PEDESTRIAN & BICYCLIST
FOCUSED APPROACH TO SAFETY

Pedestrian Safety and Darkness

Tuesday, December 20, 2022

U.S. Department of Transportation
Federal Highway Administration

ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE

Disclaimer

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Webinar Logistics

- Please post questions at any time
- We will be saving time at the end of the session for questions and discussion
- Webinar slides and recording will be posted at

https://www.pedbikeinfo.org/webinars/webinar_details.cfm?id=122

Continuing Education Credits

- Webinar approved for 1.5 CM credits through AICP
- Brief questionnaire following webinar for sharing feedback.
- Information about webinar archive materials, recording and certificates of attendance will be sent in a follow-up email this afternoon.

Agenda

- Introduction and welcome
- FHWA lighting initiative (George Merritt)
- What we know about pedestrian safety and darkness (Rebecca Sanders)
- FHWA Lighting Primer (Michael Dunn and Matt Stygles)
- Profiling work in Portland, OR, area (Brandon Summers, Zachary Lauritzen, and Scott Kocher)
- Discussion

Webinar Objectives

- Understand the role of dark conditions in pedestrian safety outcomes.
- Review recommended practices for lighting improvements.
- Learn about community efforts to focus attention on the issue of lighting.

Panelist Introductions

- George Merritt, FHWA
- Rebecca Sanders, Safe Streets Research and Consulting
- Michael Dunn, VHB
- Matt Stygles, VHB
- Brandon Summers, Oregon Walks
- Scott Kocher, Oregon Walks
- Zachary Lauritzen, Oregon Walks

Nighttime Visibility for Safety

U.S. Department of Transportation
Federal Highway Administration

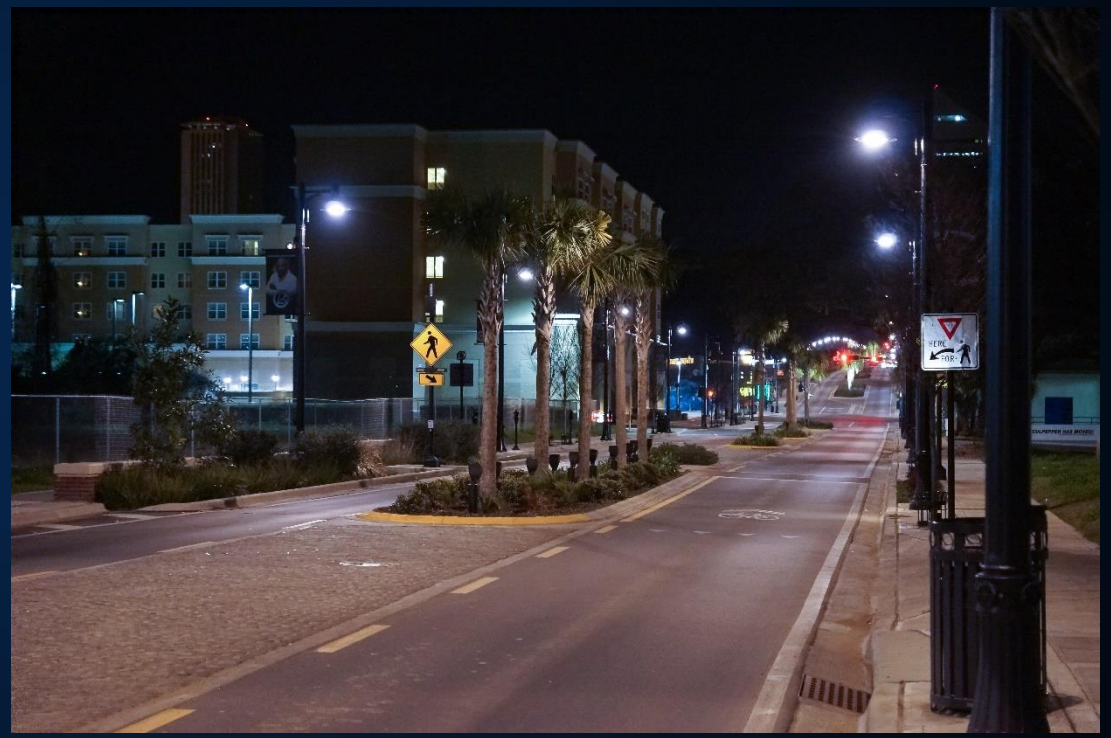
Every Day Counts
Innovation for a Nation on the Move

Nighttime Visibility for Safety

- FHWA has used a focused approach to safety for many years, based on findings that almost 90 percent of the traffic fatalities in the United States happen in three main areas:
  - Intersections
  - Pedestrians and bicyclists
  - Roadway departures

Nighttime Visibility for Safety

- Enhancing visibility in these three areas with a targeted application of cost-effective and proven lighting and traffic control device countermeasures can address a large part of the nighttime safety problem.



Nighttime Visibility for Safety

- Improving visibility along corridors, at intersections, and at pedestrian crossings can help reduce nighttime crashes and fatalities
- Several countermeasures and approaches are available that agencies can employ to improve visibility and reduce fatalities.

Please contact us!

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EDC-7: Nighttime Visibility for Safety | Federal Highway Administration (dot.gov)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_7/nighttime_visibility.cfm

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Every Day Counts
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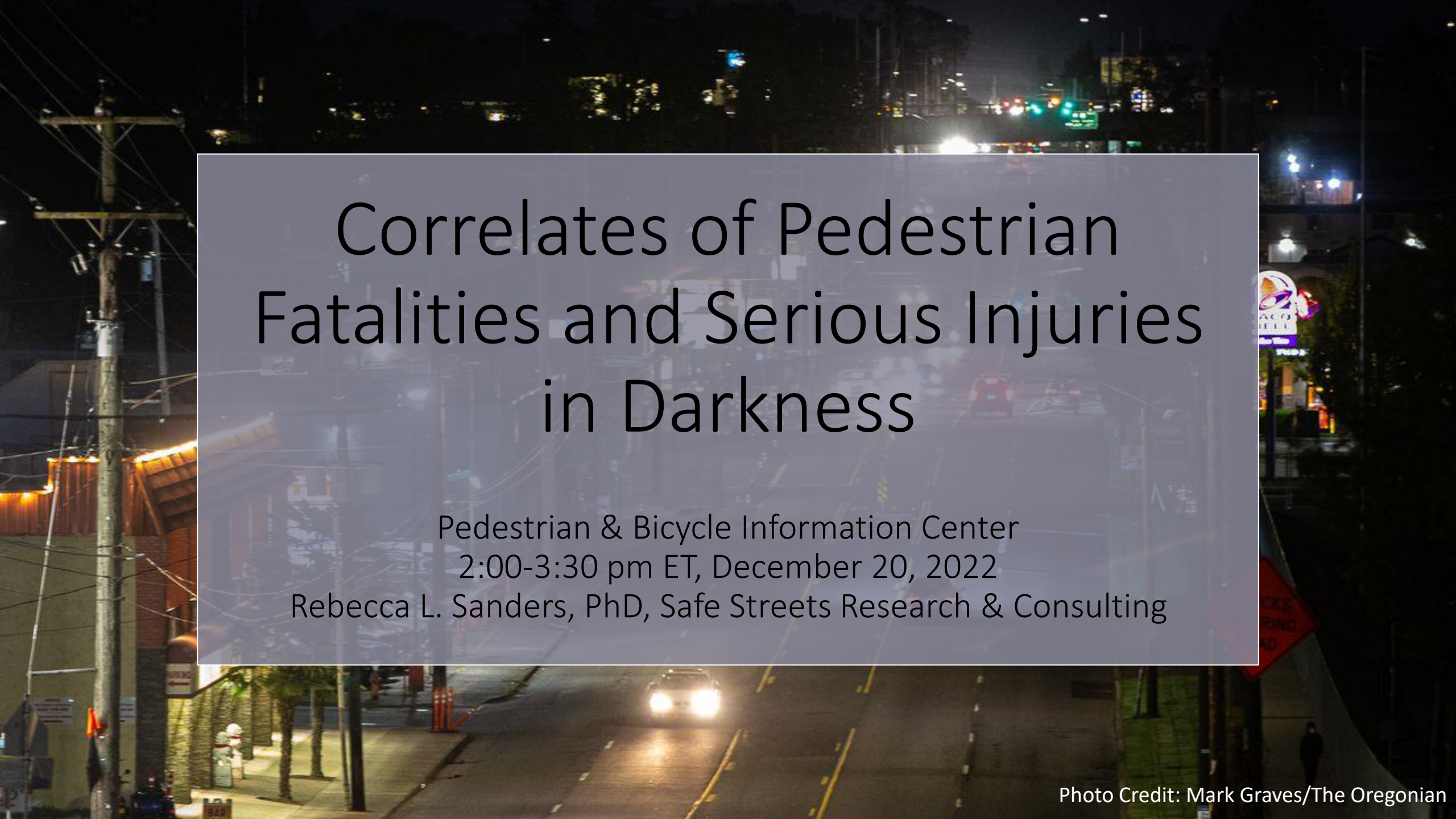

Correlates of Pedestrian Fatalities and Serious Injuries in Darkness

Pedestrian & Bicycle Information Center
2:00-3:30 pm ET, December 20, 2022
Rebecca L. Sanders, PhD, Safe Streets Research & Consulting

Photo Credit: Mark Graves/The Oregonian

Background

Image Credit: GHSA Pedestrian Safety Spotlight Report (based on FARS data)

Pedestrian Safety Trends

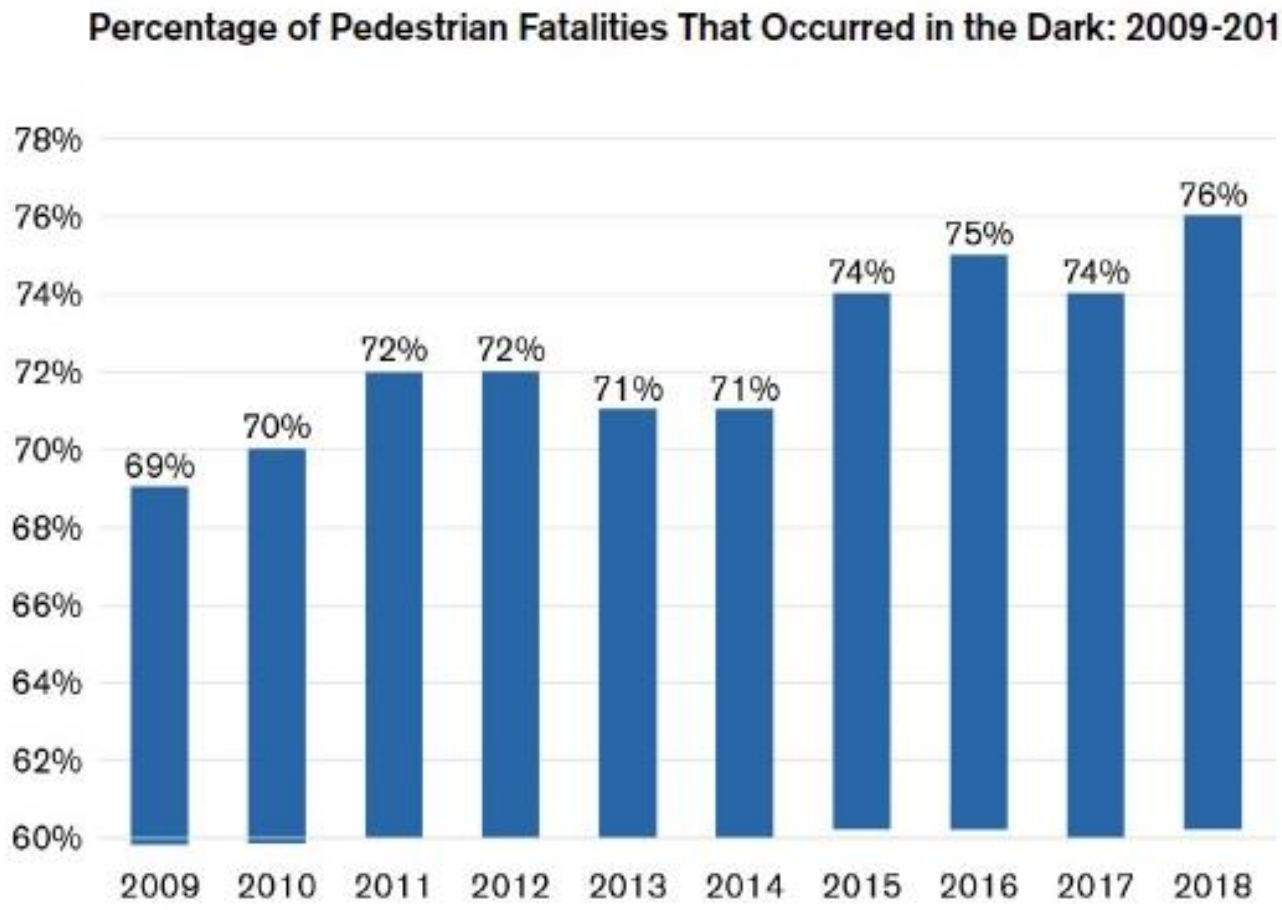

Image Credit: GHSA Pedestrian Safety Spotlight Report (based on FARS data)

Study Purpose

Examine how common crash factors are associated with the **probability of a fatal or serious pedestrian crash occurring in darkness versus daylight**.

Methodology

- 2012-2017 Fatality Analysis Reporting System (FARS) data
- 2012-2017 Transportation Injury Mapping System (TIMS) data (California)
- Bivariate analyses and binary and multinomial logit modeling
  - Pedestrian fatalities nationally
  - Pedestrian fatalities and serious injuries in California
  - Pedestrian fatalities by lighting condition
- Unit of analysis is the pedestrian

Findings: Roadway Design

- Roadways with ≥4 lanes compared to ≤ 3 lanes (US)
  - Fatalities 1.2x as likely
- State highways compared to not (CA)
  - 2.1x and 1.8x the odds of a fatality or serious injury, respectively
- Local roadways (US)
  - Fatalities 0.8x as likely

Photo of a 4-lane roadway with car and motorcycle traffic and a traffic signal.

Findings: Speed

- Speed limit, compared to 25 mph (US)
  - 30-35 mph: fatalities 1.5x as likely
  - 40+ mph: fatalities 2.4x as likely
    - OR even higher for dark, unlit conditions
- Speeding-related
  - Fatalities: approx half as likely
  - No significant difference for serious injuries

Photo of a 45-mph roadway with no sidewalk.
Credit: Nelson Sigelman/The Martha's Vineyard Times

Findings: Operations

- Functioning traffic control v. not (CA)
  - Fatalities 0.7x and serious injuries 0.8x as likely
- Intersection v. not
  - No significant difference for fatalities
  - Marginally significant difference for serious injuries

Photo of a man waiting to cross at a traffic signal with a child in a stroller.
Credit: www.pedbikeimages.org

Findings: Driver Movement

- Driver going straight v. turning
  - National fatalities: 2.3x the odds
  - CA fatalities: 5.6x the odds
  - CA serious injuries: 3.3x the odds

Photo of a car going straight through an intersection.
Credit: John Boyle/Citizen Times

Findings: Pedestrian Location & Behavior

- Pedestrian crossing not in crosswalk v. crosswalk
  - National fatalities: 2x the odds
  - CA fatalities: 1.7x the odds
  - CA serious injuries: 1.1x the odds
- Pedestrian in roadway v. crosswalk (CA)
  - Fatalities: 1.4x the odds
  - Serious injuries: 0.8x the odds
- Pedestrian in travel lane v. elsewhere
  - National fatalities: 5x the odds

Photo of two people crossing in a marked crosswalk.
Credit: Sam Newberg/Joe Urban

Findings: Pedestrian & Driver Characteristics

- Pedestrian age < 16 (baseline: 16-64)
  - Fatalities & serious inj: 0.2x the odds
- Pedestrian age ≥ 65 (baseline: 16-64)
  - National fatalities: 0.4x the odds
  - CA fatalities & serious injuries: 0.5x the odds
- Driver age ≥ 65 (baseline: 16-64)
  - National fatalities: 0.5x the odds
  - CA fatalities: 0.7x the odds
- Male pedestrian (baseline: female)
  - National fatalities: 1.1x the odds
  - CA serious injuries: 1.2x the odds

Photo of a woman crossing the street at a traffic signal.
Credit: AAA Foundation for Traffic Safety

Findings: Pedestrian Characteristics

- Pedestrian race (baseline: white, non-Hispanic)
  - Native American, non-Hispanic
    - National fatalities: 1.7x the odds
  - Black, non-Hispanic
    - National fatalities: 1.3x the odds
    - CA fatalities: 1.5x the odds
    - CA serious injuries: 1.4x the odds
  - Asian, non-Hispanic
    - CA serious injuries: 0.8x the odds
  - All others (ns)

