PBIC Livable Communities Webinar Series

Federal Highway Administration Pedestrian Safety Guidance for Transit

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Pedestrian and Bicycle Information Center

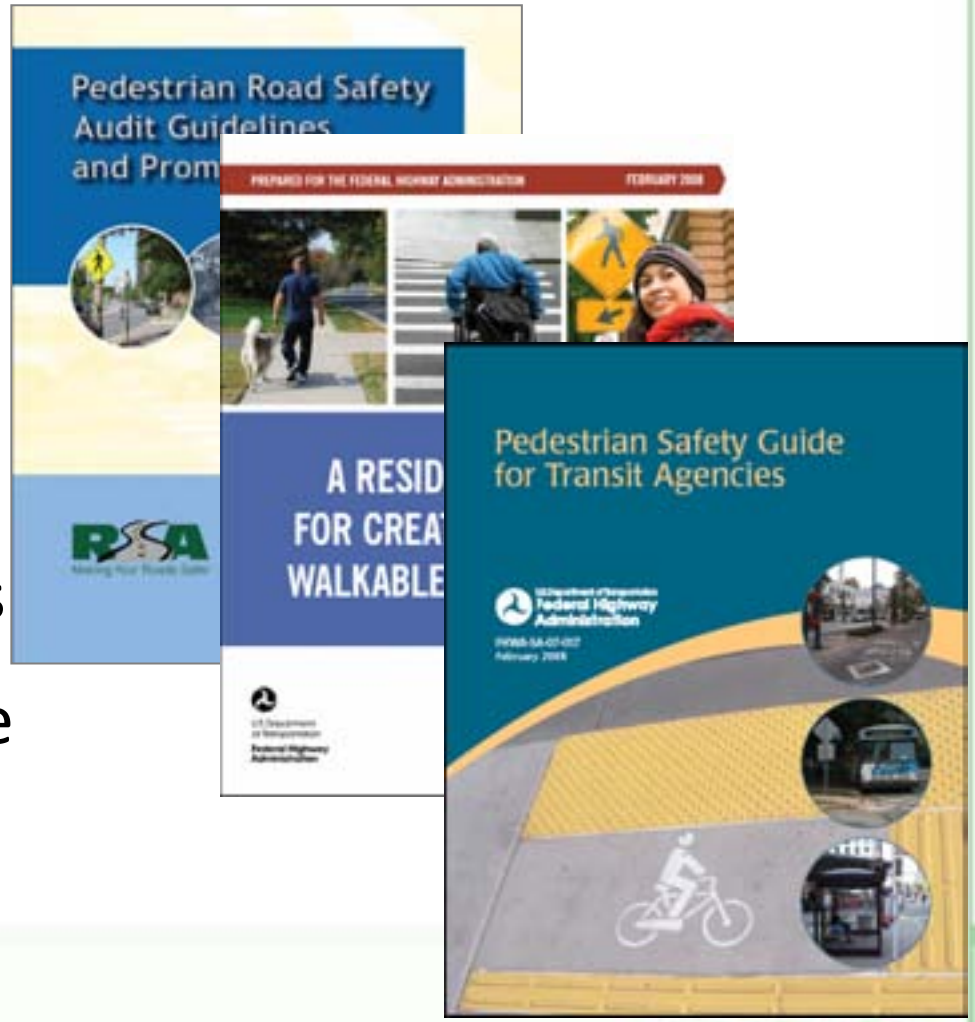
THE UNIVERSITY OF NORTH CAROLINA HIGHWAY SAFETY RESEARCH CENTER

Pedestrian Safety Tools & Techniques

- Pedestrian Safety Guidebooks- Transit Guide
- Bus Stop Improvement Program
  - Case Study: Montgomery County, Maryland
- Providing Pedestrian Access to Transit Rail
  - Case Study: Metrorail Access Plan to New Rail Stations in Reston, VA

Three FHWA Pedestrian Safety Guides

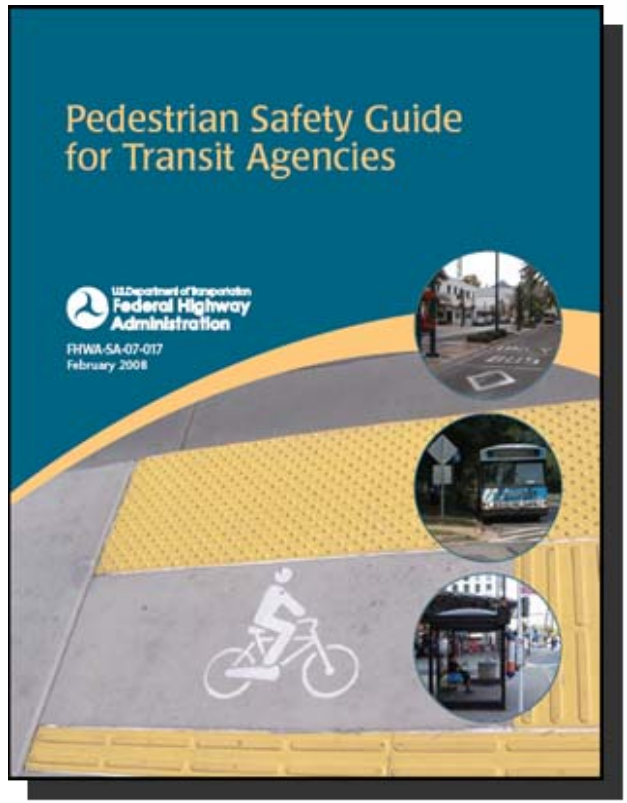
- Pedestrian Road Safety Audit Guidelines and Prompt Lists
- A Resident's Guide for Creating Safe and Walkable Communities
- Pedestrian Safety Guide for Transit Agencies



Pedestrian Safety Guide for Transit Agencies

Transit Guidebook: Overview

The guide emphasizes the importance of solving pedestrian safety issues through partnerships between transit agencies and state and local transportation agencies, municipalities, and consumer interest all of whom can affect roadways and the pedestrian infrastructure.



