ITS WASHINGTON
2022 ANNUAL CONFERENCE & EXHIBITION

CONNECTED COMMUNITIES & CONNECTED INFRASTRUCTURE

DEC 13-14 2022

GREATER TACOMA CONVENTION CENTER • TACOMA WA

How to create a more balanced, safer, and more sustainable transportation system in Washington State

Agenda

10:00 am	**Welcome** (Lisa Ballard, ITS Washington President)
10:15 am	**Creating a more balanced, safer, and more sustainable transportation system** (Dan Burden, Director of Innovation and Inspiration, Blue Zones)
10:35 am	**Safe System Approach** (John Milton, Director, WSDOT's Safety and Transportation Systems Analysis Division)
10:55 am	BREAK
11:10 am	**Transportation Systems Management and Operations** (Pam Vasudeva, Statewide Transportation Systems Management and Development Engineer, WSDOT's Transportation Operations Division)
11:25 am	**Complete Streets for State Transportation Projects** (Celeste Gilman, Strategic Policy Administrator, WSDOT's Active Transportation Division)
11:40 am	**Questions and Answers**
12:00 pm	LUNCH
1:00 pm	**Workshop: applying concepts and strategies learned to real-life corridors**
3:00 pm	**Report-out**
3:45 pm	**Closing Session**: What did we learn and how can we move forward?
4:00 pm	**Adjourn - Please visit the exhibitors**

National Picture

Creating a more balanced, safer, and sustainable transportation system

Dan Burden,
Director of Innovation and Inspiration, Blue Zones, LLC
Walkable Communities

December 13, 2022

Topics

1. Design for all
2. Design for land use
3. Multi-purpose, Multi-modal Streets
4. Complete streets
5. Low Speed Streets
6. Target Speeds
7. Convenient, Safe, Crossings
8. Compact Intersections And Roundabouts
9. Road Diets
10. Process

Streets for All (Complete Streets)

Streets for Every Use

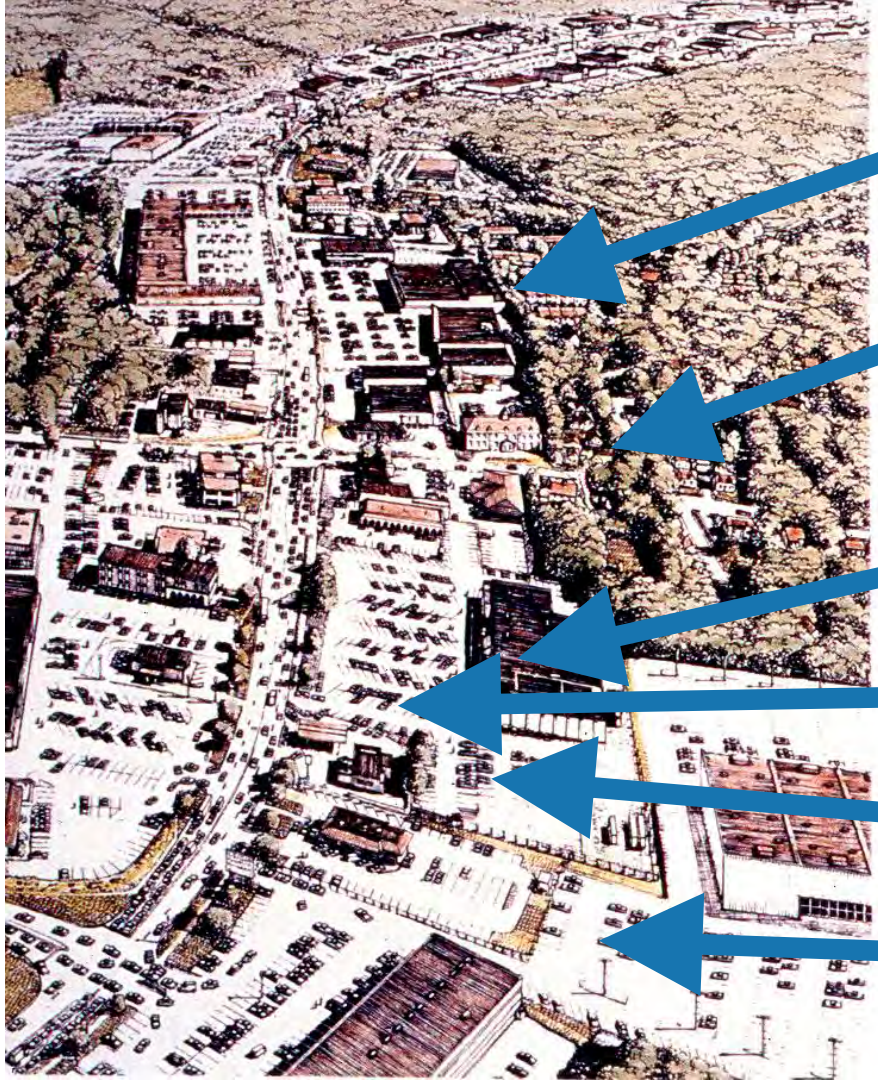
Photo by: Sarah Bowman

LAND USE

Don’t build transportation through communities, build communities through transportation

Colville, Washington

In 2006 the Washington DOT asked Dan if he could work that weekend with concerned stake holders in Colville, Washington to end a thirty-year dispute over a truck bypass around the town. Washington DOT had the funds, but not the consensus to go forward. The bypass was needed.