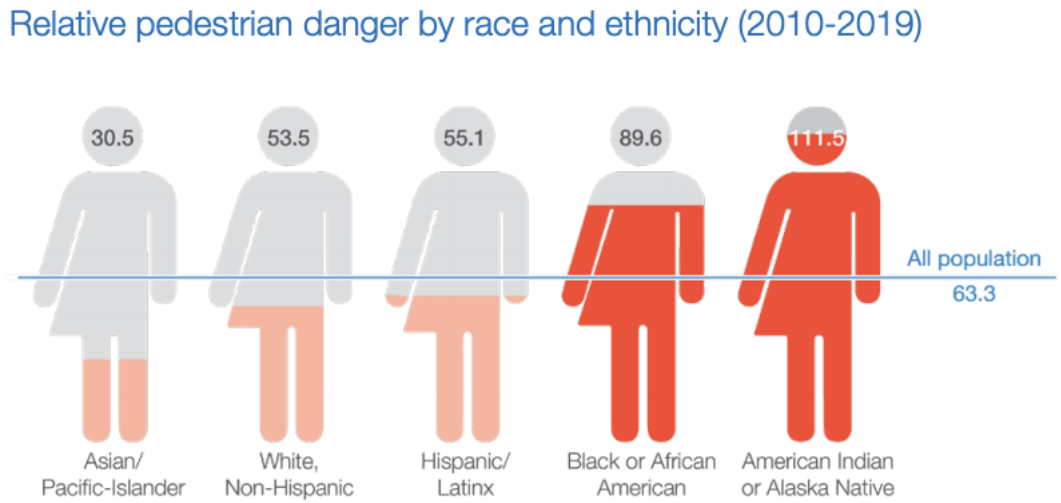

Image showing disproportionate fatality risk by race on a per-capita basis.
Credit: Dangerous by Design, 2021

Findings: Contributing Factors

- Pedestrian alcohol usage
  - National fatalities: 3.4x as likely
  - CA fatalities: 3x as likely
  - CA serious injuries: 5.2x as likely
- Driver alcohol usage
  - Approximately 2.4x as likely (fatalities & serious inj)
- Hit & run
  - National fatalities: 3.1x as likely
  - CA fatalities: 2.5x as likely
  - CA serious injuries: 1.8x as likely

Photo of an SUV flipped over after a crash involving alcohol.
Credit: Mark Kasner/LIHerald.com

Findings: Other Factors

- Sunbelt (v. all other states)
  - National fatalities: 1.2x the odds
- Clear weather (v. all other cond.)
  - National fatalities: 0.7x the odds
  - CA fatalities & ser. inj: 0.5x the odds

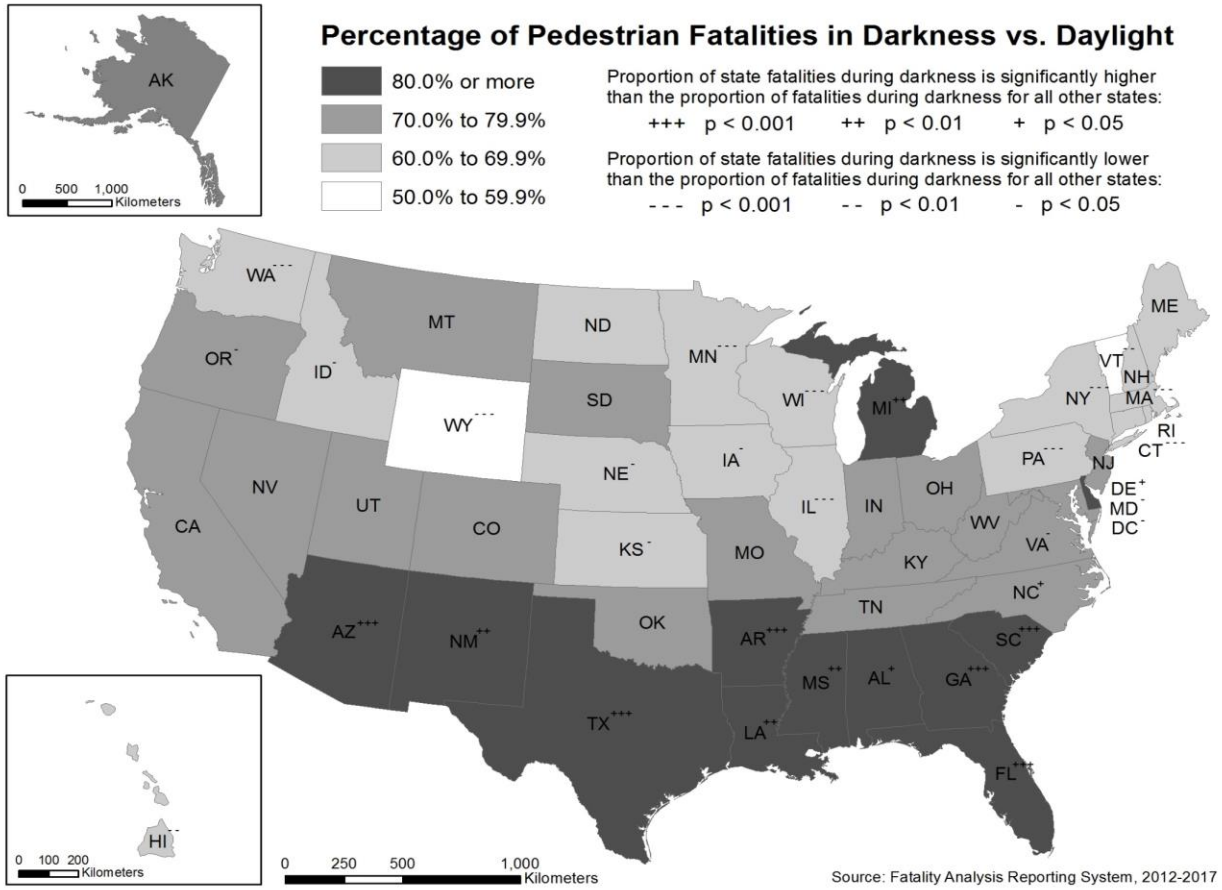

Image of U.S. map with indications of percentage of pedestrian fatalities in darkness.
Credit: Sanders, Schneider, & Proulx, 2022

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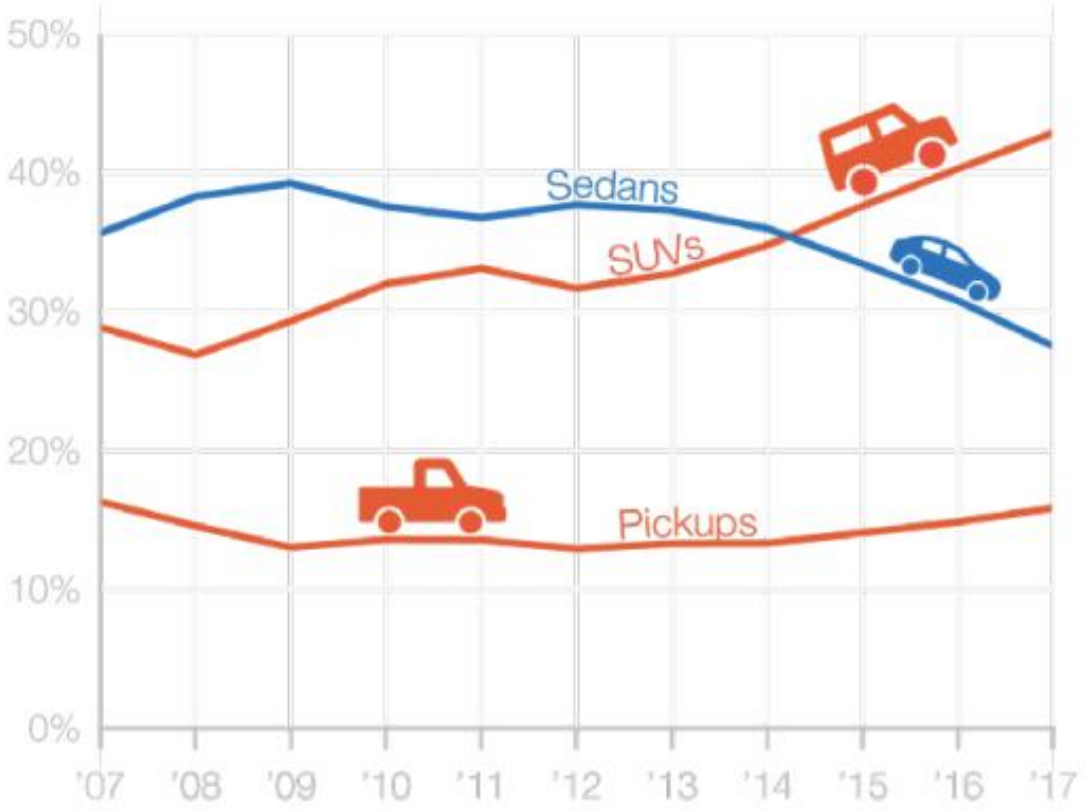
Findings: Other Factors

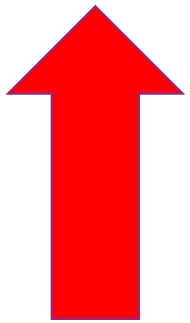
- Passenger car (v. other veh types)
  - National fatalities: 1.3x the odds
  - CA fatalities: 1.4x the odds
  - CA serious injuries: 1.3x the odds
- Weekend (v. 6pm Sun to 5pm Fri)
  - National fatalities: 1.7x the odds
  - CA fatalities: 1.3x the odds
  - CA serious injuries: 1.7x the odds



Graphic pictures percent U.S. annual market share of new vehicles, by type.
Credit: Dangerous by Design, 2021

Key Findings

- Fatalities in darkness differ from
  - fatalities in daylight
  - severe injuries in darkness
- Lighting levels are differentially associated with key variables
- Relationship with key correlates of crash severity is exacerbated
  - Speed
  - Number of lanes
  - Roadway type
  - Alcohol usage



Our Visual Capacity is Compromised at High Speeds…

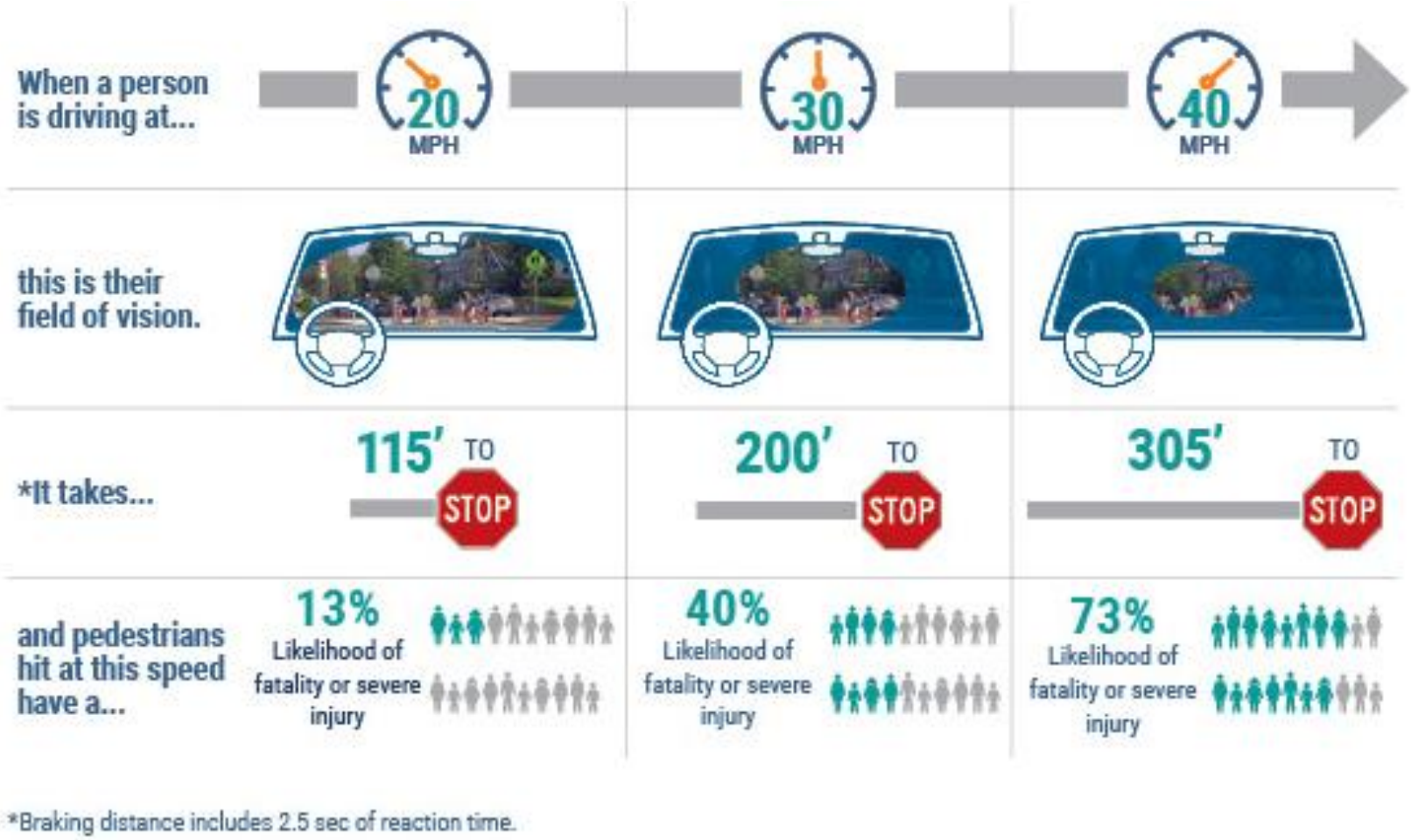


Image credit: Toole Design

…and Even More so in Darkness

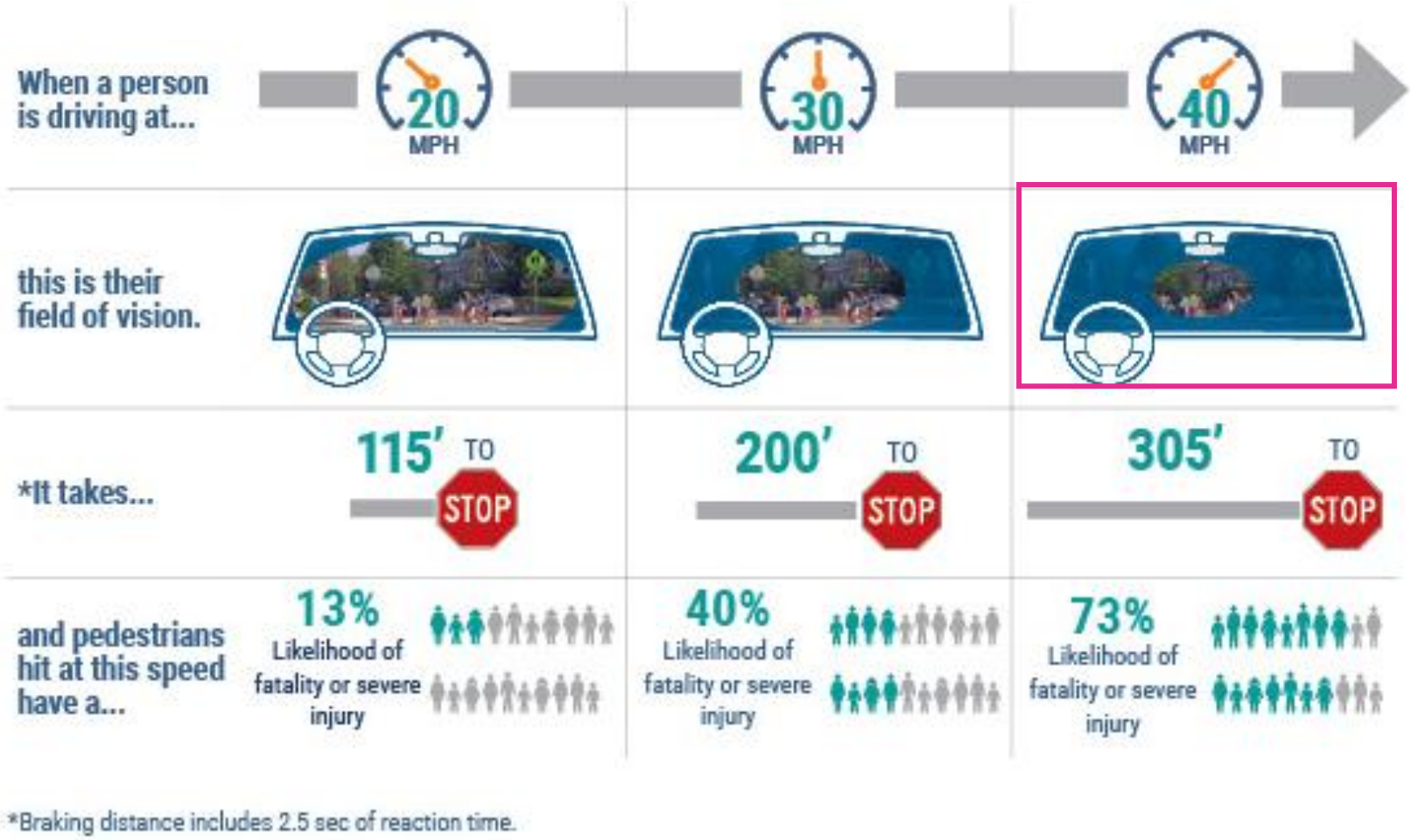


Image credit: Toole Design

Key Takeaways

Adapt practices to treat pedestrian safety specifically at night

- Make darkness the use and design case
- What can we take in at various speeds, in various lighting conditions?

