VDOT Pedestrian Safety Action Plan

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Pedestrians made up about 16% of Virginia highway fatalities in 2016.
Ped Crashes (Injuries Only) By Intersection Type

- **Signalized Intersection**: 431 (22%)
- **Unsignalized Intersection**: 383 (19%)
- **Mid-Block**: 1012 (51%)
- **Parking Lot**: 60 (3%)
- **Other**: 107 (5%)
Ped Crashes (Injuries Only) By Facility and Crossing Type

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>107</th>
<th>52</th>
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<th>17</th>
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<td>One-way or Transition</td>
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<td>Two-way, Non-divided - 2 or 3 Lanes</td>
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<td>Divided, Partial Or Full Control of Access - 4+ Lanes</td>
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<tr>
<td>Two-way, Non-divided - 4+ Lanes</td>
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- Signalized Intersection
- Unsignalized Intersection
- Mid-Block
- Parking Lot
- Other
Ped Crashes (Injury Only): Land Uses

- Residential: 722 (36%)
- Commercial: 861 (43%)
- Industrial: 238 (12%)
- Recreational: 17 (1%)
- Institutional: 28 (2%)
- Agricultural: 127 (6%)

Legend:
- Residential
- Commercial
- Industrial
- Recreational
- Institutional
- Agricultural
Ped Crashes (Injuries Only): Crosswalks

- Marked Crosswalk Present, Pedestrian Struck in Crosswalk: 39 (8%)
- Marked Crosswalk Present, Pedestrian Not Struck in Crosswalk: 22 (5%)
- Marked Crosswalk Present, Unclear if Pedestrian Was Struck in Crosswalk
- No Marked Crosswalk Present: 396 (87%)

Total: 460
Goals for the VDOT Pedestrian Safety Action Plan (PSAP)

- To better understand the pedestrian safety concerns throughout the state and identify countermeasures to address those concerns

- Consider policy, procedure, and practice changes to better promote safe pedestrian travel

- To consider the relationship between land development and pedestrian safety

- To consider maintenance issues for pedestrian access and safety

- To identify HSIP pedestrian safety projects
Step 1: Policy Review

Step 2: Crash and Data Analysis

Step 3: Countermeasure Selection
Step 1: Policy Review

Summarize and assess current VDOT policies:

- Roadway Design
- Traffic Engineering
- Permitting and land use
- Speed setting procedures
- Pedestrian planning and policy
- Research (countermeasure guidance)
- Project prioritization
Example Policy Recommendations

- Consider VDOT-specific installation guidance for countermeasures not currently in roadway design manual
- Update Traffic Impact Analysis - Pedestrian Levels of Service - per length or duration of pedestrian crossing
- Develop road diet design criteria
- Create guidance for Pedestrian Priority Zones
- Develop a checklist for land development review to consider pedestrian mobility and safety
Step 2: Crash and Data Analysis

Crash Clusters
- smaller scale
- focus on crash types

Priority Pedestrian Corridors
- larger scale
- selected per criteria evaluating risk for crashes
What is a “crash cluster”?

*Dense clusters of pedestrian crash locations, regardless of severity of the pedestrian injury*

- Uses geocoded pedestrian crash data (2012-2016) prepared for the Virginia Pedestrian Crash Assessment report

- Density is measured by unweighted distance between “nearest neighbor” crash locations

- More intense clusters appear as bright orange-red spots

328 Total Clusters Statewide --- 19 Identified as High Priority
Example Mapped Crash Clusters: District 9
Example Crash Cluster Site: Arlington (District 9)

Pedestrian Crash Location
- K: Killed
- A: Severe Injury
- B: Apparent Injury
- C: Possible Injury
Corridor Evaluation: Criteria Considered

**LAND USE FACTORS**
- ✓ Pedestrian destinations (parks, trails, and schools)
- ✓ MPO urban area/land use data layer
- ❑ Bus stops and transit/passenger rail stations

**SPEED FACTORS**
- ✓ Posted speed limits
- ❑ Operational speeds

**VISIBILITY FACTORS**
- ❑ N/A: Lighting
- ❑ N/A: Pavement markings and crossing

**DESIGN/INFRASTRUCTURE FACTORS**
- ❑ Signal density
- ❑ Intersection locations
- ❑ N/A: Sidewalk and path accommodations maintained by VDOT
- ❑ N/A: Crossing distance