Low Internal Capture Rate

Low Connectivity

Low/No Mix of Uses

Light Density, Low Yield/Acre

High Parking Requirements

Solar heat sinks, little space for green

High Internal Capture Rate

High Connectivity

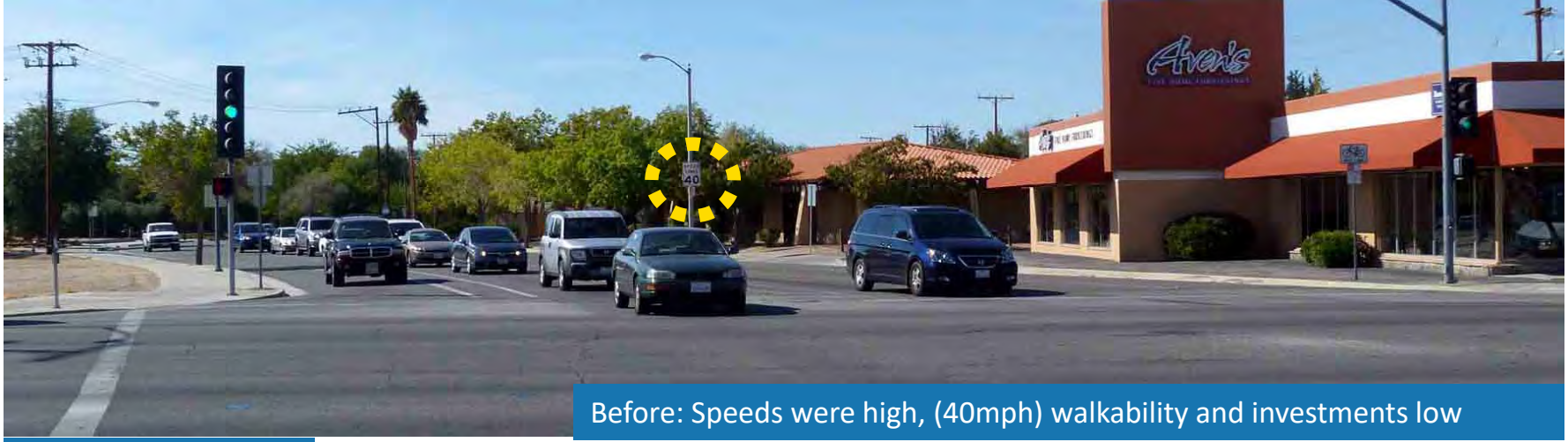
High Mix of Uses

Moderate Density, Good Yield/Acre

Moderate Parking Requirements

Space for green

ORLANDO, FLORIDA



Before: Speeds were high, (40mph) walkability and investments low

Lancaster, Ca

After: Over $800m in new investments have come to Lancaster's main street


Merry Christmas
Handbags • Shoes
Accessories

UNIVERSITY PLACE


Chico, CA
By Steve Price

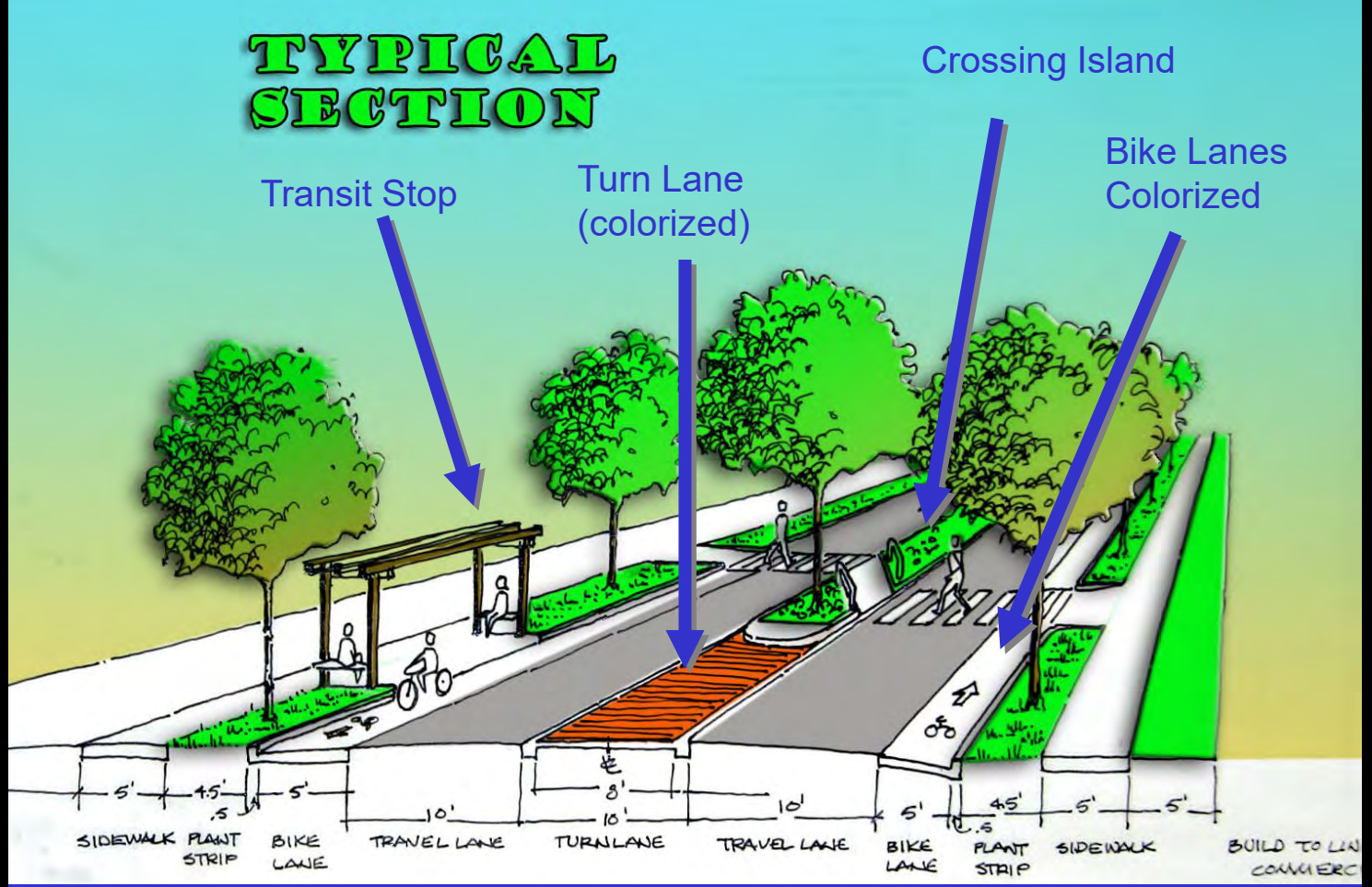
Streets for ALL
Complete Streets

Urban Area Active Transportation Principles

- Support short local trips, not regional
- Roadway efficiency is of less importance
- Reward the short trip
- Stop building for peak hour
- 20 mph is enough for downtown
- Start with 10’ lanes as default
- Start with 10-20’ corner radii downtown
- Build compact, low speed intersections
- Green and create place
- Activate many places (mixed use)
- Use short signal cycles (60 second) or
- Adopt a roundabouts first policy