Photo of multi-lane arterial roadway in darkness.
Credit: Mark Graves/The Oregonian

Key Takeaways

- Prioritize:
  - Reduced speeds
    - More time to detect
    - More time to react
  - Increased visibility
    - Additional roadway lighting
    - High-visibility countermeasures
  - Improved crossing opportunities
    - Protected crossings

Credit: FHWA

NTSB Recommendations

- Vehicle-based safety countermeasures
  - Adaptive headlights
  - Vehicle design
  - Collision avoidance technology
- Infrastructure planning
  - Pedestrian safety action plans
  - Design guides
  - Site-specific planning
- Improved pedestrian safety data

Images showing a car with adaptive headlights and a car with standard (non-adaptive) headlights. Credit: Antoine Levesque / Wheelsjoint.com

Key Takeaways

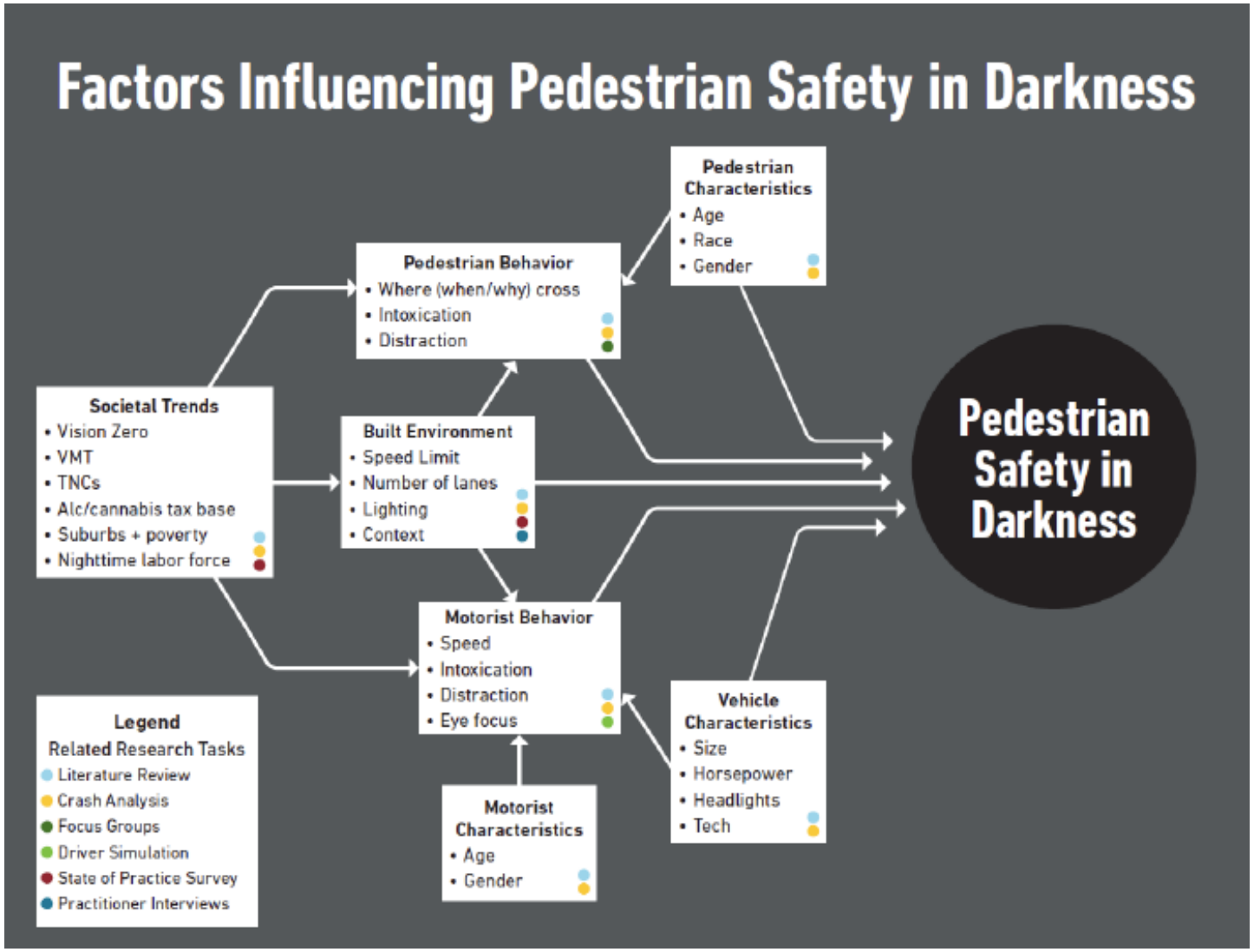
- Explore trends in race, age, and sex
  - Lighting effectiveness and skin tone
  - Countermeasure effectiveness for people in wheelchairs or shorter people (e.g., children)
  - Impact of glare on visibility and vision for both pedestrians and drivers of differing ages

Ongoing Research: NCHRP 17-97

Purpose: Develop guidance to improve pedestrian safety at night

Approach:

- Mixed methods
  - National- and local-level crash analysis
  - Focus groups
  - Driver simulation
  - Practitioner interviews
- Based in Safe Systems Approach
- Explicitly examining race as a correlate of pedestrian safety outcomes



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For further information:

Sanders, R.L., Schneider, R.J.., & Proulx, F.R. (2022). Pedestrian Fatalities in Darkness: What Do We Know, and What Can Be Done? *Transport Policy*. 120(May): 23-39. DOI: 10.1016/j.tranpol.2022.02.010

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FHWA Pedestrian Lighting Primer

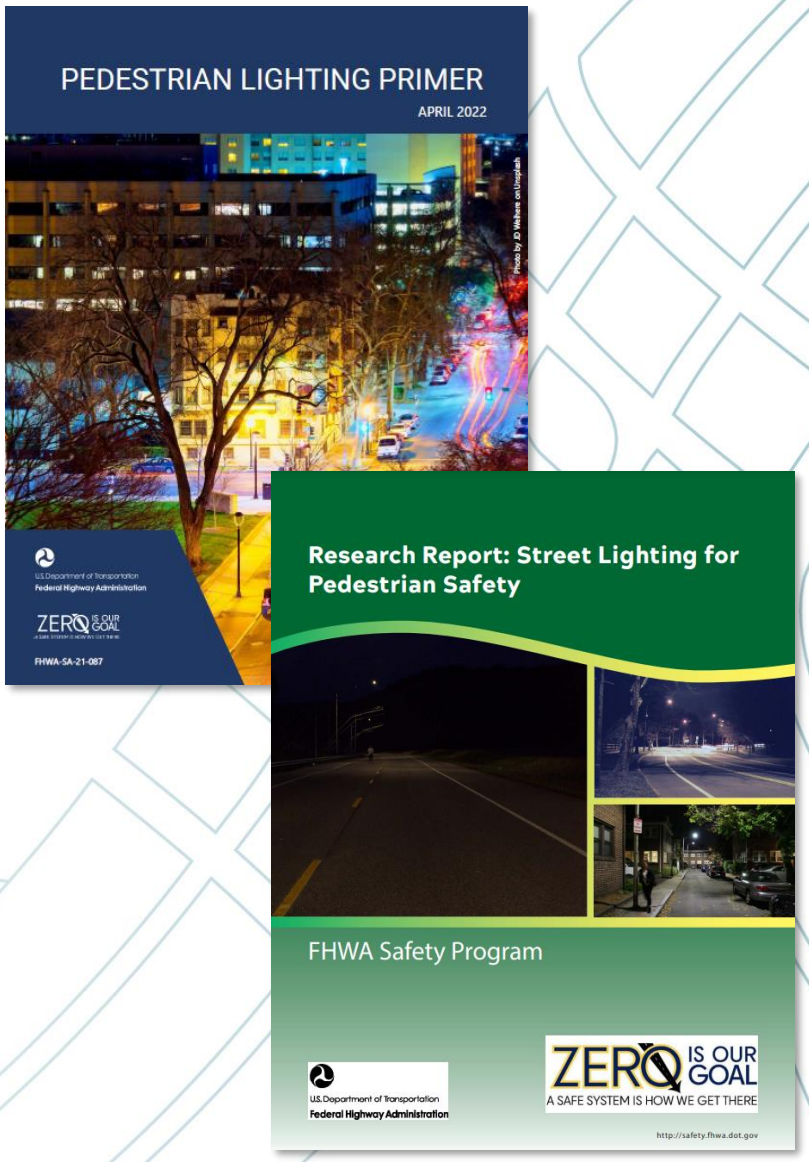
Presented by
Michael Dunn, PE
Matthew Stygles, PE

December 20, 2022

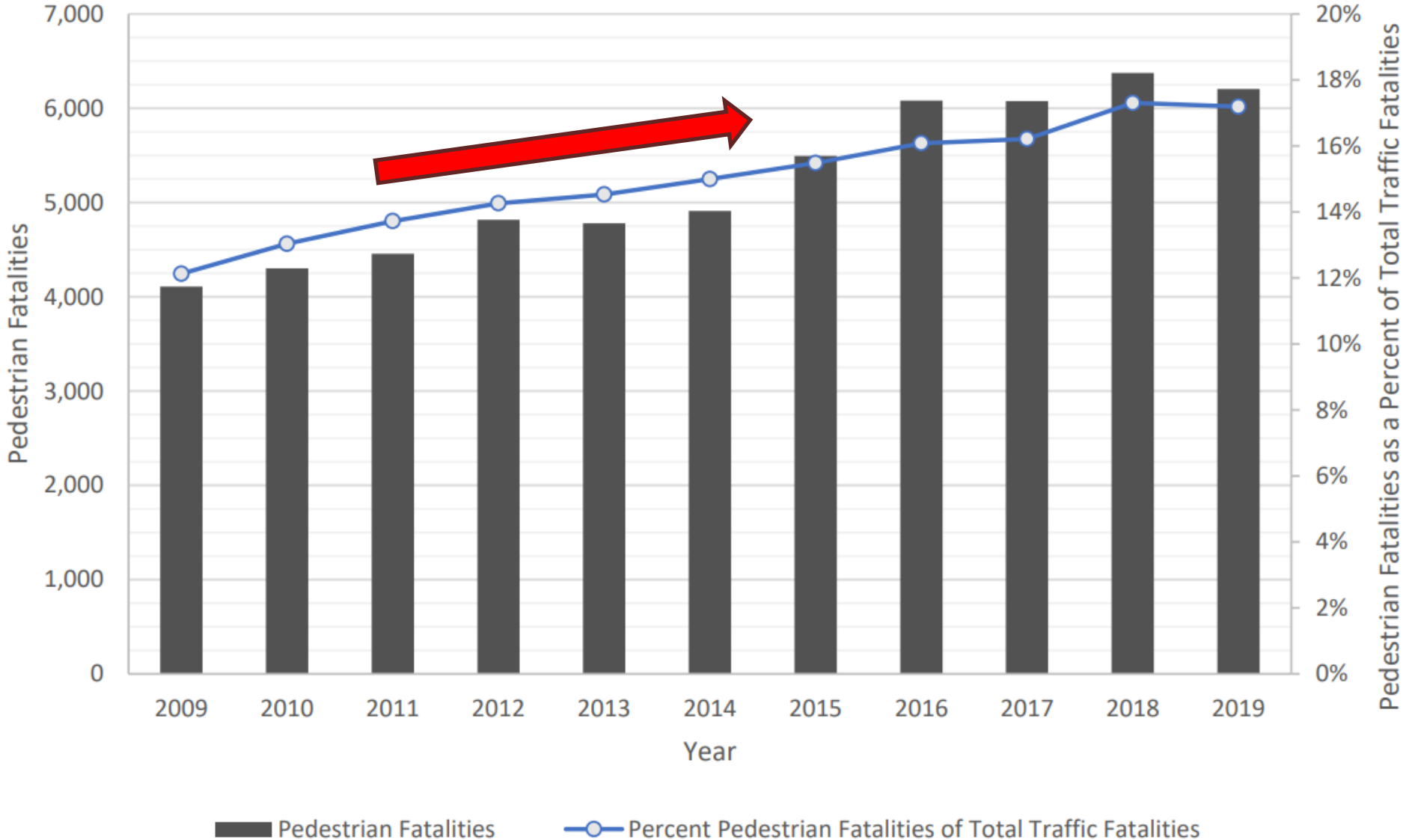
Photo by JD Weihere on Unsplash

Introduction to the Primer

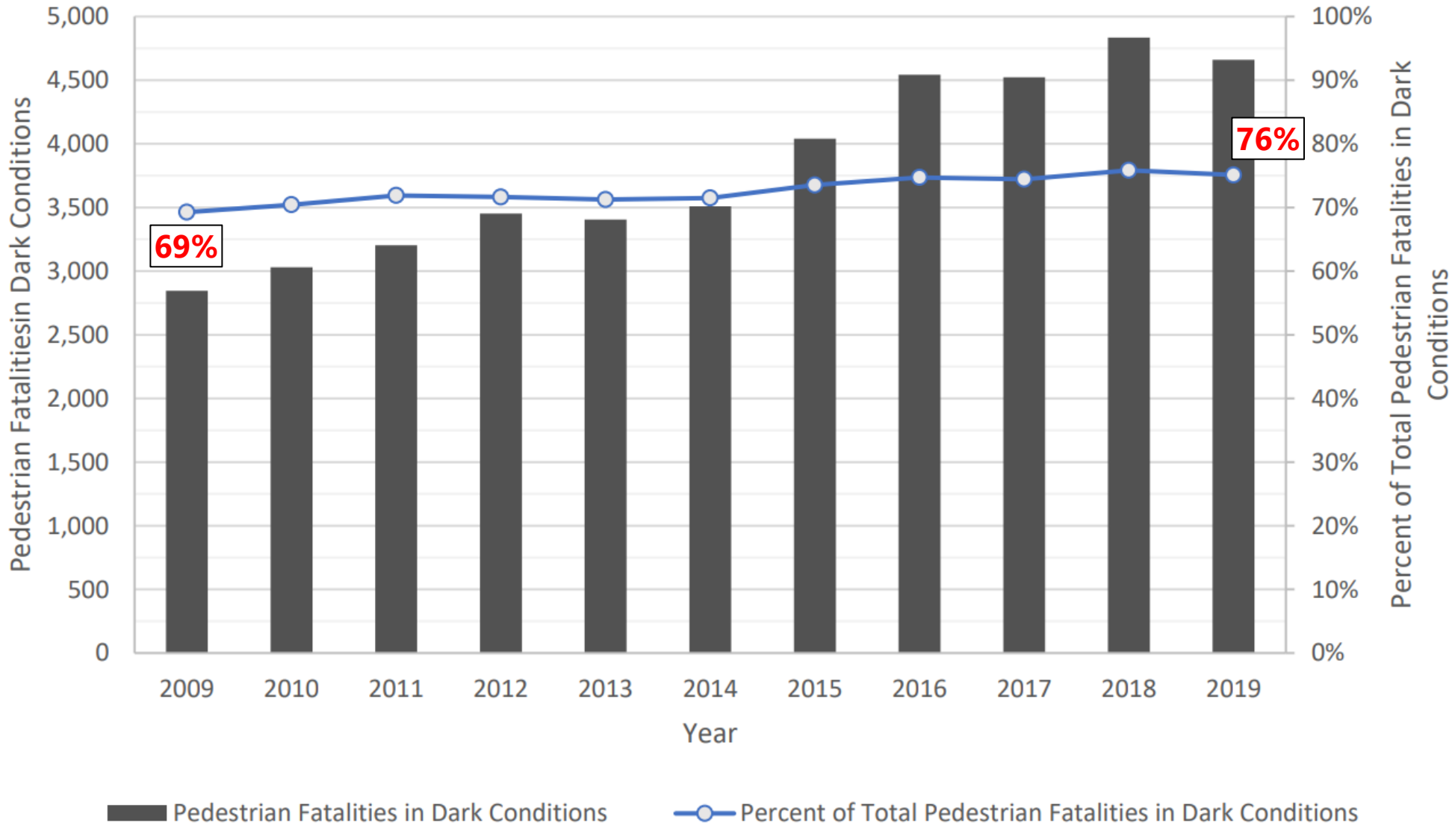
- Resource for practitioners interested in pedestrian lighting design considerations.
  - Safety practitioners interested in an introduction to lighting design
  - Lighting practitioners interested in specific considerations related to pedestrian lighting
- Companion to FHWA research report *Street Lighting for Pedestrian Safety* (2020)
  - Pedestrian lighting recommendations based on research
  - Pedestrian ability to see and detect hazards
  - Visibility of pedestrians to motorists
  - Effects of lighting on pedestrian decision making