Transit Guidebook: Content

1. Tools for identifying pedestrian safety and access issues
2. Policy and organizational approaches
3. Engineering, educational, and incentive approaches
4. Background information on pedestrian safety concepts
5. Legal issues, including key cases and rulings

Case Studies

Transit Guidebook

1. Tools for identifying pedestrian safety and access issues:

- Bus Stop Assessments
- Pedestrian Observation and Questionnaires
- Pedestrian Crash Data Analysis

Case Studies

Master Prompt	Detailed Prompt		RSA Stages			
			planning	design	construction	post construction
D.1 Presence, Design, and Placement	D.1.1	Are bus stops sited properly?	■	■	■	■
	D.1.2	Are safe pedestrian crossings convenient for transit and school bus users?	■	■	■	■
	D.1.3	Is sight distance to bus stops adequate?	■	■	■	■
	D.1.4	Are shelters appropriately designed and placed for pedestrian safety and convenience?		■	■	■
D.2 Quality, Condition, and Obstructions	D.2.1	Is the waiting area at a safe and comfortable distance from vehicle and bicycle lanes?		■	■	■
	D.2.2	Do seats (or persons sitting on them) obstruct the sidewalk or reduce its usable width?		■	■	■
	D.2.3	Is a sufficient landing area provided to accommodate waiting passengers, boarding/alighting passengers, and through/bypassing pedestrian traffic at peak times?		■	■	■
	D.2.4	Is the landing area paved and free of problems such as uneven surfaces, standing water, or steep slopes?		■	■	■
	D.2.5	Is the sidewalk free of temporary/permanent obstructions that constrict its width or block access to the bus stop?	■	■	■	■
D.3 Continuity and Connectivity	D.3.1	Is the nearest crossing opportunity free of potential hazards for pedestrians?	■	■	■	■
	D.3.2	Are transit stops part of a continuous network of pedestrian facilities?	■	■	■	■
	D.3.3	Are transit stops maintained during periods of inclement weather?				■
D.4 Lighting	D.4.1	Are access ways to transit facilities well-lit to accommodate early-morning, late-afternoon, and evening transit riders?	■	■	■	■
D.5 Visibility	D.5.1	Are open sight lines maintained between approaching buses and passenger waiting/loading areas?		■	■	■
D.7 Traffic Characteristics	D.7.1	Do pedestrians entering and leaving buses conflict with cars, bicycles, or other pedestrians?				■
D.8 Signs and Pavement Markings	D.8.1	Are appropriate signs and pavement markings provided for school bus and transit stops?		■	■	■

Transit Guidebook

2. Policy and organizational approaches:

- Take Internal Action
  - –Organizational improvements
  - –Update policies
  - –Modify services
- Develop Partnerships
  - –Local, Regional, & State Agencies
  - –Residents and Community Groups
  - –Development Community

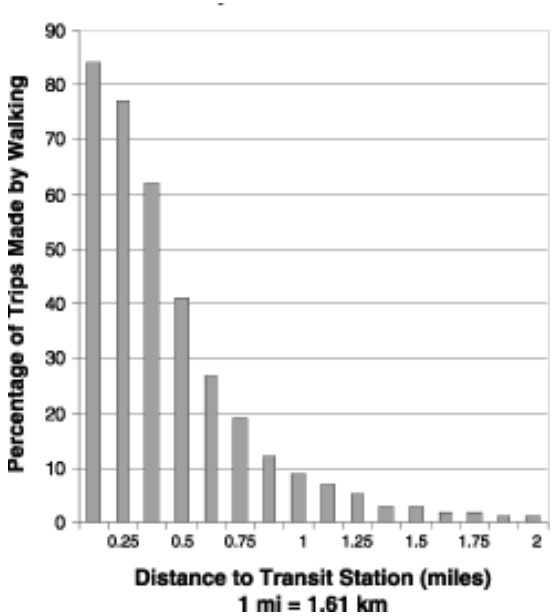
Transit Guidebook

3. Engineering, education, and enforcement:
   - Engineering Actions
     - Sidewalk and Crossing Designs
     - Traffic Control Devices
     - Rail Crossings
     - Transit Stop Designs
   - Education and Enforcement Actions
     - Programs
     - Training Topics

Posters displayed on WMATA buses as part of the StreetSmart Campaign in the Washington,DC region. Source: StreetSmart public safety program of the District of Columbia, Maryland, and Virginia.

