwa.dot.gov/ped_bike/tools_solve/walkways_brochure/

- Safety Benefits of Raised Medians and Pedestrian Refuge Areas
  - Tri-fold -
    http://safety.fhwa.dot.gov/ped_bike/tools_solve/medians_trifold/
  - Brochure -
    http://safety.fhwa.dot.gov/ped_bike/tools_solve/walkways_brochure/
Thanks
Use of Pedestrian Islands
Types of Pedestrian Islands

- Continuous Medians
- Pedestrian Crossing Islands
- Pork Chop Islands
Types of Pedestrian Islands

Three Types

- Continuous Medians
- Pedestrian Crossing Islands
- Pork Chop Islands
Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations
Final Report and Recommended Guidelines

FHWA Publication
HRT-04-100
September 2005
Charles Zegeer
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 pedestrian signals where warranted
- Locate bus stops on far side of uncontrolled intersections
- Illumination
Recommended Treatments (cont.)

- Crossing Exposure Reduction
  - Medians/Islands
  - Curb Extensions
  - Lane Reduction (width, number)
Recommended Treatments (cont.)

- Traffic Calming
  - Raised Crosswalks
  - Street Narrowing
  - Diverters/traffic circles
Conclusions and 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
NCHRP 562

- Provides methodology for determining type of crossing treatment
- Recommends modifications to the MUTCD pedestrian signal warrant
- Includes research review and Field Studies
Oregon DOT Policies
Marking Crosswalks at Uncontrolled Intersections

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 35 MPH or less
5. ADT < 15,000 ADT
6. If ADT $\geq 10,000$ median Island is required
7. On multi-lane highways additional features (medians, curb extensions, lighting) are encouraged

Oregon DOT Traffic Manual Section 6.6.1.2
Marking Crosswalks at Mid-Block Locations

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 35 MPH or less
5. ADT < 15,000 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

Oregon DOT Traffic Manual Section 6.6.1.3
Other Considerations

- Opportunity to concentrate pedestrian crossings
- Free turning movements or other traffic characteristics inhibit crossing opportunities at nearest intersection
Highway 42 – Winston, OR
A Tale of Six Islands

Hwy 99W

Corvallis

Oregon
Hwy 99W Corvallis, OR
69W in Corvallis - 2005

- Six (seven?, eight?) Pedestrian Islands were installed along a 2 mile segment
- All mid-block
- Paired with transit stops
- All have **median islands**
- Four with 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)
- Stopping compliance improved
- Crash data shows increase in rear-enders – as expected
- Very young children have been observed using
- Overall improvement to pedestrian environment
Types of Pedestrian Islands

- Continuous Medians
- Pedestrian Crossing Islands
- Pork Chop Islands
• 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

Pedestrian Islands

Benefits:

✓ Separate conflicts & decision points
✓ Reduce crossing distance
✓ Improve signal timing
✓ 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

Old Way

New proposal

Slow speed, good angle = good visibility of pedestrians

55 to 60 degree angle between vehicle flows.
Right-Turn Slip Lane - Details

- Long radius followed by short
- 55° to 70°
- 2:1 length/width ratio
- Cut through medians and islands for pedestrians
- Bicycle lane
- One car length back
Fairbanks, AK

Drivers naturally trace perfect island...
Should we mark this crosswalk?
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?
• Policy is to mark the crosswalk

• Signalization is optional
World's Tallest Man on a Bicycle
Florida DOT’s Restrictive Median Policy

Improving safety with better left turn controls
Multilane Median Policy (1993)

- Directs all Department multi-lane projects over 40 mph (60 km/h) 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 (60 km/h) design speed.

Now in the Plans Prep Manual 2.2.2
What led to the policy?

Crash Rates for Median Treatments
Florida Crash Study

25% crash rate reduction

Long, Gan, Morrison, University of Florida 1993
What led to the policy?

Pedestrian-Vehicle Crash Rates by Median Type

Intersection (1)

- Non-Traversable: 0.97
- TWLTL: 2.49
- Undivided: 2.32

Mid-Block (2)

- Non-Traversable: 3.86
- TWLTL: 6.66
- Undivided: 6.69

Pedestrian Crash Rates for Suburban Arterials

(1) Crashes per 100 million entering vehicles
(2) Crashes per 100 million vehicle miles

Pedestrian Conflicts on Undivided Roads

Source: Debbie Danton
Even small islands help...
Problems in Implementation

- Medians are controversial
- 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

LECAN TO — It will be a couple of weeks before state Department of Transpor-
We Refined our Work with Public
Our Materials
Our Materials

What do your customers think of access management?