Pedestrian Safety and Security

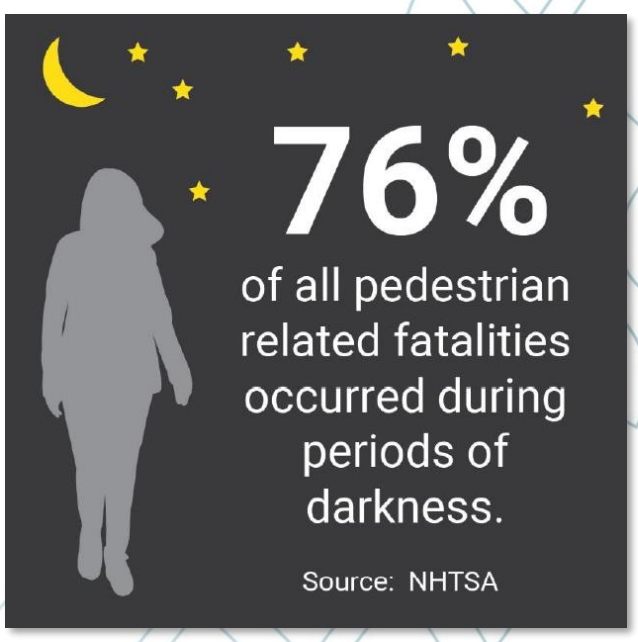


Pedestrian Safety and Security



Pedestrian Safety and Security

- 76% of pedestrian fatalities in 2019 occurred in dark conditions, an increase from 69% in 2009.
  - Fewer vehicles are on the road – around 25% of daily traffic.
  - Minority communities experience a disproportionate burden of pedestrian fatalities in dark conditions
- Dark conditions can also have negative effects on pedestrian security.
  - Reduced visibility and additional blind spots may reduce pedestrians' perceived sense of security.
  - Studies show that darkness constrains pedestrian and transit rider behavior, especially for women.



Safety Benefits of Lighting for Pedestrians

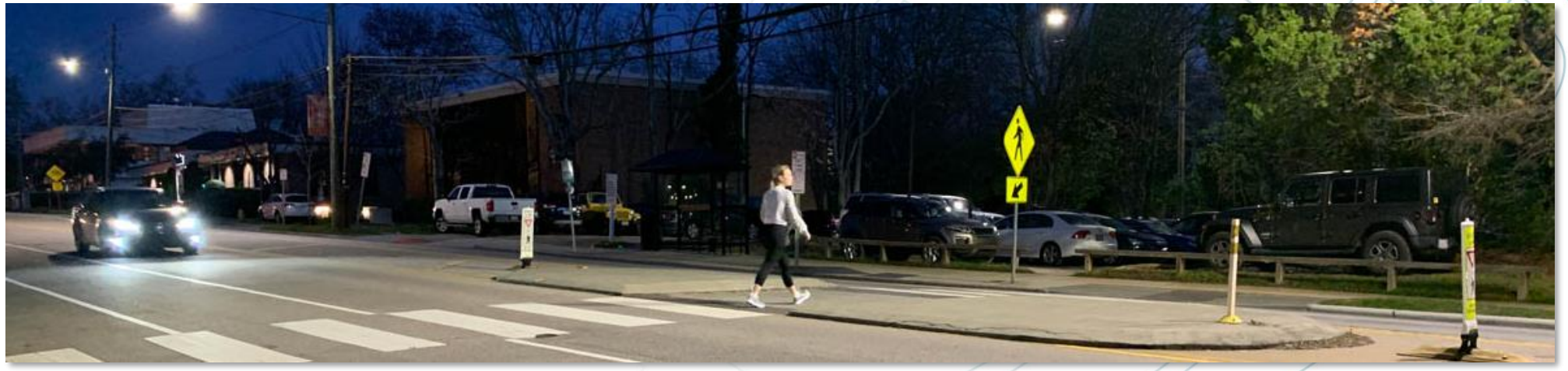
- Research has shown that proper lighting can reduce pedestrian fatal and serious injuries.
  - Several studies have produced CMFs ranging from 0.58 to 0.19
- Pedestrian safety depends not only on lighting presence, but also lighting quality.
  - Study of 32 miles of US-19 in Florida (Zhou & Hsu, 2012).
- School-age children may especially benefit from improved lighting.
  - Child pedestrian injury likelihood more than doubles in dark conditions (Jonah & Engel, 1983).
  - Safe Routes to School

The **Crash Modification Factors (CMF) Clearinghouse** contains several CMFs that quantify **reductions in the number of vehicle/pedestrian crashes** due to the addition of lighting: CMF IDs 435, 436, 440, 441, and 2379.

SafeRoutes

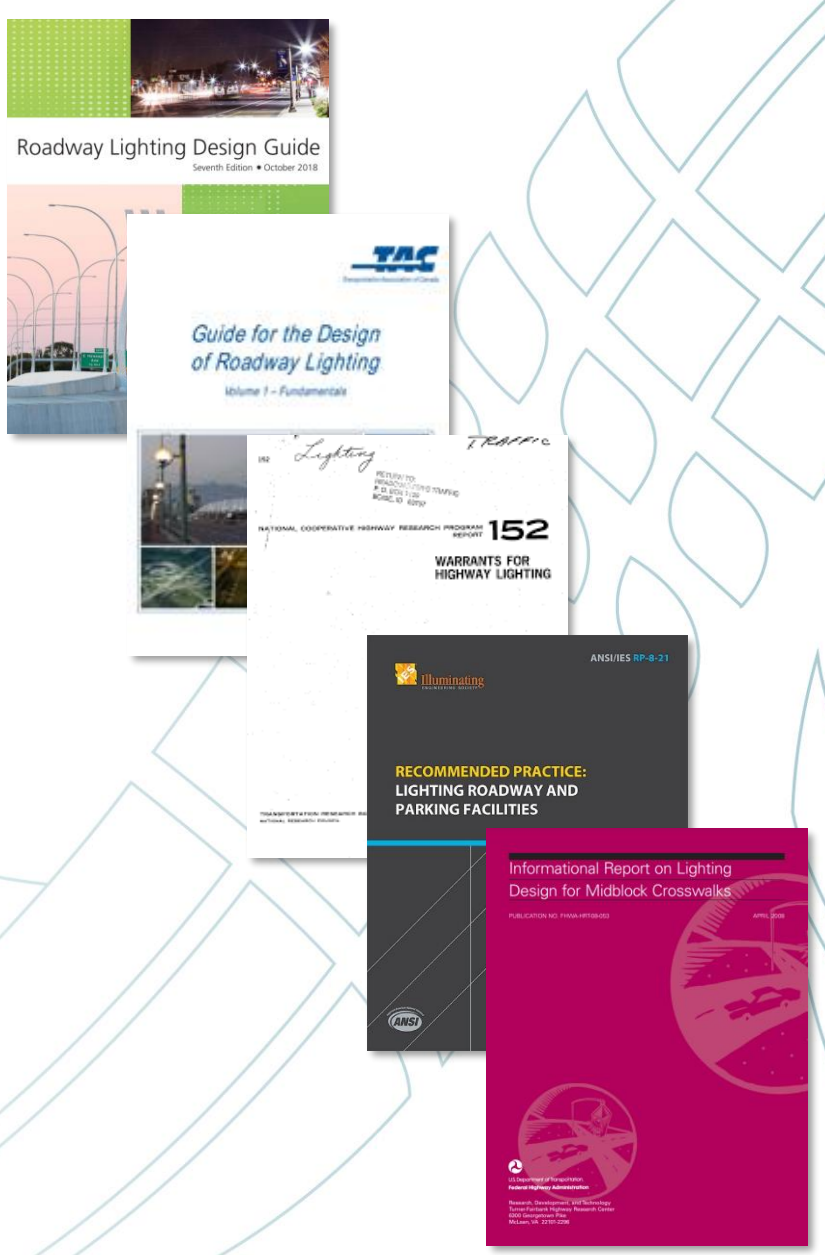
Security Benefits of Lighting for Pedestrians

- Studies show that new or improved lighting increases pedestrians' perception of security.
  - Illuminance levels, type, quality, and distribution of lighting.
- Several studies found that lighting improvements both reduced crime occurrence and increased perceived security.
  - 23%-41% reduction in outdoor nighttime crime.
  - 90% of respondents reported a decrease in fear of crime.



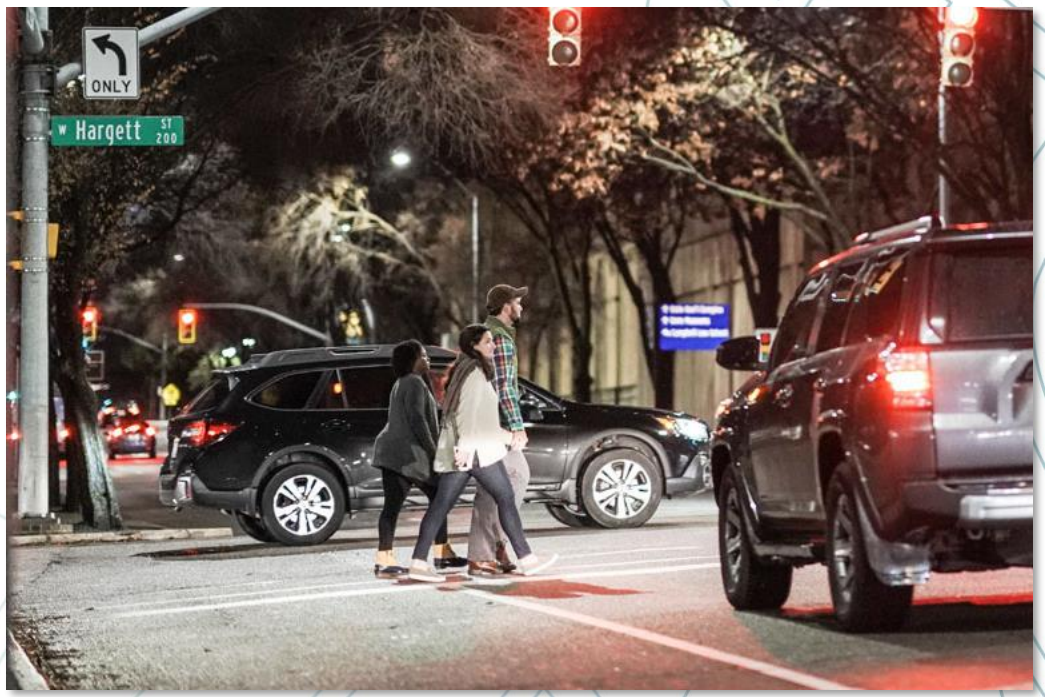
Existing Guidance

- Several established documents provide general information on lighting design:
  - AASHTO *Roadway Lighting Design Guide*
  - Transportation Association of Canada (TAC) *Guide for the Design of Roadway Lighting*
  - NCHRP Report 152: *Warrants for Highway Lighting*
  - Illuminating Engineering Society (IES) IES RP-8-21 *Recommended Practice: Lighting Roadway and Parking Facility*
  - FHWA *Informational Report on Lighting Design for Midblock Crosswalks*



Remaining Gaps

- Visibility of children by motorists in low-light conditions.
- Differences in light requirements between adult and child pedestrians to maintain visual performance.
- Recommended light levels for optimal visibility for both pedestrians and drivers.
  - Sidewalks
  - Roadway segments without crosswalks
  - Separated pedestrian facilities
- Universal metrics for pedestrian lighting
- Effects of different lighting sources and luminaire types on pedestrian visibility

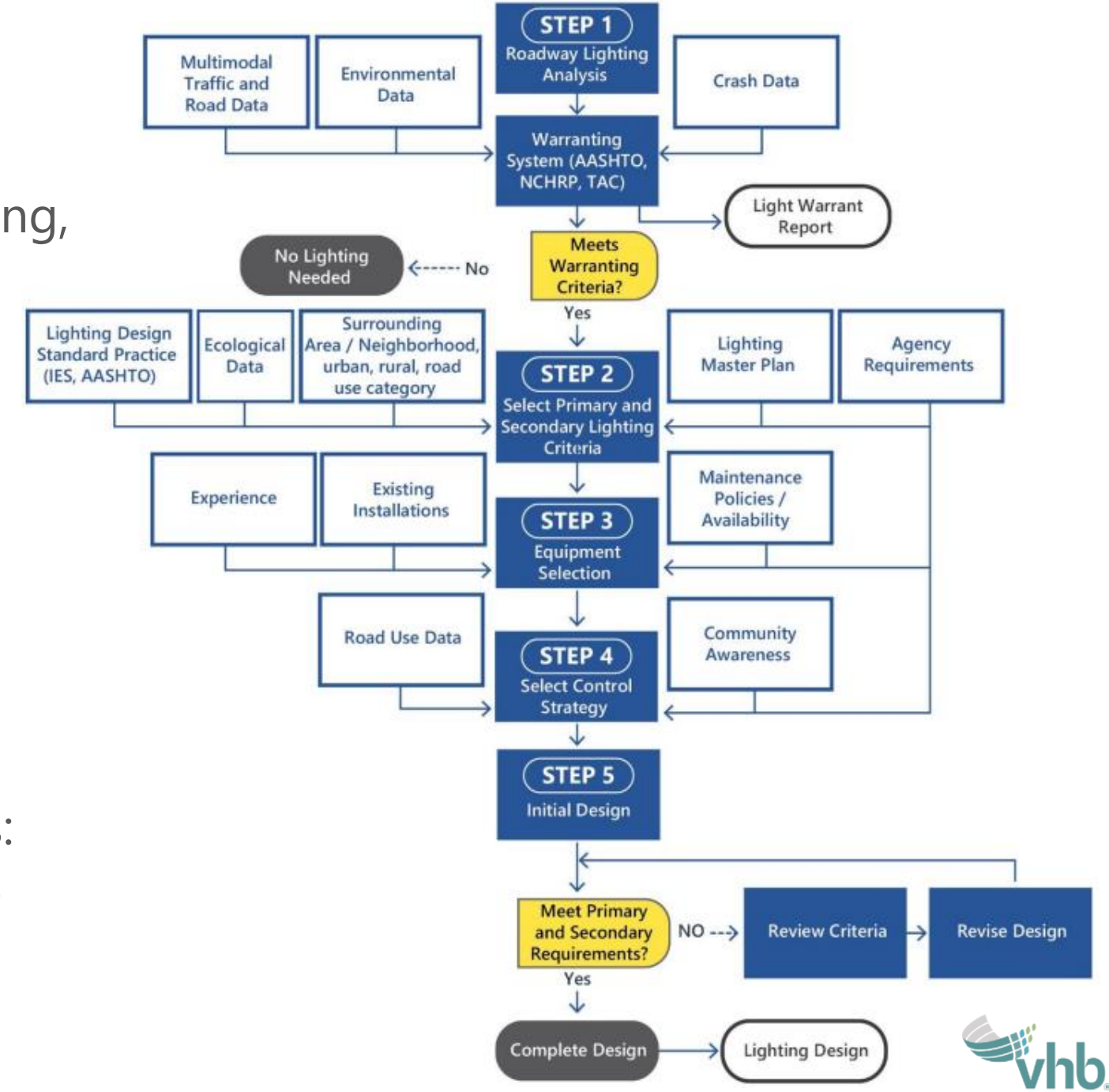


Design Process for Pedestrian Lighting

vhb®

Lighting Design Process

- Simplified procedures for warranting, decision making, and designing a lighting system
- Five main steps
  1. Assessment of Needs
  2. Design Criteria Selection
  3. Equipment Selection
  4. Controls Selection
  5. Design and Verification
- For each step, the Primer provides:
  - General lighting context and guidance
  - Pedestrian-specific considerations



Assessment of Needs

- Well-established warrants for most roadway lighting
  - AASHTO, IES, NCHRP
- What about pedestrian lighting systems?
  - Varies widely by agency and region
  - Engage public in an equitable way
  - Often case-by-case… selection of factors from 2021 STEP Scan Tour

Factors identified by a STEP Pedestrian Lighting Scan Tour for assessing pedestrian lighting needs.