Transit Guidebook

4. Background information on pedestrian safety concepts:
   - Walking distances to transit
   - Vehicle Speed vs. Safety
   - Pedestrian Characteristics and Behavior



5. Legal issues, including key cases and rulings:
   - Example Laws and Standards
   - Example Legal Cases

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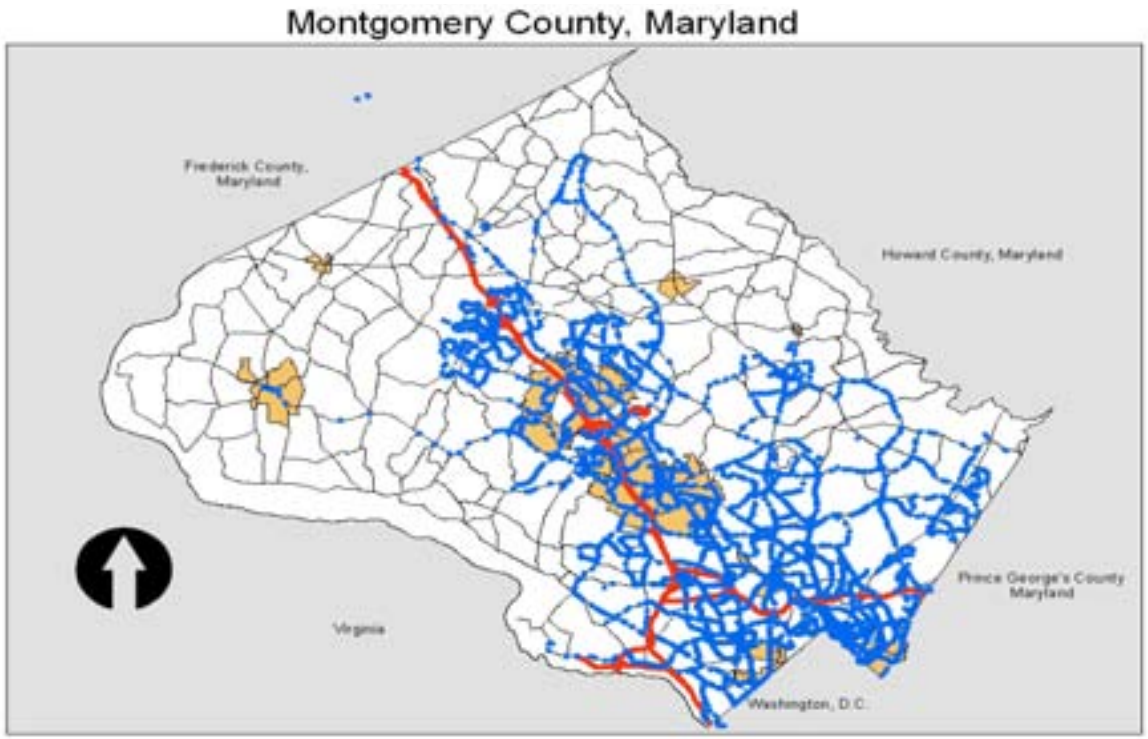
Montgomery County Bus Stop Improvements Program

Ride On Bus Stops



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Issues at Bus Stops


Issues at Bus Stops


Issues at Bus Stops

Types of Information Surveyed

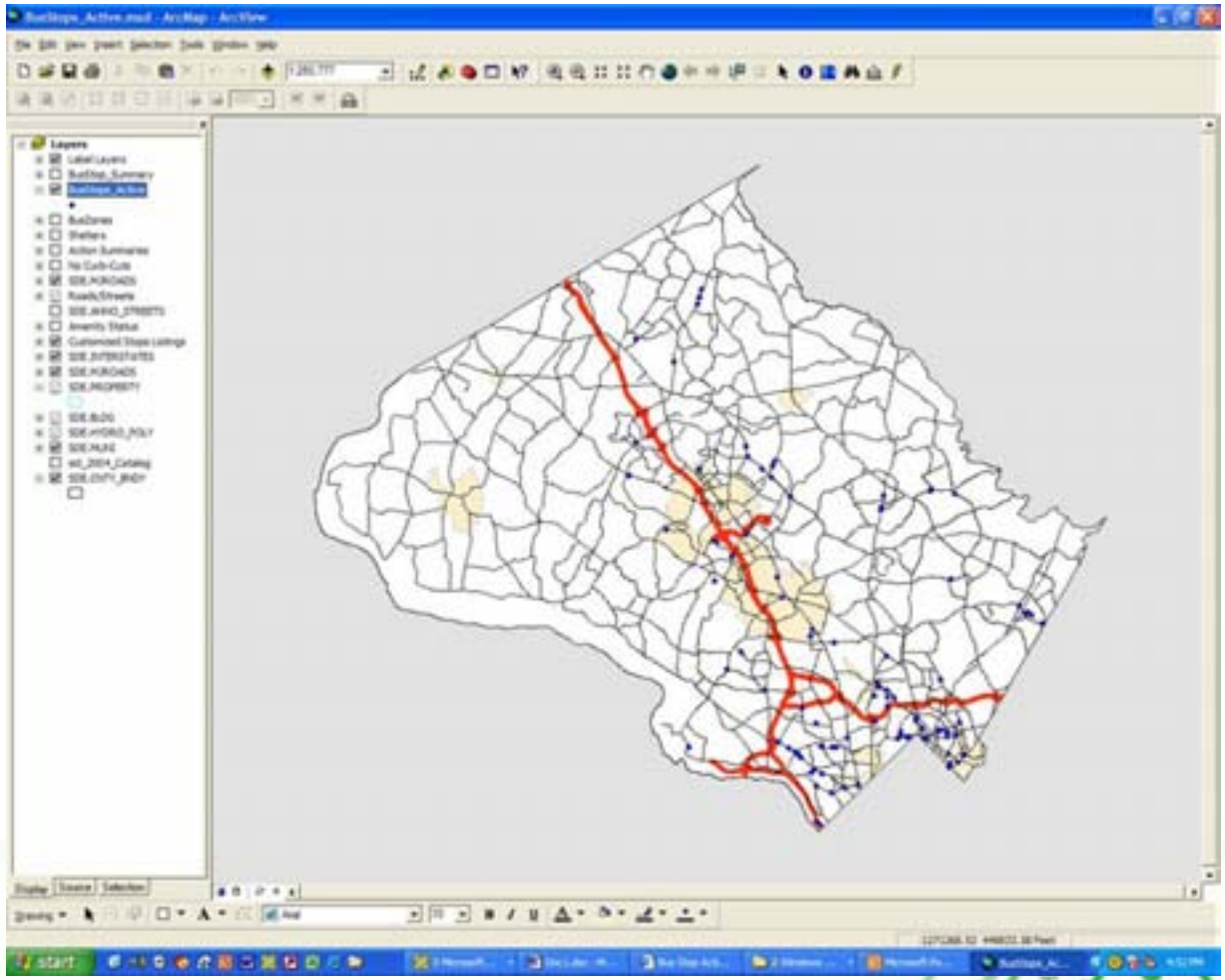
- Location / Description
- Pedestrian Access / Connection
- Signage Information
- Safety / Security
- Amenities