**VOLUME/OTHER FACTORS**
- ✓ Pedestrian crash data
- ✓ Vehicle traffic volumes
- ✓ Population and employment density (US Census)
- ✓ Vehicle ownership (US Census)
- ✓ Poverty levels (US Census)
- ✓ Prevalence of impaired (alcohol) citations
Total Priority Corridors: 181
Total Corridor Mileage: 610 miles
61% of priority corridors are locally-owned roadways
Corridor Scoring Example: Hampton Roads

Top 1% of scored road segments
Top 10% of scored road segments
Priority Corridor Example: Chesapeake Blvd, Norfolk (VA 194)
Step 3: Countermeasure Selection

- Focus on FHWA Proven Safety Countermeasures
- Review other research and guidance: PEDSAFE and NCHRP reports
- Existing VDOT policies
Commonly Cited Countermeasures

High Visibility Crosswalk
• Indicates preferred crossing points and help designate right-of-way for motorists to yield
• High visibility materials and patterns: transverse lines, ladder, and bar pairs

Curb Extension
• Narrowing of the street at a marked crosswalk to reduce distance and increase visibility
• Commonly paired with on-street parking and parking restrictions
Commonly Cited Countermeasures

**Pedestrian Countdown Head**
- Visible (and potentially audible) countdown of the walk phase during “Don’t Walk” interval
- Demonstrated reduction in last second crossings

**Leading Pedestrian Interval**
- Signal timing improvement where pedestrians are given “WALK” signal before the motorist’s green light
- Makes pedestrians more visible to motorist (especially turning vehicles)
Commonly Cited Countermeasures

**Advance Warning Signage**
- Highly visible signs that indicates the presence of pedestrian crossings
- Placed ahead of crossing, and in combination with marked crosswalks

**In-Street Yield Signage**
- High visibility sign that reminds motorists of yielding requirements when encountering pedestrians
- Affixed to the pavement surface with a flexible mount to withstand contact with vehicles
Commonly Cited Countermeasures

Pedestrian Hybrid Beacon (PHB)
- Specialty pedestrian activated beacon that warns and controls traffic at unsignalized marked crosswalks
- Yellow lights warn of pedestrians, red lights stop traffic for pedestrians

Rectangular Rapid Flashing Beacon (RRFB)
- High frequency blinking pedestrian warning sign that is used in tandem with a marked crosswalk
- Flashing pattern can be activated with pushbuttons or automated and should be unlit when not activated
Commonly Cited Countermeasures

Pedestrian Refuge Island
- Raised islands or medians place in the center of the street at an intersection or mid-block
- Allows pedestrians to find appropriate crossing gap and focus on oncoming direction at a time

Road Diet
- Conversion of a roadway that often reduces travel lanes and adds shared center turn lane and on-street parking or bicycle lanes
- Subject to existing roadway configuration and AADT
Example Linear Improvements

**Sidewalk Connections**
- Connecting gaps in the sidewalk and path network reduce need for pedestrians to walk in the roadway
- Sidewalks on one or both sides of the roadway per adjacent land use context

**Transit Stop Access**
- Review bus shelter placement relative to pedestrian crossings and intersections
- Build sidewalks to shelters from nearest network
Countermeasure Selection

- Number of travel lanes
- Speed limit
- ADT (i.e. 10,000-15,000 vpd threshold)
- Presence of median or signalized crossing
- Estimated pedestrian activity (per land use context)
- Presence of existing crosswalk markings
- Crash types & prevalence
  - Time of day: Day versus Night
  - At intersection
  - Driver compliance
7 out of 8 crashes occurred on 2-lane undivided roadway, all crashes occurred in a 25 mph zone, and 5 out of 8 crashes involved improper action by the driver.

High visibility crosswalks; Right Turn on Red restrictions or Leading Pedestrian Interval
• 4-lane median divided roadway with minimal pedestrian crossings and low density residential and commercial land uses. AADT: ~25,000; Speed Limit: 45

• Little to no existing pedestrian crossing infrastructure and wide crossing distances.

Consider sidewalks, pedestrian countdown signals; PHBs at key mid-block crossings
Next Steps for Local Agencies

View or download the data and information
- [ArcGIS Online map showing crash clusters and priority corridors](#)
- Corridor and crash cluster “cut sheet” maps linked
  - [Corridor Site Example](#)
  - [Crash Cluster Site Example](#)

Coordinate review with VDOT staff / local agency
- Review local plans, crash reports, and site conditions
- Discuss refined countermeasures

Develop and submit HSIP and/or SMART SCALE projects
Thanks!

For more information:

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