Group 1 Most common Factors	Group 2 Less Common Factors	Group 3 Other Factors
Average daily traffic (ADT) volumes	Available sight distance	Ambient lighting levels
Functional classification	Benefit-cost analysis	Frequency of inclement weather
Nearby development, land use, or density	Channelization devices (curb, guardrail, etc.)	Presence of parking
Night-to-day crash ratio*	Intersection layout complexity	Retroreflective pavement markings (reduced need for lighting)
Night or pedestrian crash history	Presence of multiple turn lanes	Anticipated crossing locations for children (e.g., schools , parks, recreation centers)
Ped/bike presence and crossing maneuvers (any – with or without marked crossings)	Speed limit (often 35+ or 45+ mph)	Speeding history (10+ mph over posted)
Ped/bike volume during hours of darkness (often 100+/hr)	Vertical and horizontal curvature	Turning movement volumes
-	-	Wide or depressed medians

Note: * Night-to-day crash ratio = number of crashes at night / number of crashes during day.

Selection of Design Criteria

The Primer explores two categories of design criteria:

- **Primary criteria (target light levels)**
  - Desired luminance, illuminance, etc.
  - Calculated in photometric design software
- **Secondary criteria (aesthetics and comfort)**
  - Characteristics of lighting system
  - Glare, color temperature, unwanted excess light
  - Considered in equipment and controls selection
- Practitioners typically refer to publications by IES and AASHTO for general roadway lighting

Primary Design Criteria

- **Luminance –** perceived brightness of a surface, *cd/m²*
- **Illuminance –** amount of light striking a surface, *lux (lx)* or *footcandle (fc)*

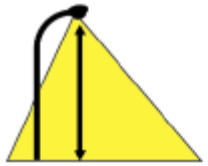
Selection of Design Criteria

- Pedestrian-specific recommendations in the Primer pull from additional FHWA resources:
  - *Informational Report on Lighting Design for Midblock Crosswalks*, 2008
  - *Research Report: Street Lighting for Pedestrian Safety*, 2020
- **Supplemental** design criteria recommendations for ped facilities:

Pedestrian facility characteristics		Light Source Characteristics			
		Average Illuminance	Average Luminance		CCT (LED only)
			Rural	Urban	
Intersection crosswalk		30 lux vertical	*	*	3000 K to 4000 K
Midblock crosswalk		20 lux vertical	*	*	3000 K to 4000 K
Facility adjacent to roadway	Low[2] to Medium[3] Pedestrian Activity	2 lux vertical	*	1 cd/m^2	3000 K to 4000 K
	High[4] Pedestrian Activity and/or School Zones	10 lux SC	1 cd/m^2	2 cd/m^2	3000 K to 4000 K

*Use minimum maintained average pavement luminance criteria from RP-8-18.

Equipment Selection



Luminaire mounting height

BUG Rating

Luminaire wattage

IES light distribution

Correlated color temperature (CCT)

Aesthetics

- The Primer provides definitions and general considerations for each of these components of equipment selection.
- Pedestrian-specific recommendations explore the impacts of mounting height (often 20 ft or less, “Ped Scale”) and IES distribution type.

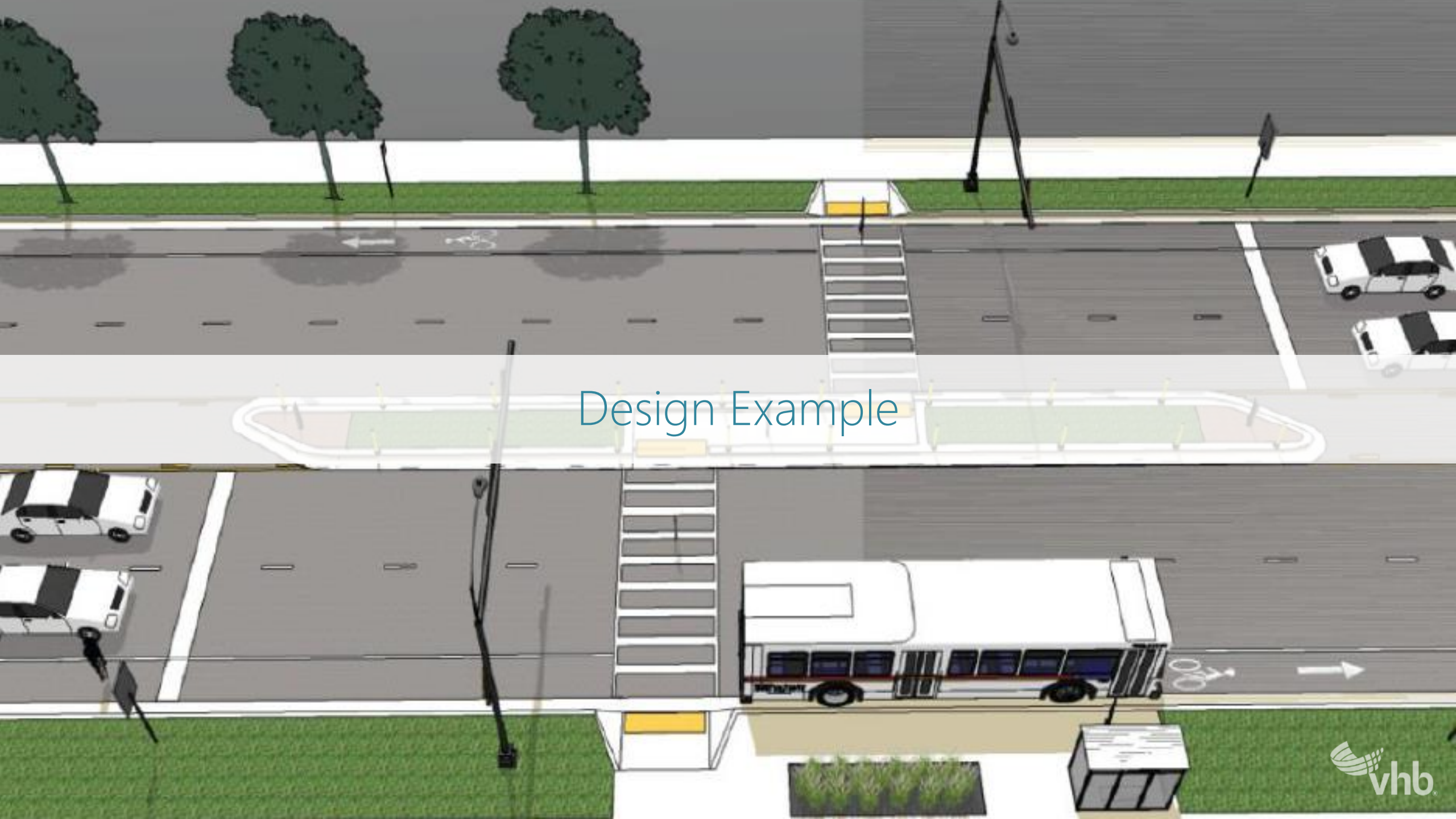
Determination of Control Strategy

- **Lighting controls** are hardware and software that adjust power and light output.
- The Primer explores potential use of alternative control strategies, including adaptive lighting.

Design and Verification

- The final step of the lighting design process.
- Practitioners use a software model to determine the physical arrangement of luminaires that meet design criteria and equipment selections.
- Focus on location of light poles

Photograph. Examples of negative and positive contrast.
Source: FHWA



Design Example

Design Example

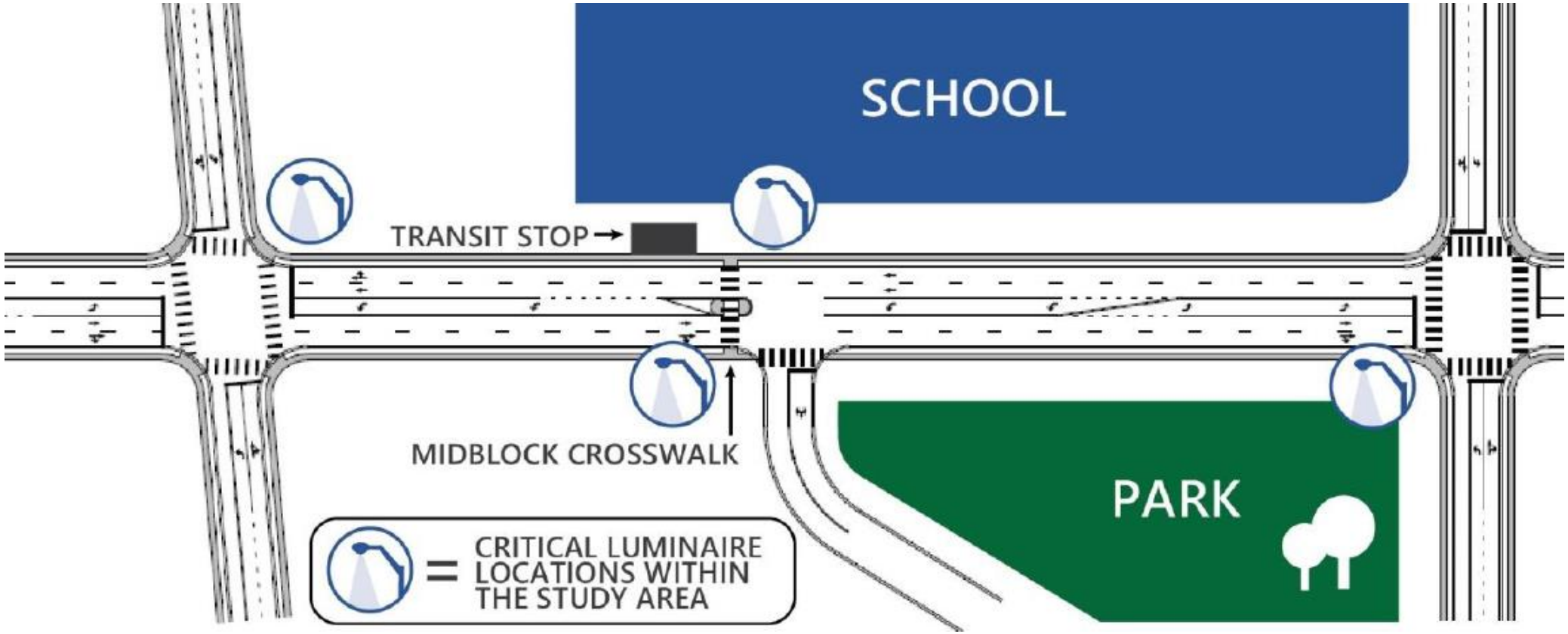
- Urban five-lane arterial
- Midblock crosswalk connecting a park and a school, at a transit stop

The Primer walks through each step of the lighting design process:

1. Assessment of Needs
2. Design Criteria Selection
3. Equipment Selection
4. Controls Selection
5. Design and Verification

Design Example

- Identify critical luminaire locations – lighting for positive contrast within constraints of the facility



Design Example

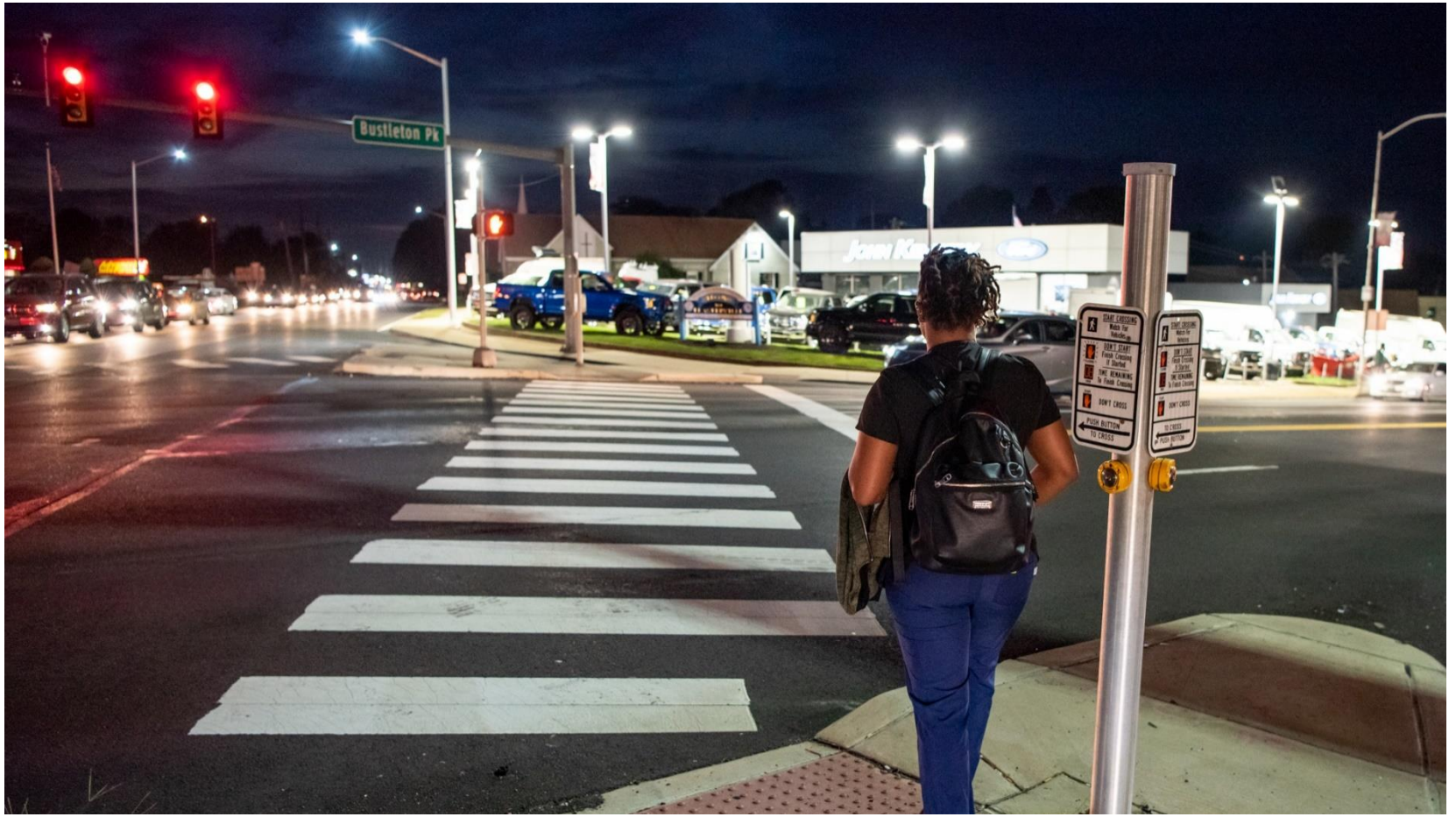
- Develop a layout that meets selected design criteria.
- Lighting design is often an **iterative process**. Test a layout, identify problem areas, adjust, recalculate…

Calculation Zone	Calculation Type	Units	Target Criteria	Calculation Results
			Average	Average
Midblock Crosswalk	Vertical Illuminance	Lux	20	25.19
Intersection Crossing (West)	**Vertical Illuminance**	**Lux**	**30**	**25.46**
Intersection Crossing (East)	**Vertical Illuminance**	**Lux**	**30**	**24.10**
Sidewalk (North)	SC Illuminance	Lux	10	10.09
Sidewalk (South)	SC Illuminance	Lux	10	10.21
Roadway (Westbound)	Luminance	Cd/m^2	2.0	2.53
Roadway (Eastbound)	Luminance	Cd/m^2	2.0	2.54

Note: Additional lighting design criteria recommended in IES *RP-8-18* should be evaluated and considered for uniformity and glare.

Michael Dunn, PE | mdunn@vhb.com | 919.741.5357

Matthew Stygles, PE | mstygles@vhb.com | 984.960.5103



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Offices located throughout the east coast

FATAL PEDESTRIAN CRASH REPORT – PORTLAND, 2017-2019

PEDESTRIAN SAFETY IN DARKNESS

FEDERAL HIGHWAY ADMINISTRATION WEBINAR – DECEMBER 20, 2022

OREGON WALKS

- Lighting as infrastructure
- Lighting as equity
- Lighting is not enough

“They are on some electronic device that apparently is more important than whether or not they survive crossing the street. To me, I’ve noticed that is a huge issue.”