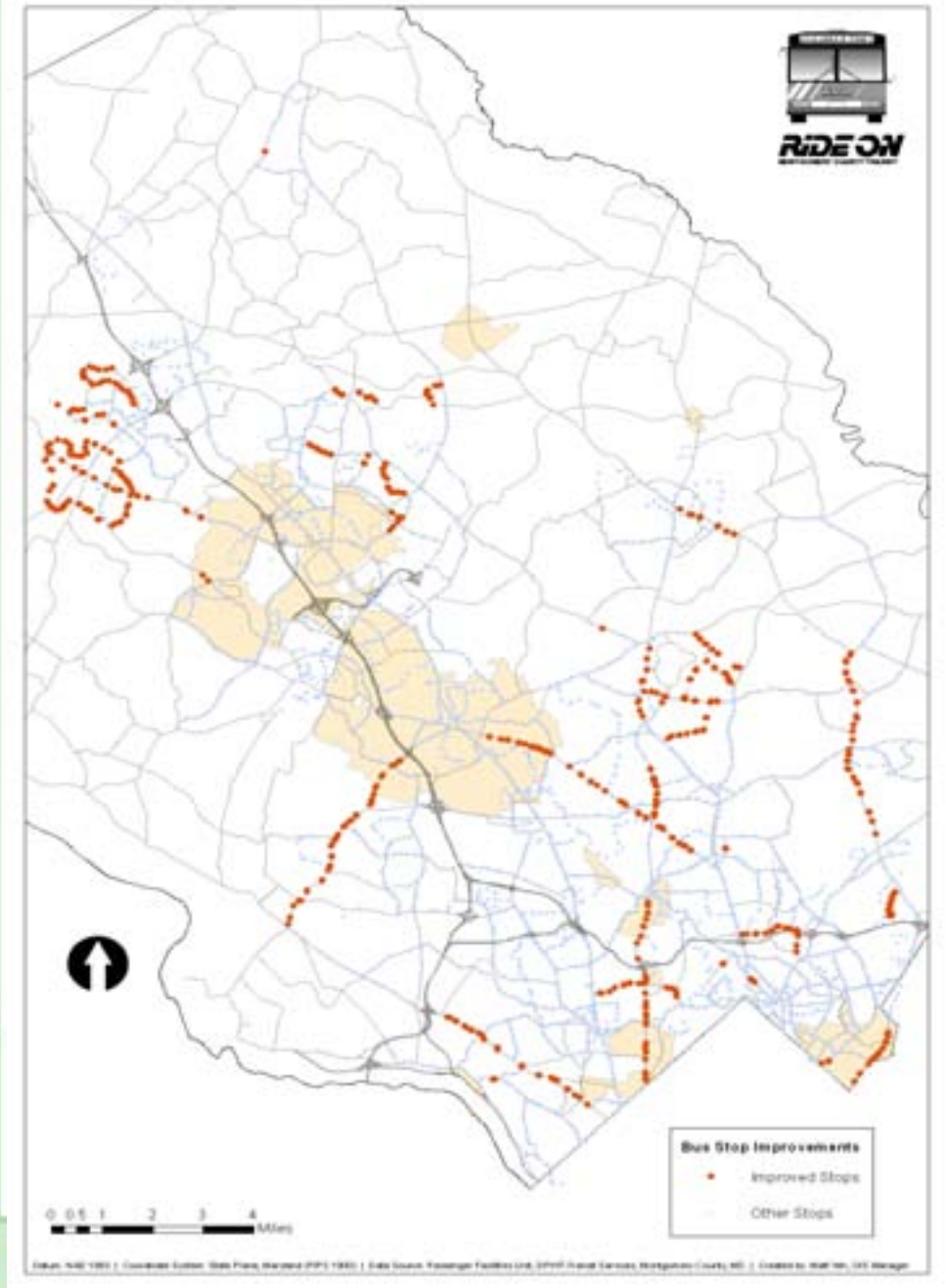
Prioritizing Bus Stop Improvements

- Can passengers wait at the stop without being in danger?
- Are stops reasonably close to a safe street crossing location?
- Can/Should the street crossing location be improved?
- Can passengers get to the stop along reasonably safe path?