STREETS FOR ALL USERS (Complete Streets)

- Focus is on flexible design approach.
- “Context sensitive” solutions . . .
  - Type of road & users
  - Speeds, volumes
  - Land uses
  - Local plans & priorities



Work from the Edges In

Complete Streets are not

Complete Streets are NOT:

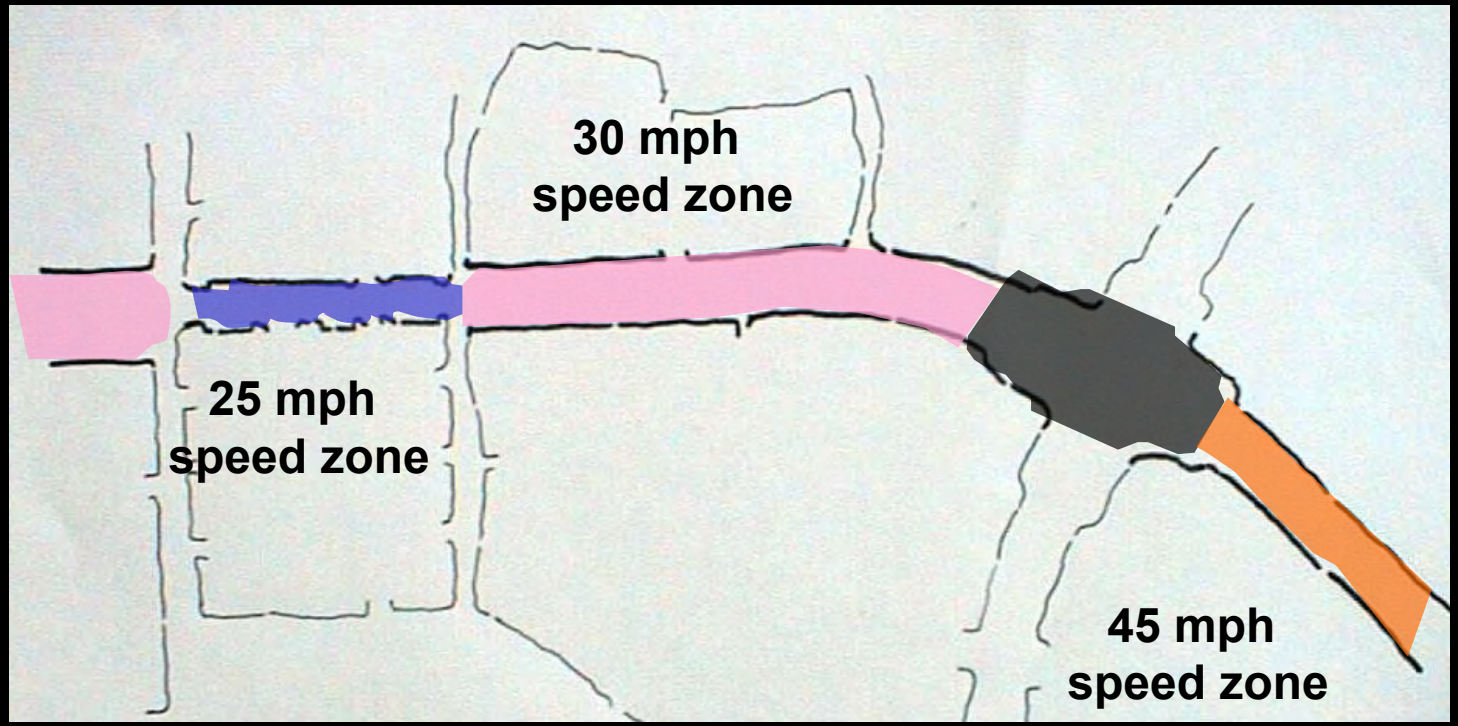
- One “special” street project
- A design prescription
- A mandate for immediate retrofit
- A silver bullet; other issues must be addressed such as land use, environmental concerns, and transportation demand management.

Complete Streets not only bring back life to Main Streets, they bring back customers. Programs as diverse as New York City and Muscatine, Iowa demonstrate that rebuilding streets for less speed for cars, and more room for people, often double or triple income streams to businesses and business investments. The yield per acre goes up!

Target Zero and Target Speed

Target Speed

Target Speeds Appropriate to Land Uses




Chico, CA


Chico, CA


Chico, CA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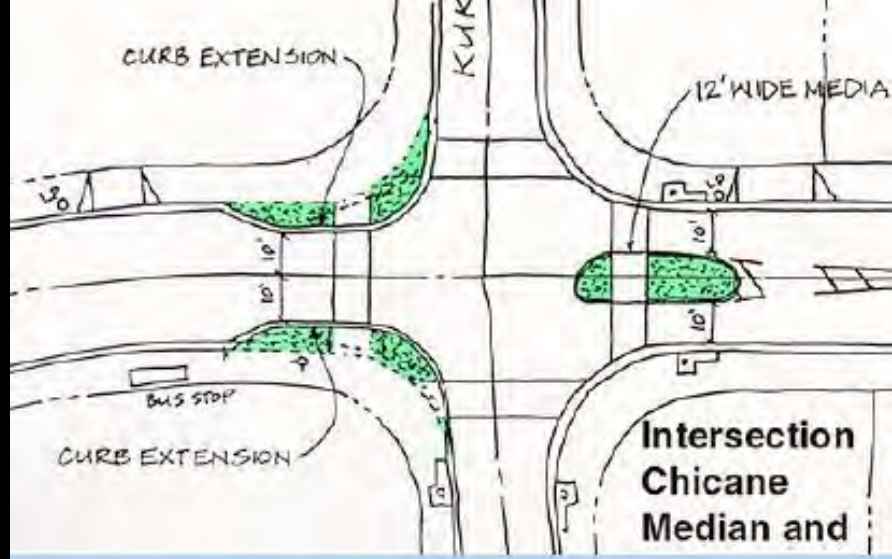
Chico, CA