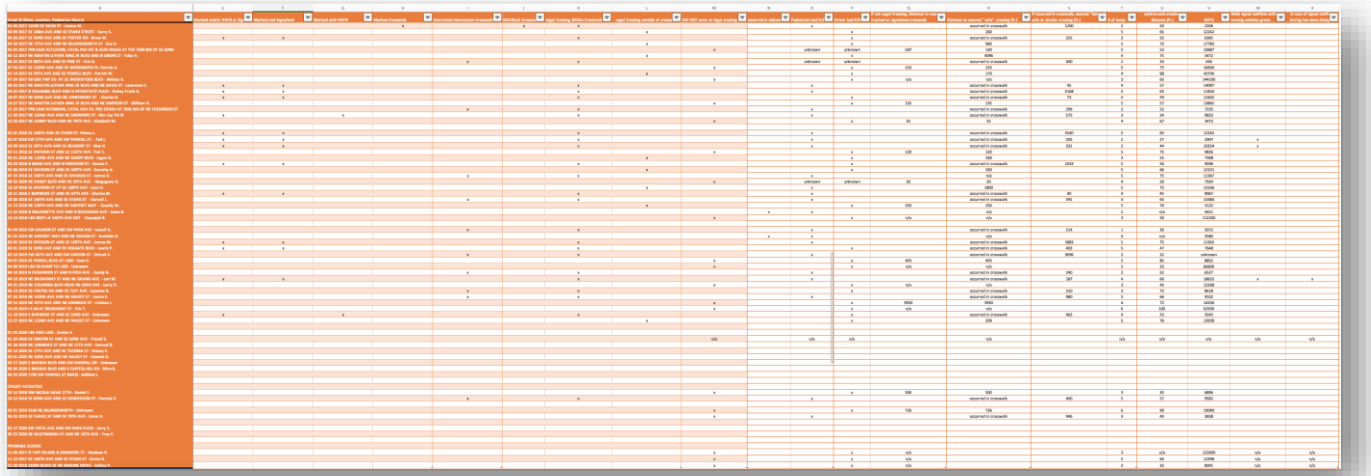
- Portland City Commissioner, 2019

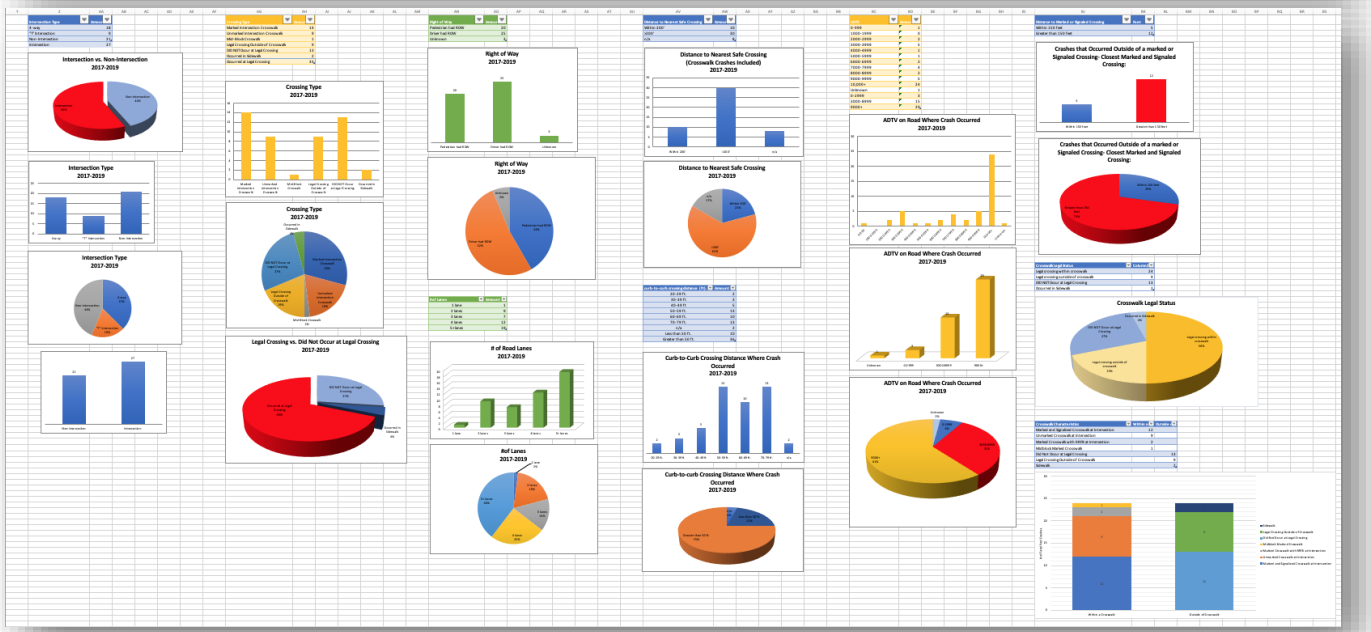
WHAT WE LOOKED AT

- Police Reports
- Google Streetviews
- Traffic Count and Speed Data
- Safety Plan Classifications ArcGIS
- Speed Zone Orders
- Vehicle Information
- Equity Matrix
- Laws and Ordinances
- News Reports
- Research Publications

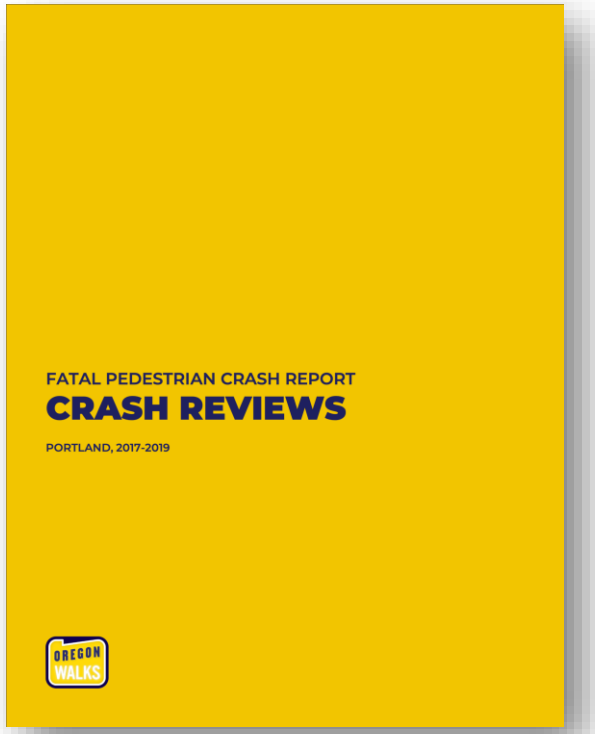
EXCEL DATA SHEET

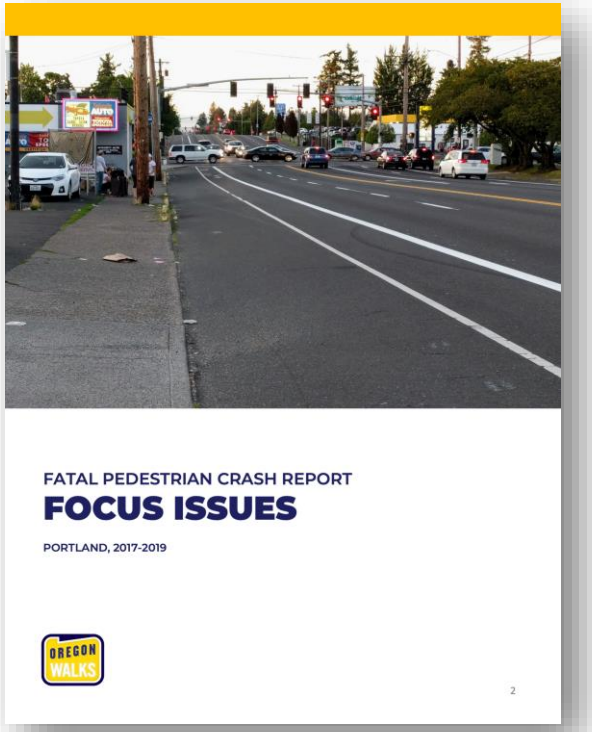
Crash Location
Driver Characteristics
Pedestrian Characteristics
Road Functional Classification
PBOT Equity Matrix
Intersection + Crosswalk + ROW
Speed
Sightline
Impairment
PBOT Safety Plans
Lighting
Vehicle Data
Intoxicants
Distraction
Driver Legal Consequences
Police News Release/Media Survey





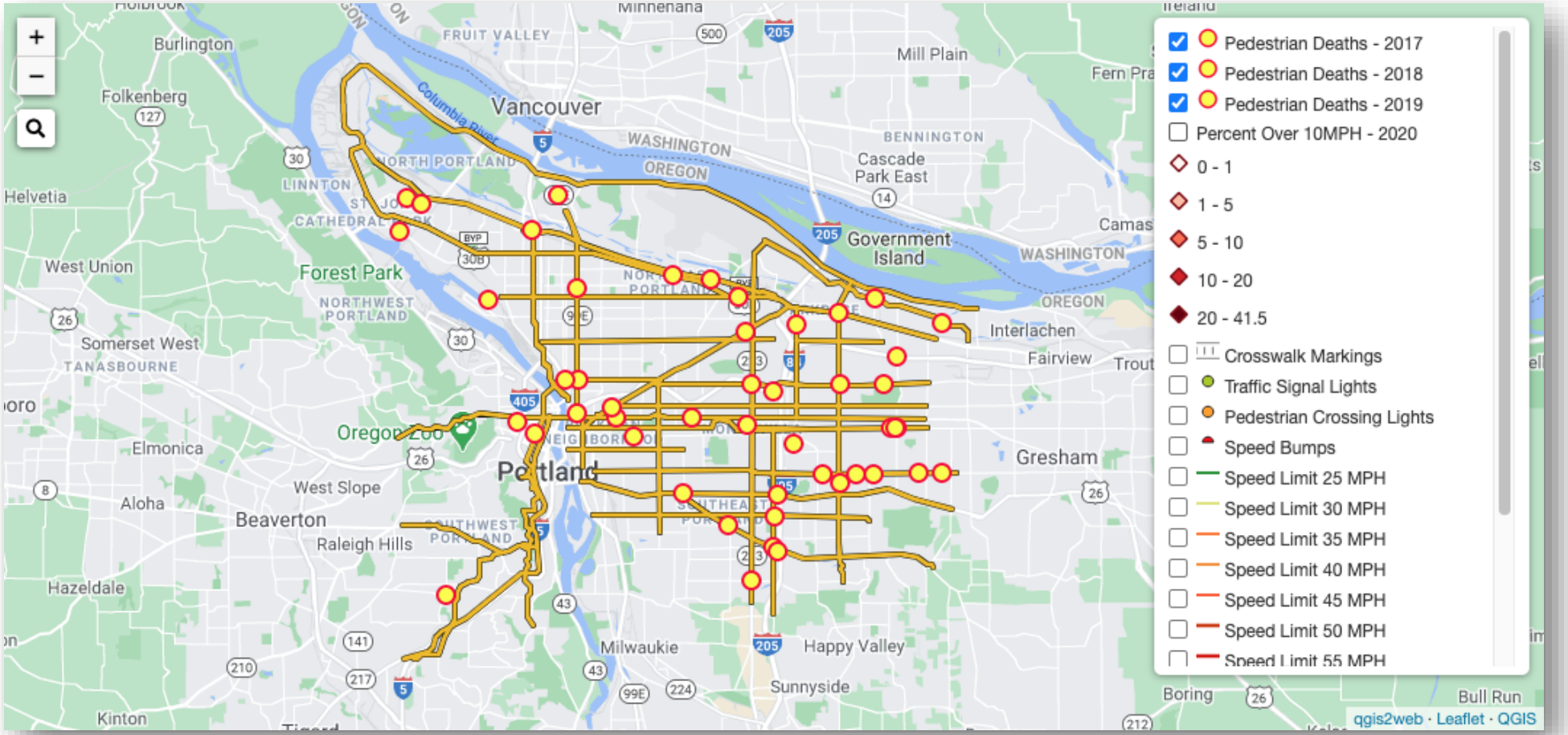
FULL REPORT





https://oregonwalks.org/fatal-pedestrian-crash-report/

INTERACTIVE CRASH MAP



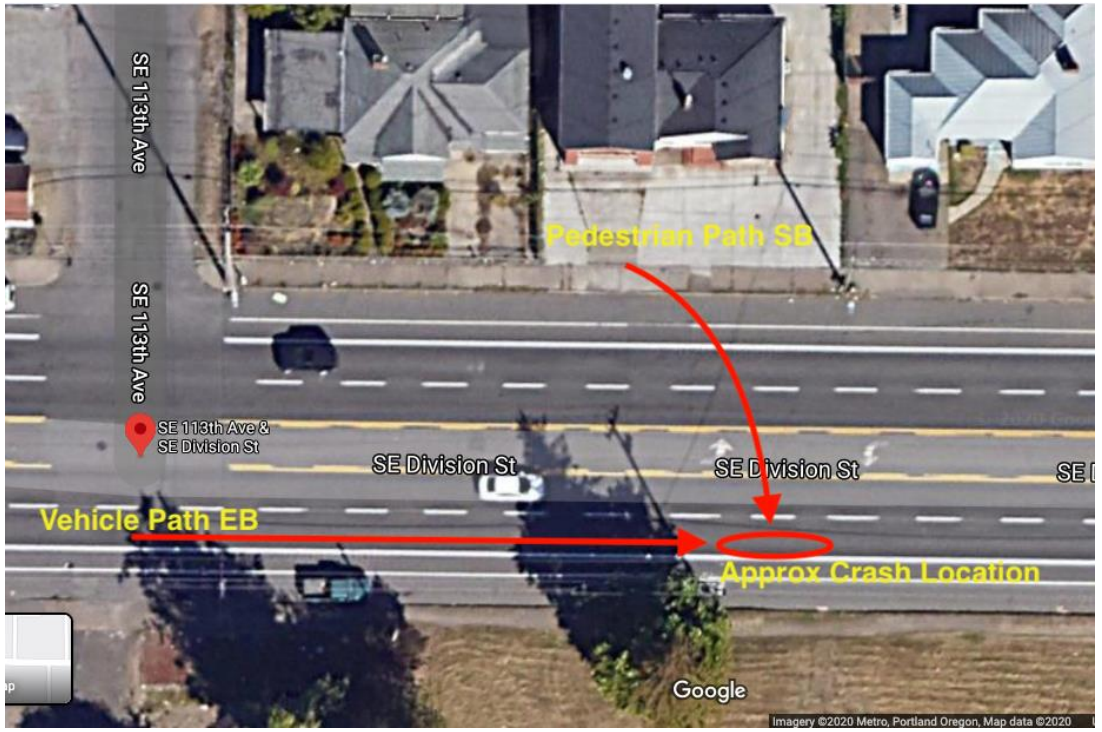
https://oregonwalks.org/fatal-pedestrian-crash-report/

SE DIVISION ST NEAR SE 113th AVE
03/11/2018

The crash location is mid-block on SE Division St. just east of the T-intersection at SE 113th Ave. The road is 5 lanes wide (2 EB, 2 WB, center median) with bike lanes, on-street parking and sidewalks on both sides. The speed limit is 30 mph. There are no streetlights on the south side of the road where there is a vacant field. The crash occurred at night.

Mr. Fuk Chan was crossing from the Chinese Community Center on the north of the road from a point within 150' of an unmarked crossing at 113t Ave in a slightly SE direction. He had a mobility disability and walked at a slow pace without the aid of a cane or walker.

The person driving was heading EB in the #2 outside lane where he hit and killed the person walking. Due to a slow walking pace, police determined that the person walking was in the roadway and within view of the person driving for approx. 25 seconds before the collision.



SE DIVISION ST NEAR SE 113th AVE
03/11/2018

Driver Perspective

Pedestrian Perspective

SE DIVISION ST NEAR SE 113th AVE
03/11/2018

Lack of Traffic Calming

77.8% of drivers exceed the posted speed limit of 30 mph with 766 drivers daily exceeding 40 mph. There are 1756’ between signals at 112th and 119th Avenues. Though the speed limit has been lowered from 35 to 30 mph since the crash, more needs to be done to lower driver speeds on this corridor.

Possible Inadequate Lighting

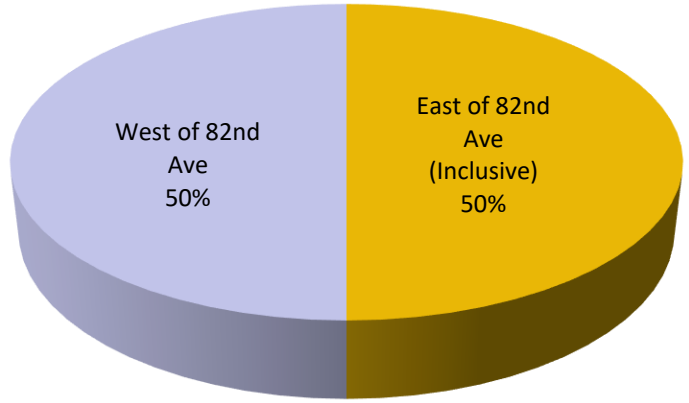
LED streetlights are located only on the north side of road. This crash occurred on south side of road where there are no lights. While the corridor is part of the PBOT Safety Action Plan for SE Division Street running through 2025, this specific site is not included for lighting upgrades. Ensure lighting is sufficient according to current PBOT Appendix K guidelines. 1.0 Average Maintained fc, 3 Uniformity Ratio.