Using the Database to Address the Implementation Process

- Using the surveyed dataset, the GIS system enables query poor bus stops





Program Progress (as of Jan. 2008)

- Total number of bus stops = 5340
- Number of stops planned for improvements = 3458 (64.76%)
- Number of stops field-reviewed for improvements = 629 (11.78%)
- Number of stops requiring construction = 556 (10.41%)

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Before and After → Sidewalk Connections

Before and After → Reverse Bulb-out Intersection Improvement

Before and After → ADA Access

Before and After → Pad & Knee Wall

Before and After →Ped Refuge Island

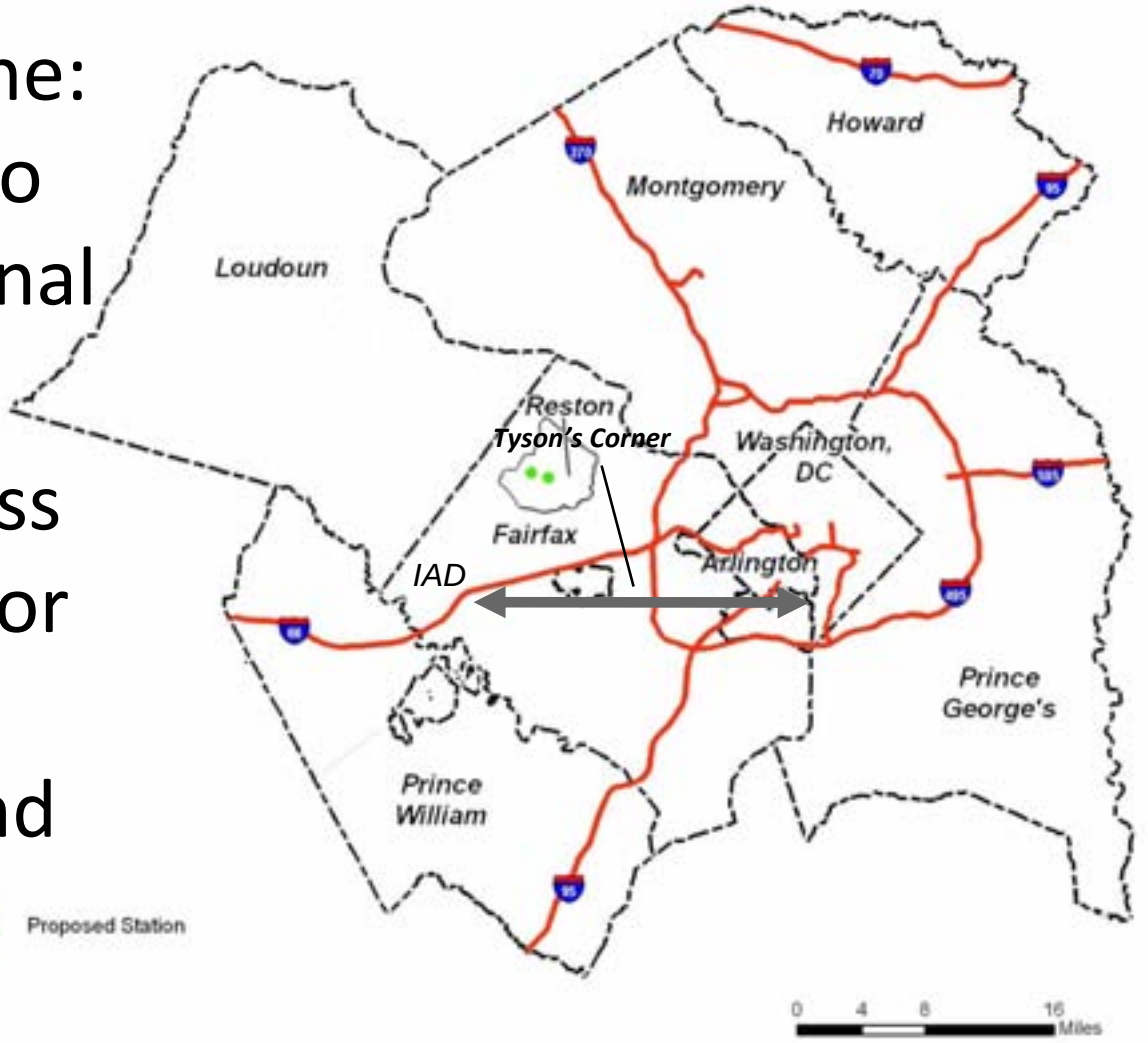
Key to Success

- Use Field Design
- Team Approach to Collaborative Solutions
- Leveraging Other Projects/Funding
- Building Attractive Features
- Making Tangible Safety Improvements in Real Time