produce
Chico, CA


22 DOWNTOWN SB
710


CURB EXTENSION
12' WIDE MEDIA
BUS STOP
CURB EXTENSION
Intersection
Chicane
Median and


22 DOWNTOWN SB

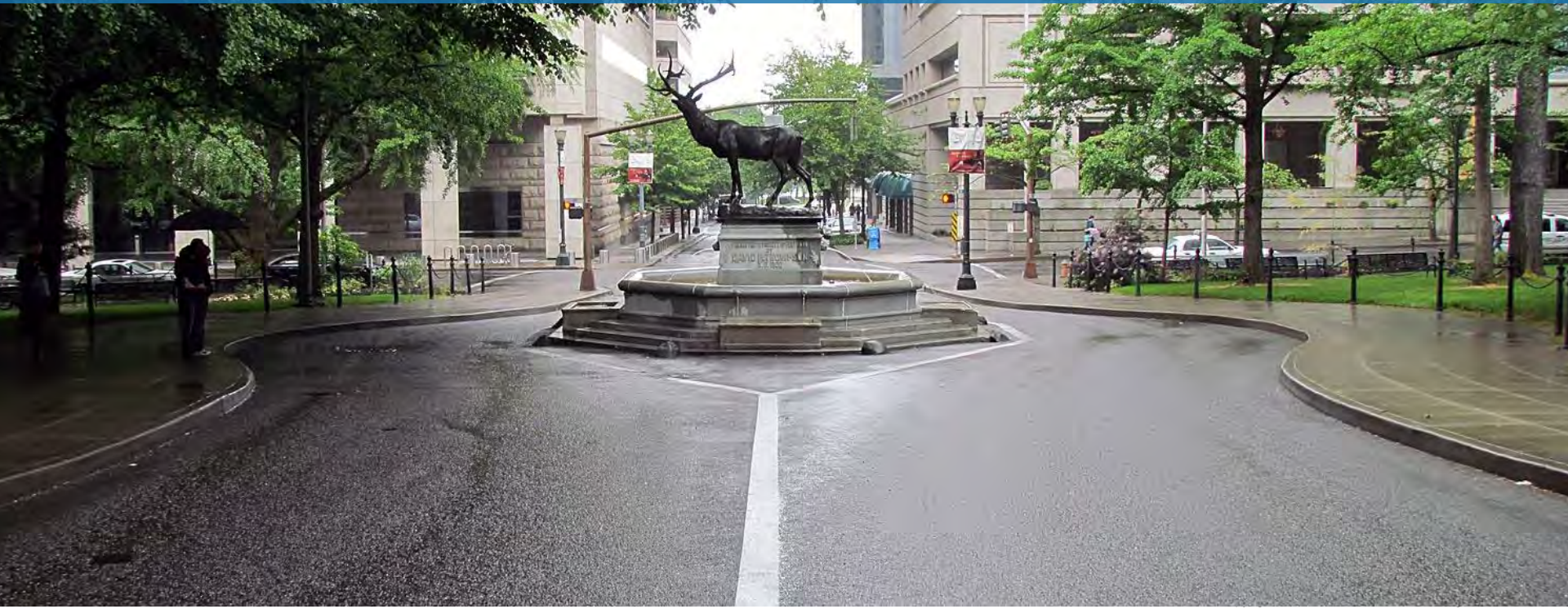

22 DOWNTOWN SB
710


22 DOWNTOWN SB
710


Sacramento, CA
By Steve Price

20 is Plenty

Engineers have been over-designing streets for speed for decades. A number of European, Canadian, Australian and now American cities are saying *20 is Plenty*. Designing and posting downtown and neighborhood streets for lower speeds can be a community policy.



Convenient, Safe Crossings


STATER BROS
LANE
BIKE

Compact Intersections and Roundabouts

Curb Extensions (Bump Outs)

Curb extensions, or bumb-outs, place pedestrians out from behind parked cars, improving sightlines and reducing crossing distances. Curb extensions create compact intersections that promote walking and make the intersection operate more efficiently. They reduce vehicle turning speeds by physically and visually narrowing the roadway. They also provide increased pedestrian waiting space.

Curb extensions reduce the crossing distance for pedestrians by 44 feet at this intersection in Venice, Florida

Include ramps and curb extensions for accessibility

Consider Roundabouts

In order to carry additional traffic volumes at intersections, engineers are forced to add more lanes. Notice that when traffic counts reach high numbers, turn lanes are added. The benefit of roundabouts is that they can often handle as high or even higher numbers of vehicles in fewer lanes.

Roundabouts will not work everywhere, and much depends upon traffic loading factors, but when they can be applied, they make for low speed, safe, efficient and compact intersections that welcome bicyclists and pedestrians.

Image Location: Maui, Hawaii

Streets Impact Health & Wellbeing

Conventional street engineering widens roads for vehicular efficiency. People walking and bicycling become discouraged, so more people end up driving. Crashes increase, due to increased load and added conflict points. Roadway sections can double or triple in price. Walking is engineered out of the environment.

Image: University of Hawaii, Hilo Campus
Photo vision: Todd Clements

Rebuilding the intersection to support walking and bicycling lowers speed and noise, shortens crossing times, moves more cars, reduces personal injury crashes by 70%, and eliminates delays for both people walking and driving. When the street honors development, development will honor the street.