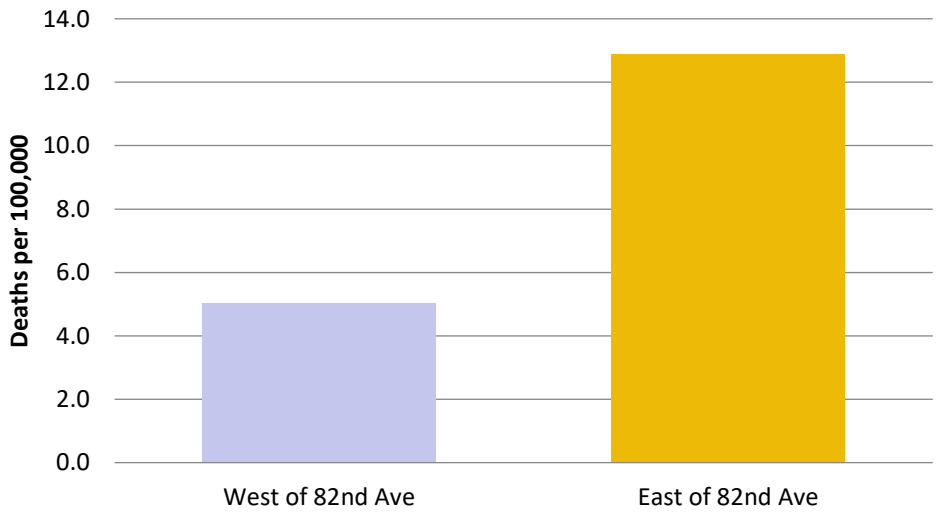
Oregon Walks Findings

West vs. East Portland (82nd Ave. Border)

A disproportionately large number of fatal pedestrian crashes occurred in East Portland, defined as the area of Portland east of 82nd Avenue (inclusive). According to the 2010 census and PBOT's East Side in Motion plan, East Portland contains 28% of city population, yet was the location of 50% of pedestrian crash fatalities.

The death rate for pedestrian crashes is much higher east of 82nd Ave. There were 12.9 pedestrian fatalities per 100,000 in East Portland as compared to 5 per 100,000 in West Portland.

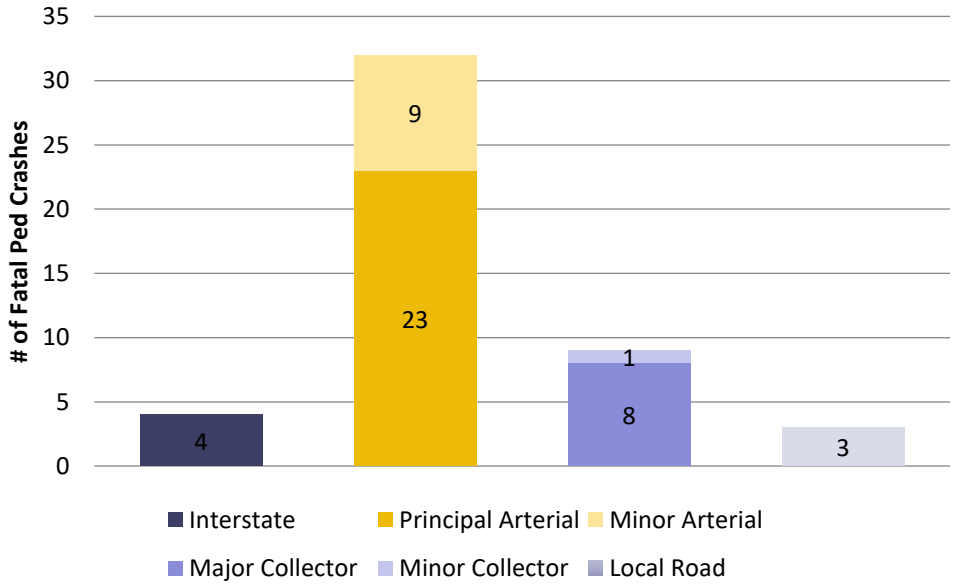


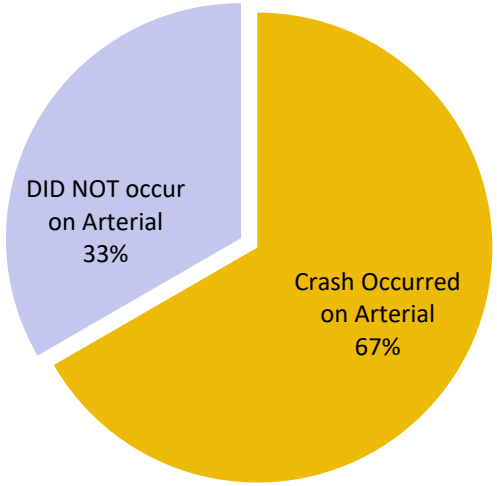


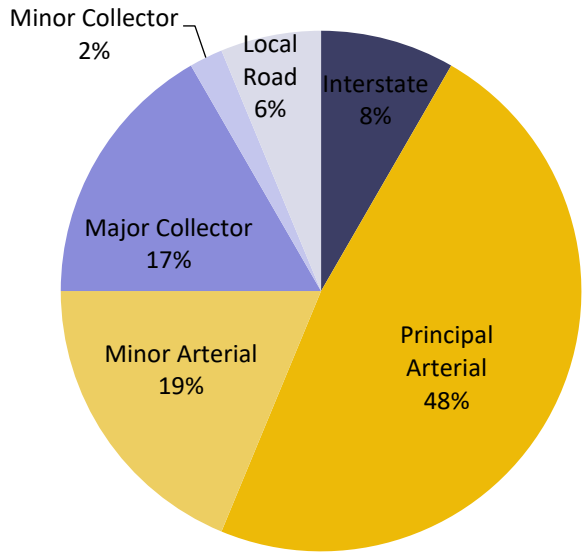
Road Federal Functional Classification

A majority of fatal pedestrian crashes occurred on Arterials (67%).

Principal Arterials accounted for 48% of crashes while Minor Arterials accounted for 19%.



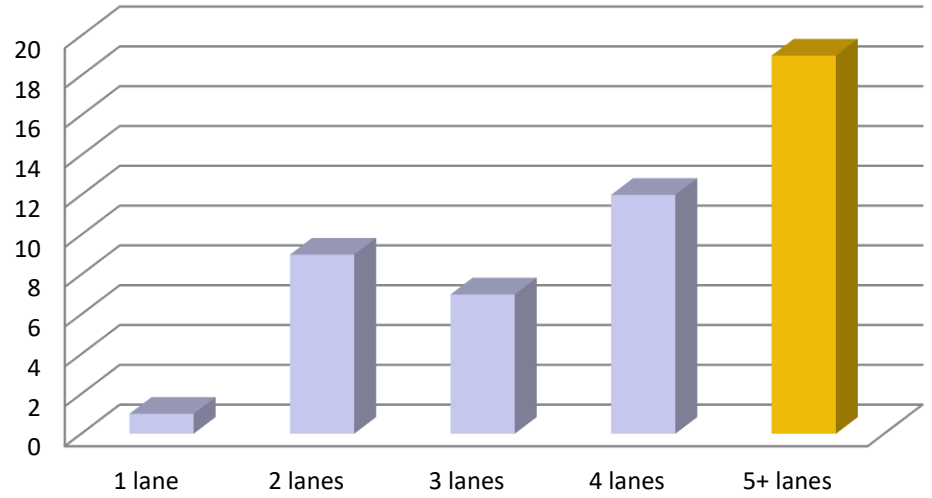


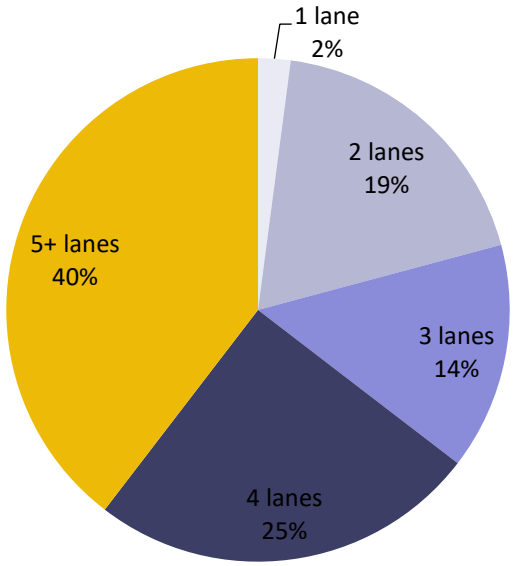


Number of Lanes

The most crashes (40%) occurred on 5 lane roads.

Data suggests that as the number of lanes increases, the likelihood of a crash increases.



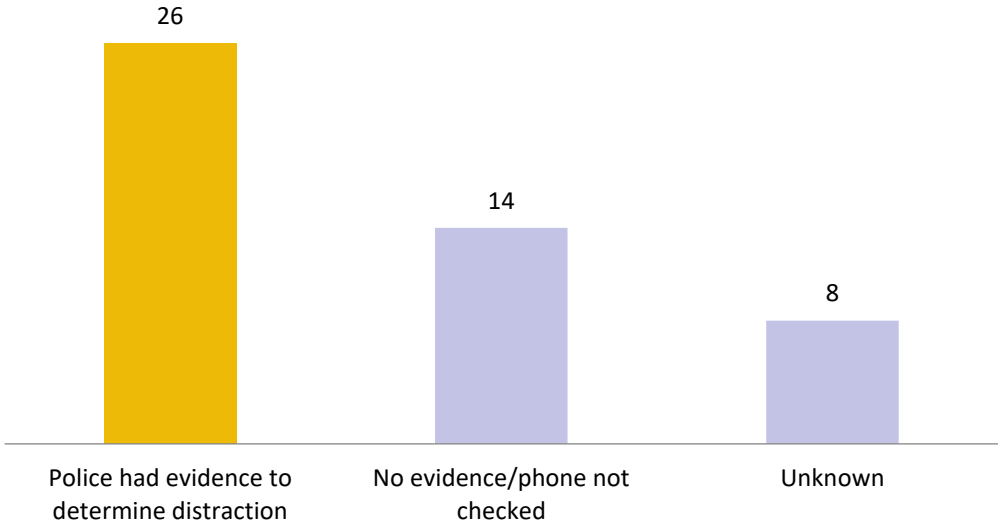


Distraction

Major Crash Team investigators attempt to determine whether electronic distraction was involved for the driver or pedestrian in most crashes.

Cell phones or other electronic distraction of driver or pedestrian were determined not to be a factor in any of the 26 fatal crashes ins which police had evidence from which to make a determination (e.g., review of phone data, witness interview, location of phone recovered at scene, etc).

In the case of 14 drivers (29% of those available), there is no note in the police report confirming that officers checked cell phone data or made an assessment of distraction.



Lighting Review

On-street Google Maps and police reports used to determine:

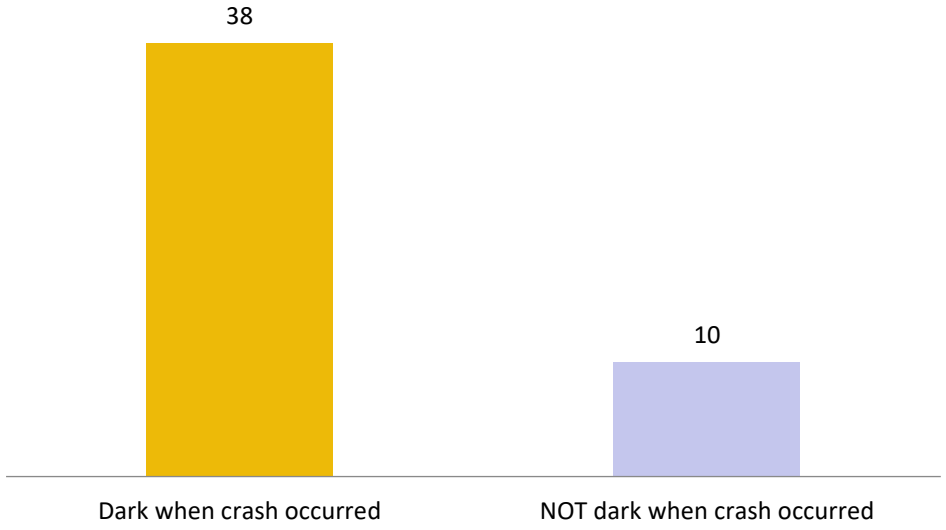
- **lack-of or non-functioning lighting**
- **long distance between streetlights**
- **streetlights on only one side of the road**
- **roadside lighting clutter**
- **streetlight obstruction**

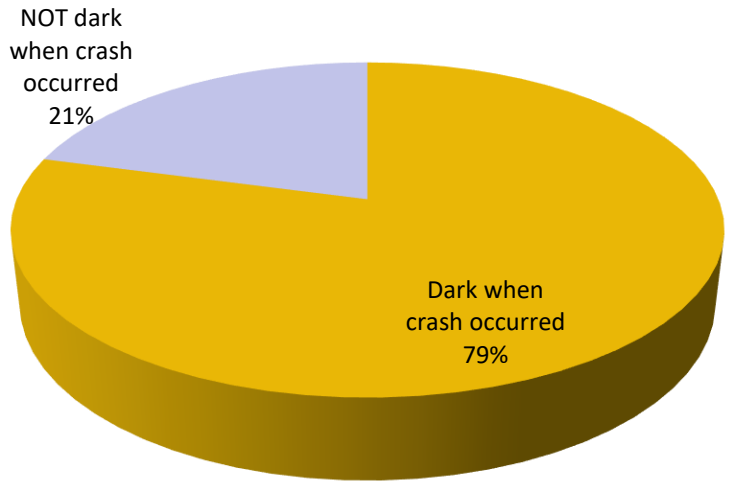
- **Whether Lighting has been added since crash**
- **Whether “Not Lighted” checked or darkness mentioned as contributing factor to crash**
- **Whether “No Contrast w/background” or “clothing not visible” box checked for Pedestrian description**

Darkness

A majority of crashes (79%) occurred when it was dark.

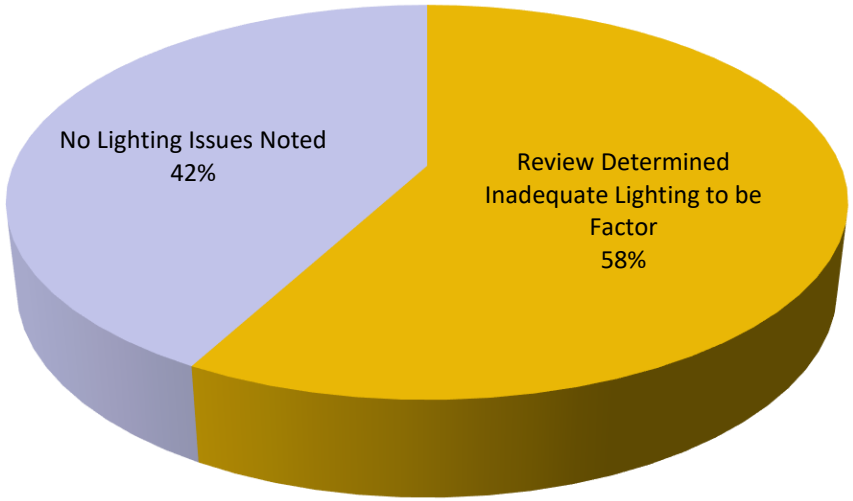
The police report box for “dark-not lighted” crash location description was checked for only 3 crashes (6%).





Location Issues

Taking into account a Google Maps analysis of streetlight location, separation distance, and type (HPS vs. LED) as well as PBOT lighting guidelines for recommended foot-candle measurements (Appendix K) at the 38 locations where crashes occurred in darkness, inadequate, obstructed, or inoperative lighting was determined to be a possible crash factor at 58% of crash locations. (Subject to on-site measurement verification).