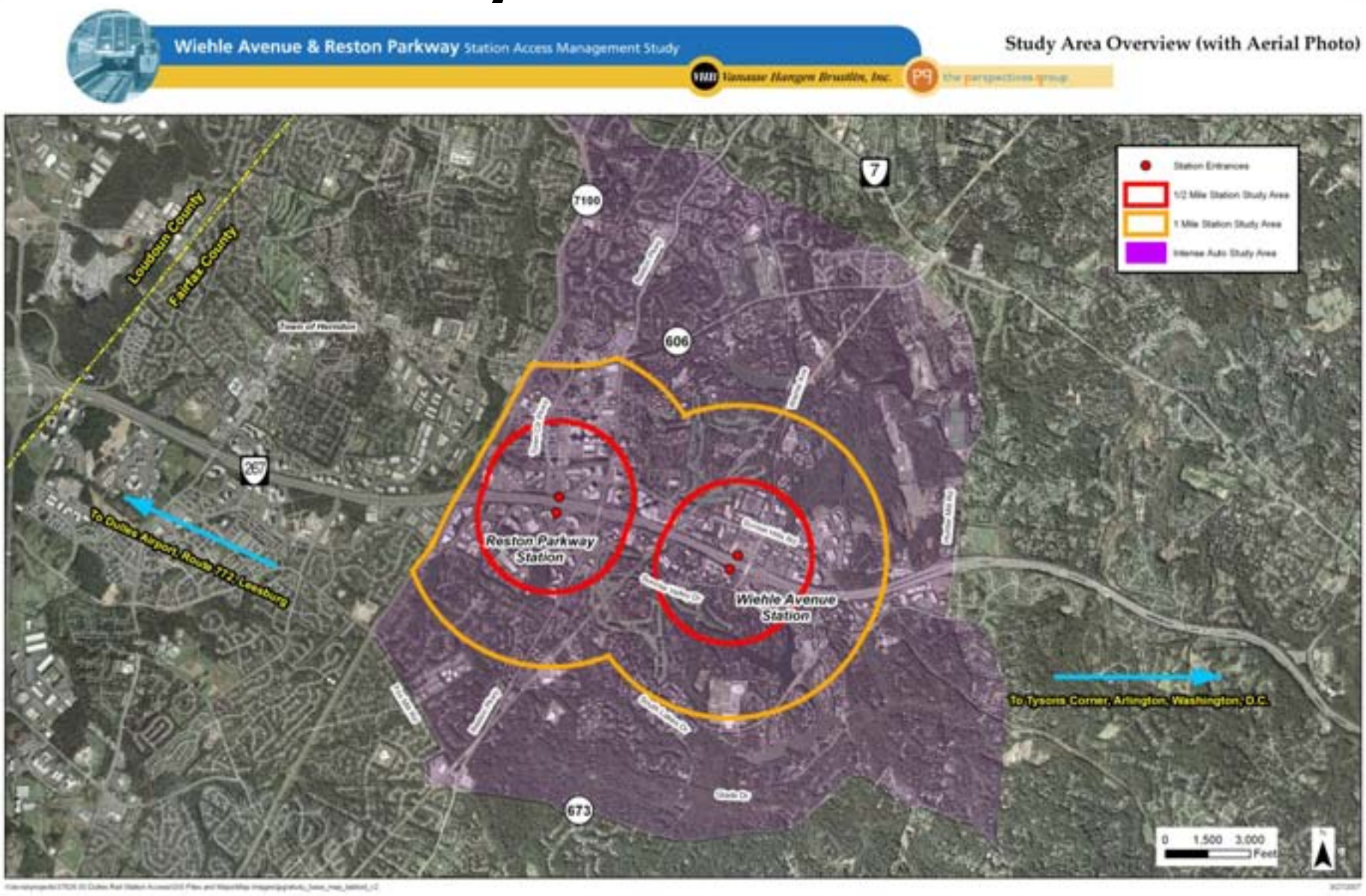
Application of the Pedestrian Intersection Safety Index (PISI) in Planning Access to New Rail Stations

Background

- New Metrorail line: Washington DC to Dulles International Airport (IAD)
- Extension will pass through two major developments – Tysons Corner and Reston

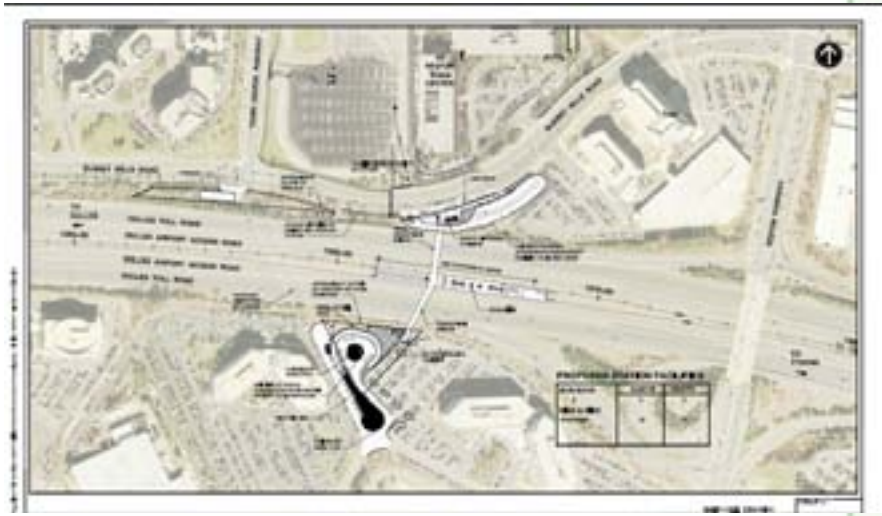


Study Area: Overview



Project Objective

- Develop a Station Access Management Plan
  - Safe access
  - Convenient access
  - Consider all modes



- Pedestrian component included:
  - Inventory all pedestrian facilities
  - Application of the Pedestrian Intersection Safety Index (PISI)

Pedestrian Intersection Safety Indices (PISI)

- What are PISI's?