Asheville NC

Road Diets

Road Diets

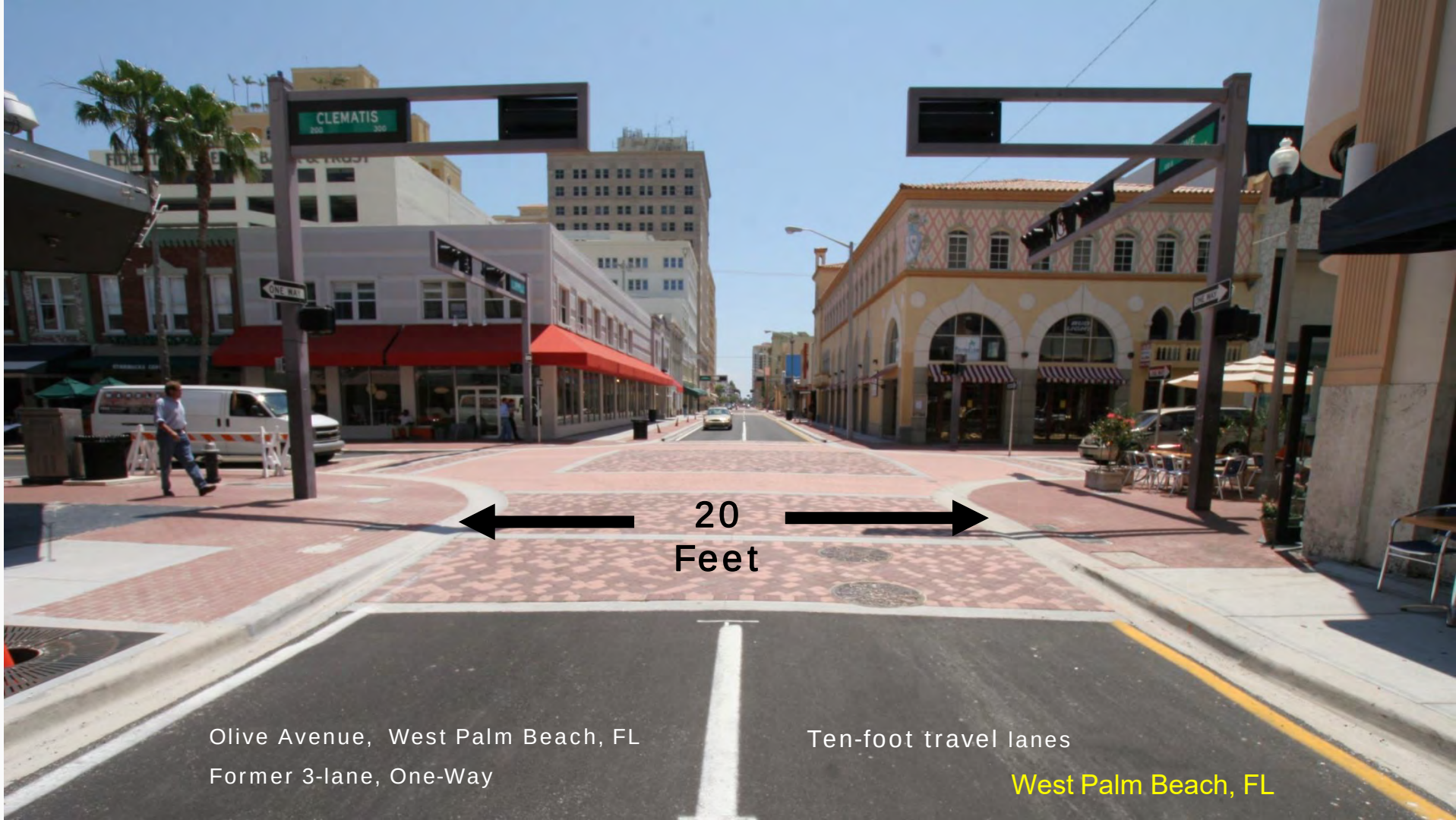
Narrowing and/or eliminating additional travel lanes can calm traffic and have tremendous safety benefits for all roadway users.

- Conversion of 4-lane roadways to 3-lane (one lane each direction with shared left turn lane)
- Reduce weaving and turning conflicts
- Reclaim street space for parking, bike lanes, curb extensions or other uses.
- Overall crash reduction of 19% to 47%*
- Emergency response impact - limited

**Federal Highway Administration FHWA*

Seattle, Washington

Ft Lauderdale By-The-Sea, FL


CLEMATIS
ONE WAY
20
Feet
Olive Avenue, West Palm Beach, FL
Former 3-lane, One-Way
Ten-foot travel lanes
West Palm Beach, FL

If you need a wider outside lane or a buffer lane where do you find the added space?

STREET TREES

URBAN "VILLAGE" areas in New Hampshire containing "on-street parking and pedestrian-friendly roadside treatments" were "two times less likely to experience a crash" than the purportedly safer roadways preferred by most transportation engineers.

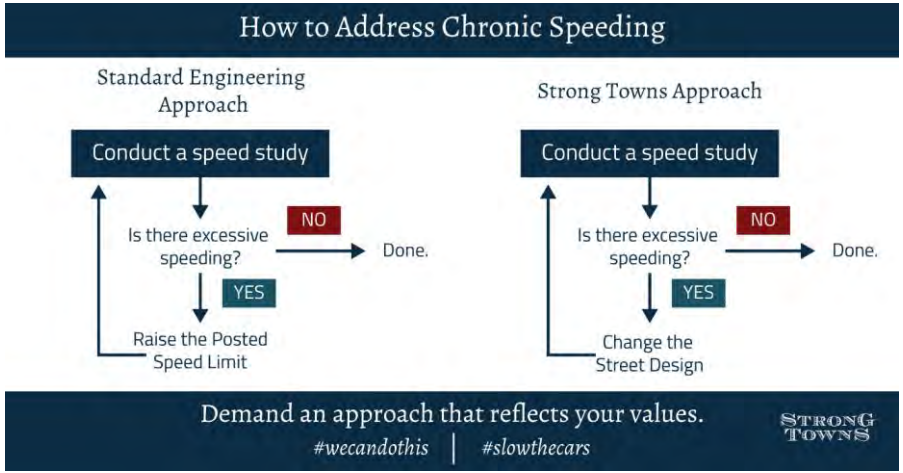
STREET TREES A study of five arterial roadways in downtown Toronto found that mid-block car crashes declined between 5 and 20 percent in areas where there were elements such as trees or concrete planters along the road.