Updates

At the time of the report release in 2021:

- Lighting had been upgraded at 2 sites since a fatal crash occurred
- 21 locations still had unresolved possible lighting issues

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03/11/2018

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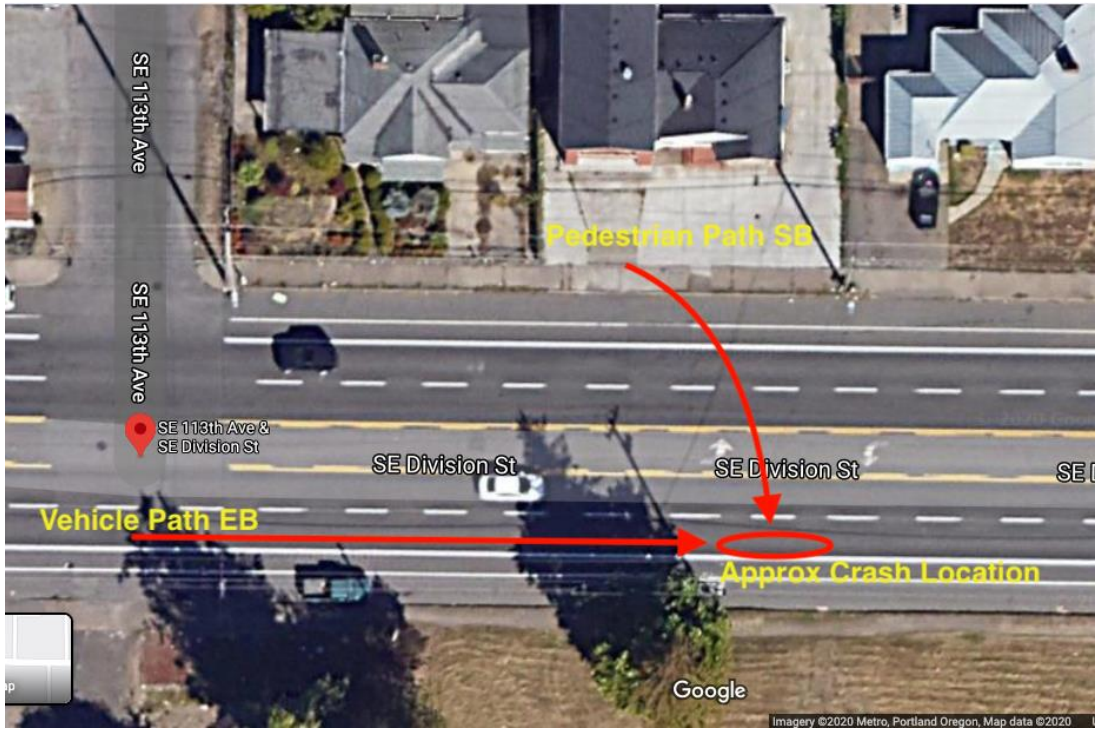



11312 SE Division St
Portland, Oregon
Google
Street View - Jul 2016
SE Division St
Google
Image capture: Jul 2016 © 2022 Google United States Terms Privacy Report a problem

2016


11298 SE Division St
Portland, Oregon
Google
Street View - Feb 2022
SE Division
Google
Image capture: Feb 2022 © 2022 Google United States Terms Privacy Report a problem

2022

Equity

Appendix D:
“Walking While Black” Report

• PBOT hosted two focus groups to more intentionally elevate the voice of BlackPortlanders in PedPDX.

• **Poor Lighting was listed as the primary concern for Black communities.**

• Inadequate street lighting was both infrastructure concern and a personal safety and security concern.

Places to Improve - Average Point Value (from 1-6)

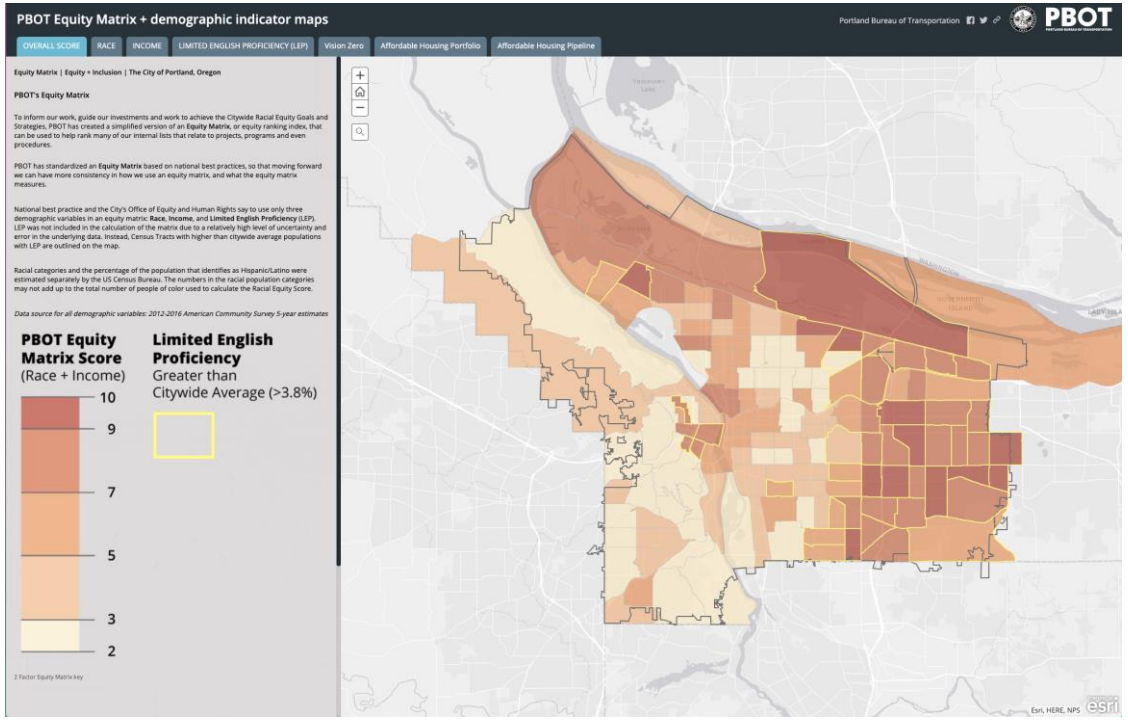
WHAT MAKES WALKING DIFFICULT IN PORTLAND?	WALKING WHILE BLACK	CITYWIDE
Poor Lighting	5.00	3.62
Sidewalks / walking paths missing on BUSY streets	4.94	4.66
People driving too fast on BUSY streets	4.82	4.29
Not enough safe places to cross busy streets	4.78	4.46
People driving too fast on RESIDENTIAL streets	4.74	4.44
Sidewalks / walking paths missing on RESIDENTIAL streets	4.71	4.29
Drivers not stopping for pedestrians crossing the street	4.47	4.29
Buckled / cracked / uplifted sidewalks, or other tripping hazards	4.47	3.46
Missing curb ramps at intersections	4.00	3.22
Not enough time to cross the streets	3.91	3.08

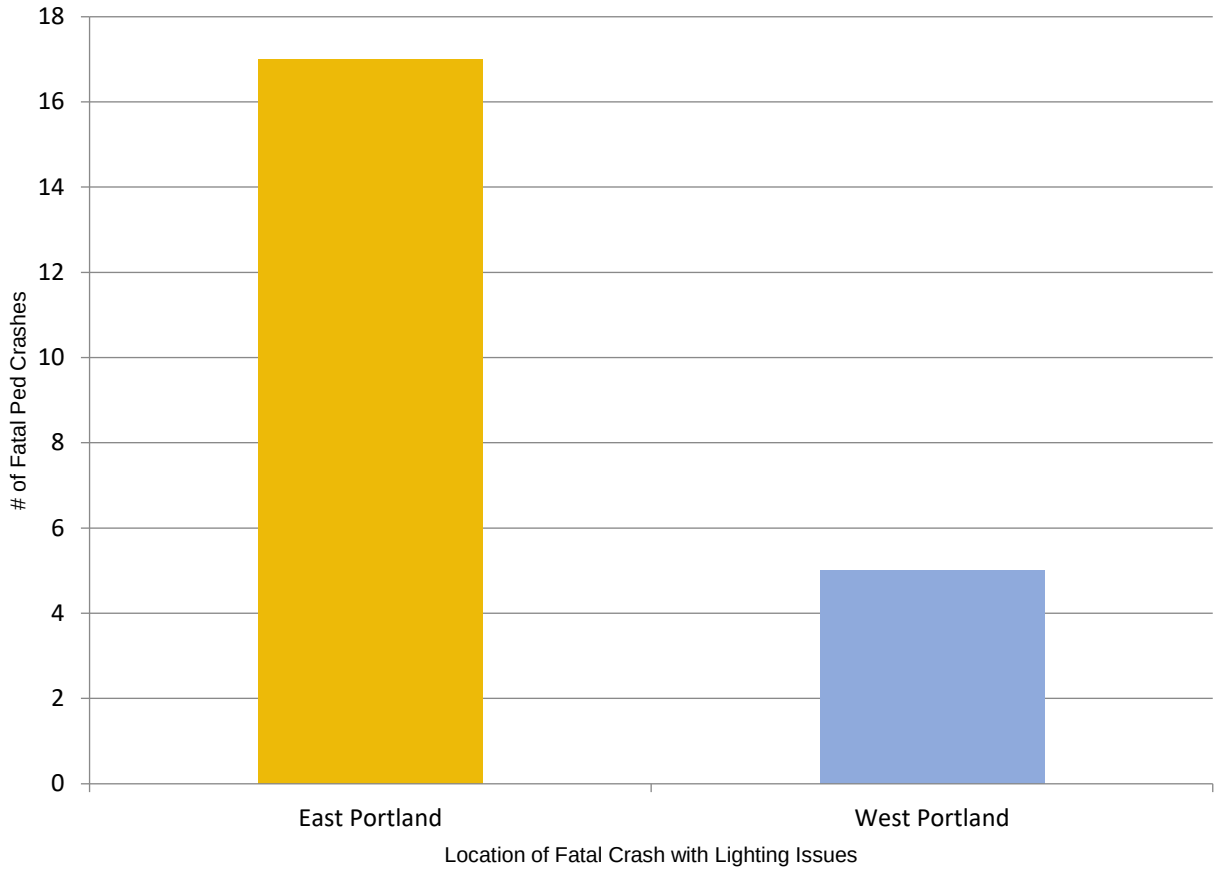
Figure 1. Which kinds of places are the most important to improve for walking in Portland?

PBOT Equity Matrix

Data Available:

- Race Data for Crash Location
- Income Data for Crash Location
- Overall Equity Matrix Score





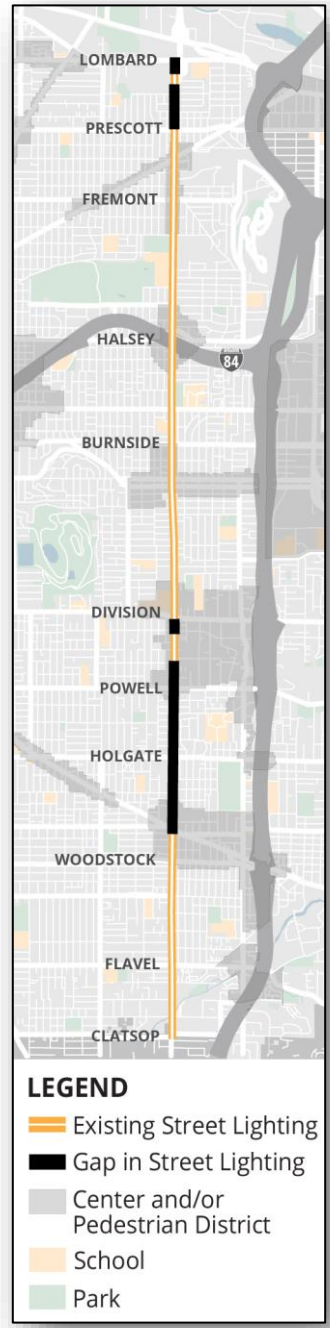
A majority (17 out of 22 or 77%) of fatal pedestrian crash locations with lighting issues were located in East Portland (east of 82nd Ave.) with all located east of the Willamette River.

8 out of 8 pedestrian fatalities in which the person killed was identified as Black occurred when it was dark.

At 7 out of 8 of those crash locations, lighting issues were determined to be a factor.

82nd Avenue


OR-213

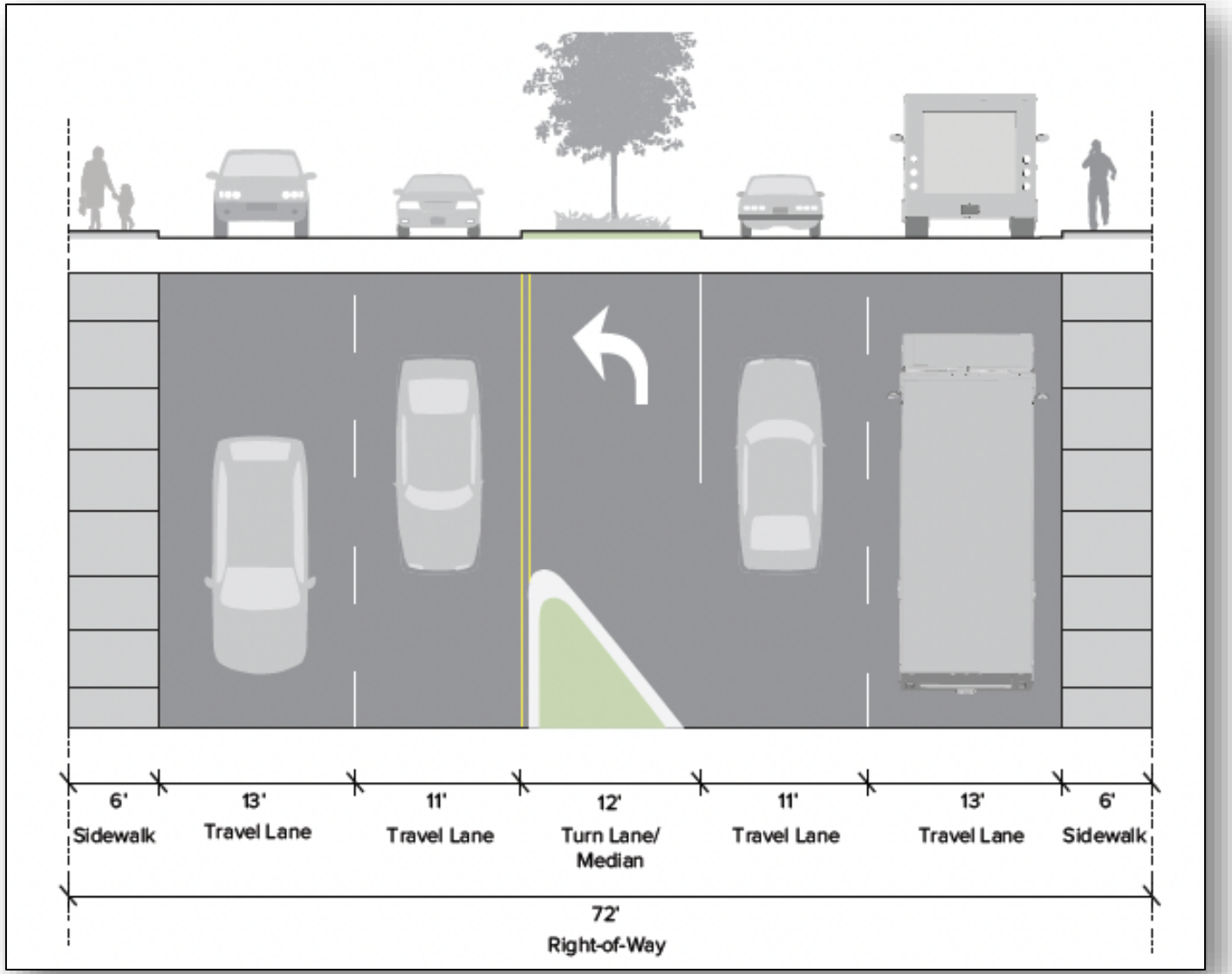

LOMBARD
PRESCOTT
FREMONT
HALSEY
84
BURNSIDE
DIVISION
POWELL
HOLGATE
WOODSTOCK
FLAVEL
CLATSOP
LEGEND
Existing Street Lighting
Gap in Street Lighting
Center and/or Pedestrian District
School
Park


161 NE 82nd Ave
Portland, Oregon
Google
Street View - Mar 2022
dy's
CROSSWALK CLOSED
CROSSWALK CLOSED
Vestal Elementary
OR-213
MONTAVILLA
NE 80th Ave
NE 82nd Ave
NE 84th Ave
213
Google
Image capture: Mar 2022 © 2022 Google United States Terms Privacy Report a problem

LEGEND

Crossings Planned for Construction in:

- 2022 – 2023
- 2023 – 2024
- 2025 – 2026
- Existing Signal/Beacon
- Center and/or Pedestrian District
- School
- Park


6'
Sidewalk
13'
Travel Lane
11'
Travel Lane
12'
Turn Lane/
Median
11'
Travel Lane
13'
Travel Lane
6'
Sidewalk
72'
Right-of-Way

Lighting is not enough

Questions and Discussion

Thanks for joining!

- Be on the lookout for an email with:
  - An evaluation survey
  - Meeting materials (with contact information)