  A set of models that enable users to identify intersection crossings and intersection approach legs that should have the greatest priority for an in-depth safety assessment.

- Higher indices indicate greater priority for an in-depth safety assessment.

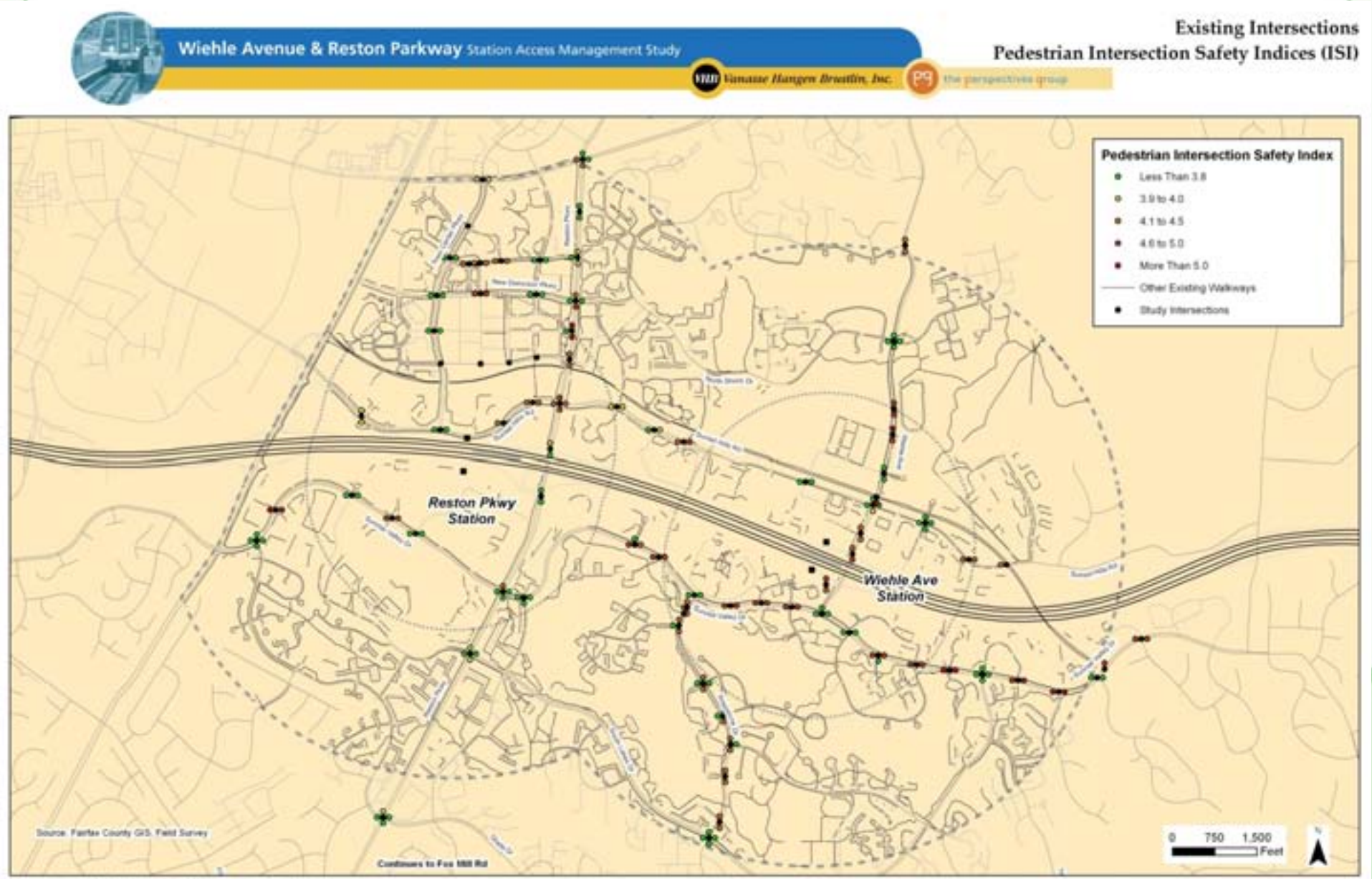
PISI

- Determined by calculating a value for pedestrian crash potential on each approach to an intersection
- Data required are typically readily available

Ped ISI = 2.372 – 1.867**SIGNAL** – 1.807**STOP** + 0.335**THRULNS** + 0.018**SPEED** + 0.006(**MAINADT*SIGNAL**) + 0.238**COMM** where:		
Ped ISI	*Safety index value*	
SIGNAL	Signal controlled crossing	0 = no 1 = yes
STOP	Stop sign controlled crossing	0 = no 1 = yes
THRULNS	Number of through lanes on street being crossed (both directions)	1, 2, 3, …
SPEED	85th percentile speed of street being crossed	Speed in mph
MAINADT	Main street traffic volume	ADT in thousands
COMM	Predominant land use on surrounding area is commercial development (i.e., retail, restaurants, etc.)	0 = not predominantly commercial area 1 = predominantly commercial area