SEATTLE — Last year, legislators in Washington state passed a law to bolster the urban forestry work of the Department of Natural Resources. The agency's urban and community forestry program, which had just two staffers in 2020, will grow to nine positions once the department finalizes new hires. Those new staffers, along with a new state-funded grant program, will supercharge the department's efforts to inventory tree canopy in Washington's communities, help cities maintain their trees and determine where to plant new ones.

https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2022/08/25/towns-may-grow-millions-more-trees-with-15b-for-urban-forestry?utm_source=Sightline%20Institute&utm_medium=web-email&utm_campaign=Sightline%20News%20Selections

Avoid Past Mistakes

The 85th Percentile



The 85th Percentile idea, based on the 1964 "Solomon Curve," says speed limits should be set at what 85 percent of drivers think is healthy.

It was created back when the highway system was still young, cars didn't approach speeds as quickly as they do today, and we didn't have the sort of statistics and research on traffic dangers we do today.

"Revise traditional speed-setting standards to balance 85 percentile approaches with safe systems approach that better incorporates crash history, safety of pedestrians, bicyclists."

CONTACT INFORMATION

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Safe System

Reducing crashes for all road users

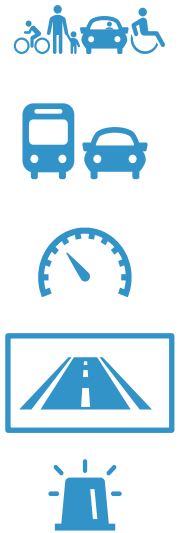
John C. Milton, PhD, PE, RSP2IB, PTOE
State Safety Engineer

December 13, 2022

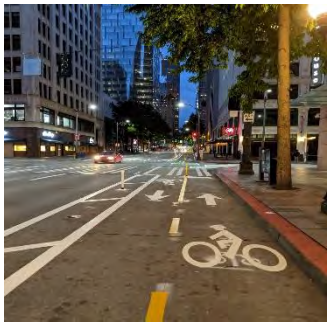
Safe System Approach

Source: FHWA-SA-20-015

Safer roads



Avoiding crashes involves:



Separating users in space

Separating users in time

Increasing attentiveness and awareness

Source: City of Seattle

Safer roads

Managing crash kinetic energy:

Managing speed

Manage Mass difference

Manage crash angles

Safe Speeds

Safe Speeds

Roads designs and operations to accommodate appropriate speeds for the **context and modes – target speeds**