A number of surveys have been done to solicit input from drivers regarding access management projects. Motorists were asked to provide their opinions regarding changes to several roadways that had undergone access improvements. The overwhelming majority of motorists stated that they liked the changes, felt the roadway was safer because of the changes, and that the selection of businesses they frequented was not affected by the changes.

The Driver Survey

- 78% felt safer
- 84% felt traffic moved better

Drivers surveyed along 5 improved corridors in Central Florida FDOT District 5 (Ivey Harris & Walls - 1995)
US 192 Kissimmee

Before
After

- Safety
- Aesthetics
- Efficiency
- Pedestrian/Transit friendly

US 192 – Kissimmee

Source: Glatting Jackson
Research on U-turns
Important for the arguments you get
Operational Study

- Over 300 hours of video
- Counted actual evasive maneuvers (Conflicts)
- Eight sites in Tampa Bay area
Conflict Rates for Direct Lefts vs. Right Turn followed by U turn

Conflicts per thousand involved vehicles

Average Rate

- Direct Left Turns
- Right Followed by U-turn

University of South Florida - 2001
Create Clear Guidance

- Procedure
- Handbook
- Access Management Committees in every District
Median Handbook

Intergim Version

The purpose of this document is to guide the professional through the existing rules, standards and procedures, as well as to provide current national guidance on the best ways to plan for medians and median openings.

Unless stated otherwise or specifically referenced, this is not a set of standards or a Departmental Procedure but is a comprehensive guide to allow the professional to make the best decisions on median planning.

The primary thrust of this handbook is the unsignalized median opening. Even though much of this material can be used with signalized intersection planning, issues of signalized queues and signal timing are not covered in detail.

Florida Department of Transportation
State of Florida
Systems Planning Office
505 Suwannee St
Tallahassee, Florida 32399
www.dot.state.fl.us/planning

1.1 Medians and their Importance for Safety

Why do we use medians?

- Vehicular Safety — to prevent crashes caused by head-on and crossover traffic, headlight glare and traffic turning left.
- Pedestrian Safety — to provide a refuge for pedestrians crossing the highway.
- Vehicular Efficiency — to remove turning traffic from through lanes thereby maintaining highway operating speed.
5.1 Special U-Turn Considerations
Advice to Others

- Carefully work with business managers as well as land owners
- Go the extra mile for personal communication with businesses
Thanks
NYDOT’s Shoulder Policy
What led to the policy?

- State highway law states that pedestrians can use the shoulder and how they can use the shoulder, therefore it was felt to be important to include the guidance for designers and relate it specifically to pedestrians.

- State Law:
  When sidewalks are not provided, a pedestrian is required to walk on the left side of the roadway facing traffic [Section 1156-b, NYS Vehicle & Traffic Law].
Current policy is consistent with federal policy and design guidance and states that NYSDOT must make pedestrians integrated elements of our intermodal transportation system. It is Department policy to consider the accommodation of pedestrians, including persons with disabilities, during the earliest scoping stage of Department projects.
Application of the policy

- In light of the law…

- Decide whether it is practicable for pedestrians to walk facing traffic or if provisions should be made for them to walk in either direction along one side of the road.

- The decision should be based on safety, e.g., the ability to cross the road safely, and other considerations.

- Facing traffic, 1.2 m wide accessible shoulders may be sufficient and appropriate pedestrian crossings should be provided to access the shoulder along the opposite side of the roadway.

- Walk in either direction, the accessible shoulder width should be 1.525 m.
The design standards to support the policy are found in Ch 18 of their Highway Design Manual: Pedestrian Facility Design.
The implementation of a paved shoulder policy?

- If pedestrians are not legally barred from travelling on the road, they are part of transportation systems and therefore need to be accommodated.

- To help make the case, review potential use and attractors. **Attractors** and **destinations** are defining features of a pedestrian route.

- Create a process that includes documentation of need for the countermeasures- NYDOT uses a Pedestrian Generator Checklist
Has this policy affected budgets?

- The policy has added some costs, for instance adding the 4 ft shoulder on both sides of the roadway) but it is already an assumed cost when projects are estimated.
- NYDOT is currently working on a cost-benefit analysis to help justify the including of 4 ft shoulders.