- Indices provide a relative assessment of safety

PISI Map


Wiehle Avenue & Reston Parkway Station Access Management Study
Vanasse Hangen Brustlin, Inc.
the perspectives group
Existing Intersections
Pedestrian Intersection Safety Indices (ISI)
Pedestrian Intersection Safety Index
Less Than 3.8
3.9 to 4.0
4.1 to 4.5
4.6 to 5.0
More Than 5.0
Other Existing Walkways
Study Intersections
Reston Pkwy Station
Wiehle Ave Station
Source: Fairfax County GIS, Field Survey
Continues to Fox Mill Rd
0 750 1,500
Feet

PISI for Selected Intersections

Intersection	Control Device	North	South	East	West
Wiehle Ave & Sunrise Valley Dr	Signal	3.35		2.58	2.92
Wiehle Ave & Sunset Hills Rd	Signal	3.30	3.97	2.86	3.28
Sunset Hills & Reston Parkway	Signal	4.64	4.77	4.28	4.34
Reston Parkway & Sunrise Valley Dr	Signal	4.28	3.49	2.93	2.92
Reston Parkway & Market St	1-way stop	5.53	5.53		2.45
Soapstone Rd & South Lakes Dr	Signal	2.76	2.42	2.86	2.88
Soapstone Rd & Purple Beech Dr	1-way stop	4.25	4.25	1.69	1.69
Sunset Hills & Michael Faraday Ct	Signal	1.63	1.63	2.53	2.53
Reston Parkway & Colts Neck Rd	1-way stop	4.86	4.52	1.69	
Reston Parkway & South Lakes Dr	Signal	3.82	3.82	2.88	2.33
Sunrise Valley & Glade Dr	Signal	2.15	2.00	3.26	3.26
Soapstone Rd & Durand Dr	2-way stop	4.25	4.25	1.69	1.69

PISI ~ 1.5: Side streets

- 2 lanes
- Low-volume (2,000 vpd)
- Low-speed

PISI ~ 5.5: Arterial streets

- 7 lanes
- High volume (30,000 vpd)
- Higher speeds (45 mph)

Corridor Evaluation

Reston Parkway

Cross Street	Side	ISI
Glade Dr	South	3.5
Glade Dr	North	3.8
South Lakes	South	3.8
South Lakes	North	3.8
Sunrise Valley	South	3.5
Sunrise Valley	North	4.3
EB DTR Ramps	South	3.3
EB DTR Ramps	North	3.3
WB DTR Ramps	South	3.6
WB DTR Ramps	North	4.0
Sunset Hills	South	4.8
Sunset Hills	North	4.6
Bluemont Way	South	4.3
Bluemont Way	North	4.3
Market St	South	5.5
Market St	North	5.5
New Dominion Pkwy	South	4.8
New Dominion Pkwy	North	4.2
Bowman Towne Dr	South	3.8
Bowman Towne Dr	North	3.8
Spectrum Ctr	South	3.5
Spectrum Ctr	North	3.2
Baron Cameron Ave	South	4.2
Baron Cameron Ave	North	3.8
Average		4.0

Wiehle Avenue

Cross Street	Side	ISI
Sunrise Valley	North	3.4
EB DTR Ramps	South	4.4
EB DTR Ramps	North	4.7
WB DTR Ramps	South	4.7
WB DTR Ramps	North	4.4
PNR Lot Entrance	South	4.4
PNR Lot Entrance	North	4.0
Sunset Hills	South	4.0
Sunset Hills	North	3.3
W&OD Trail	MidBlo	5.0
Isaac Newton Sq S	South	3.0
Isaac Newton Sq S	North	3.0
Isaac Newton Sq N	South	4.7
Isaac Newton Sq N	North	5.0
Chestnut Grove Sq	South	4.7
Chestnut Grove Sq	North	4.7
North Shore Dr	South	2.9
North Shore Dr	North	2.9
Fairway Dr	South	4.3
Fairway Dr	North	4.3
Average		4.1

Application in Prioritization

- Difficult to highlight individual safety concerns without the use of the PISI
- Residents safety concerns on similar set of intersections as those flagged by the PISI analysis
- The community trusted the results of further analysis and prioritization

Benefits of PISI Analysis

- Detailed recommendations for improvements developed for 38 intersections
- Intersections selected based on their proximity and PISI value
- Detailed geometric changes recommended for intersections with a high PISI value
- General safety and visibility improvements recommended for remaining intersections

Conclusions

- The PISI was successfully used to study pedestrian access to two proposed Metrorail stations
- Can identify corridors or areas which may present safety issues
- Intersections with high ISI values also identified by community members

Information

Pedestrian and Bicyclist Intersection Safety Indices- Final Report

http://www.tfhrc.gov/safety/pedbike/pubs/06125/06125.pdf

What we discussed…

- Resources that are available for improving pedestrian safety: The Transit Guide.
- How bus stops may be improved.
- How we use Ped ISIs to identify locations with pedestrian safety issues.

Questions

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