Injury minimization by reducing kinetic energy

Automated speed enforcement, self explaining roads

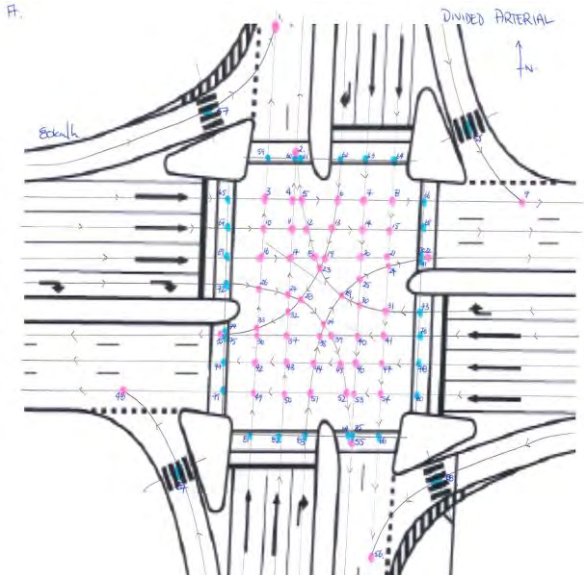
Source: WSDOT

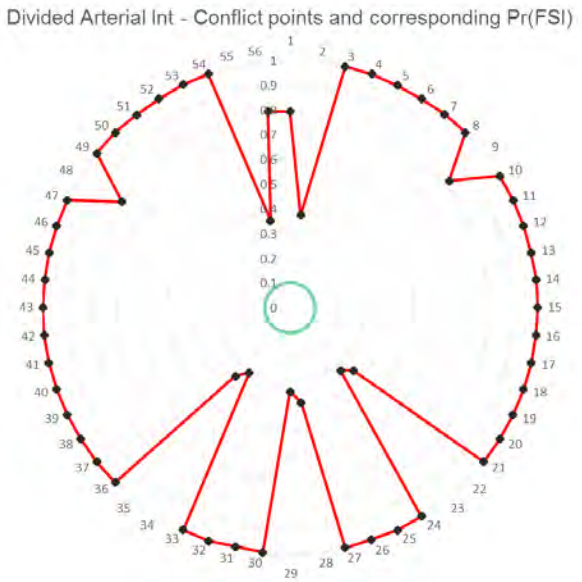
Source: Chicago.gov

Reduce intersection energy

Divided arterial signals - 80 km/h x 60 km/h

$K = \frac{1}{2} mv^2$

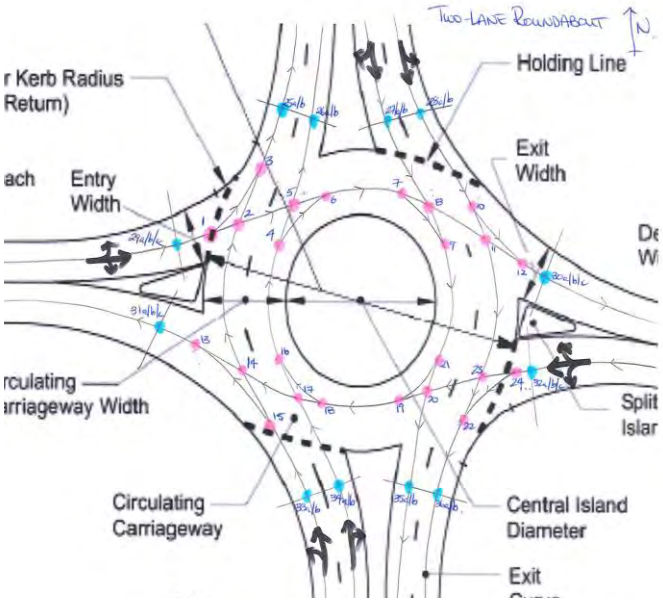


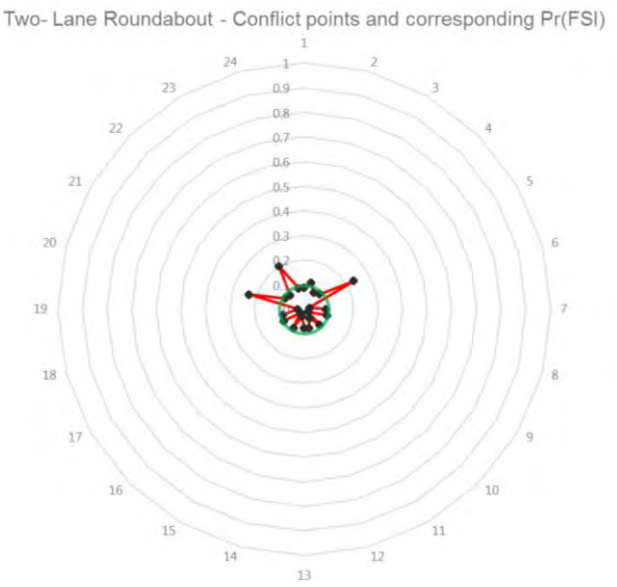


Source: Blair Turner

Reduce intersection energy

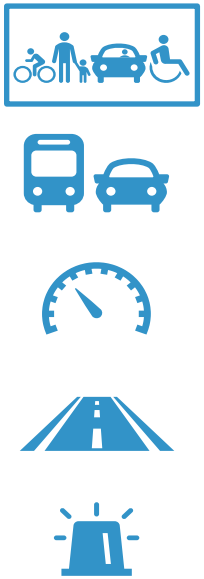
Divided arterial roundabout - 80 km/h x 60 km/h





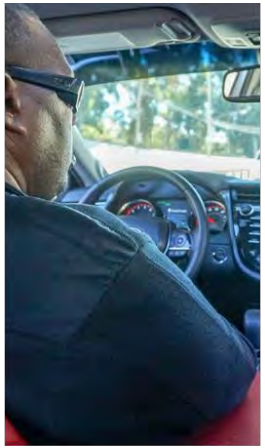
Source: Blair Turner

Safe road users



Walk

Bike



Drive

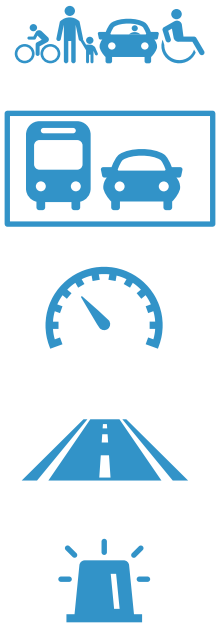
Transit

Roll

Road users have a responsibility to operate, to the best of their ability, within the expectations and boundaries of the transportation system.

Education and training on safe road behaviors comprise the cornerstones of promoting safe road users and a safety culture.

Safe VEHICLES



Active safety

Measures to reduce the chance of a crash occurring

- Lane departure warning
- Autonomous emergency braking

Passive safety

Protective systems for when crashes do occur

- Seatbelts and airbags
- Crash-absorbing vehicle crumple zones

Safe VEHICLES - continued

All road user safety

Measures that protect all road users

- Bicyclist and pedestrian detection
- Information to those walking and biking V2P, V2B
- Vehicle size and design

New technology

Leveraging connected and automated vehicle (CAV) technology to improve safety

Safe system principles

Death/serious injury is unacceptable

Support safe road user behavior

Prevent exposure to large forces

Shared responsibility

Safety is proactive

Strengthen all parts

Safe system principles

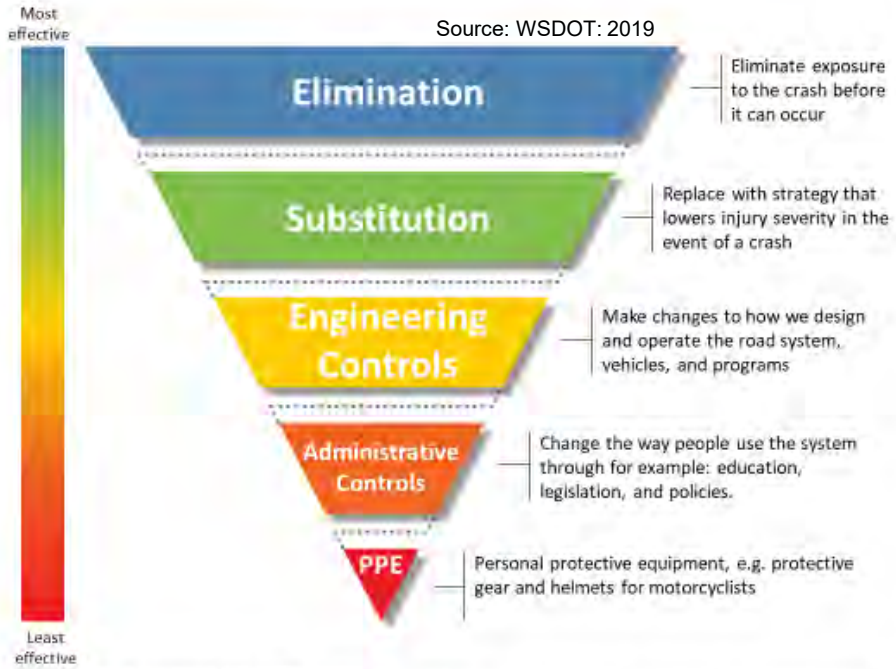
1. **Death and serious injury is unacceptable:** While no crashes are desirable, the Safe Systems approach prioritizes elimination of crashes that result in death and serious injuries.
2. **Safety is proactive:** Proactive approaches address context, contributing factors, and crash types and help to reduce the potential for fatal and serious crashes. These approaches complement traditional, reactive crash reduction programs that focus on individual sites and segments with observed crashes.
3. **Shared responsibility**: A shared responsibility exists amongst those who design, build, manage, and use roads and vehicles and provide post-crash care to proactively reduce the potential crashes resulting in serious injury or death.
4. **Strengthen all parts**: All parts of the system must be strengthened to multiply their effects in synergy; and so that if one part fails, road users are still protected.
5. **Prevent exposure to large forces**: The human body has a limited physical ability to tolerate crash forces before harm occurs; the system should prevent those limits being exceeded.
6. **Support safe road user behavior**: People make mistakes that can lead to crashes; a safe system should make it easier for humans *not* to make these mistakes and tune their tasks as much as possible to their competencies by safe design of roads and vehicles

Death and Serious Injuries are unacceptable

Death and Serious Injury is unacceptable

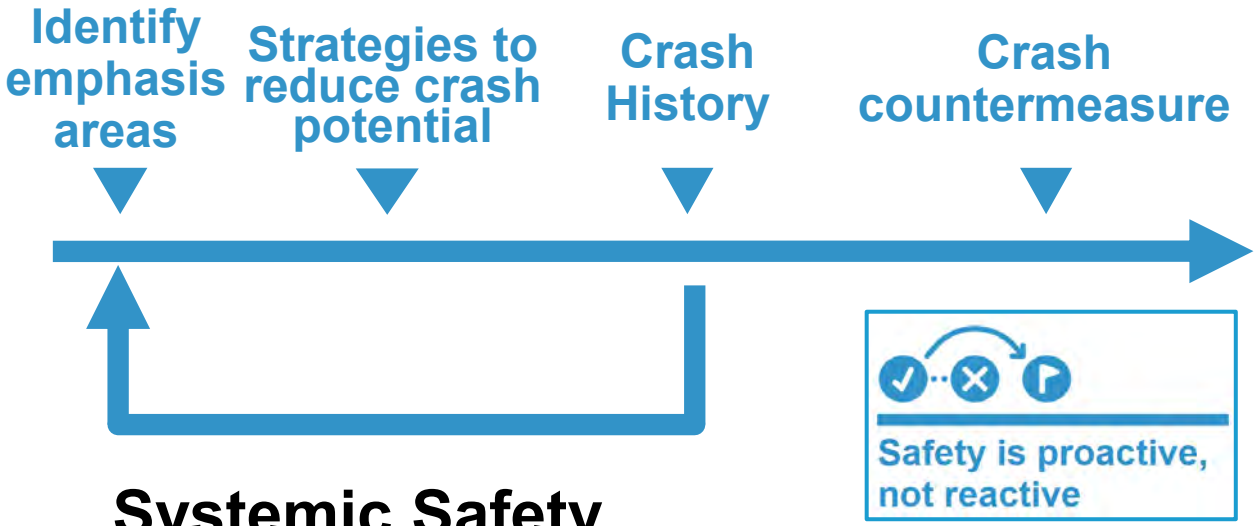
Hierarchy of Controls for Road Safety

Recognizing the effectiveness of design and operational choices we make in reducing fatal and serious crashes.



Hierarchy of Controls for Traffic Safety, *adapted from* Hierarchy of Controls (National Institute of Occupational Safety and Health, 2017), transportation system examples added to graphic

Proactive versus reactive

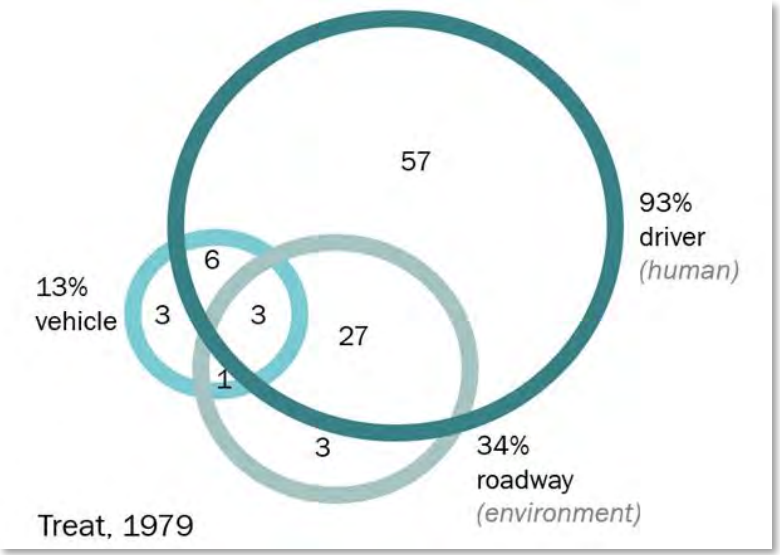


Systemic Safety

Systemic safety approaches, complete streets implementation]”
Reduce crash potential before the crashes occur
Focus on crash types and potential contributing factors

Share Responsibility

Blame



Shared responsibility

- **Road users, owners, operators and manufacturers, together are responsible for road safety outcomes**
- Countermeasures can be implemented were errors occur, we already do this

✓With run off road crashes we provide roadside safety hardware that reduces crash severity

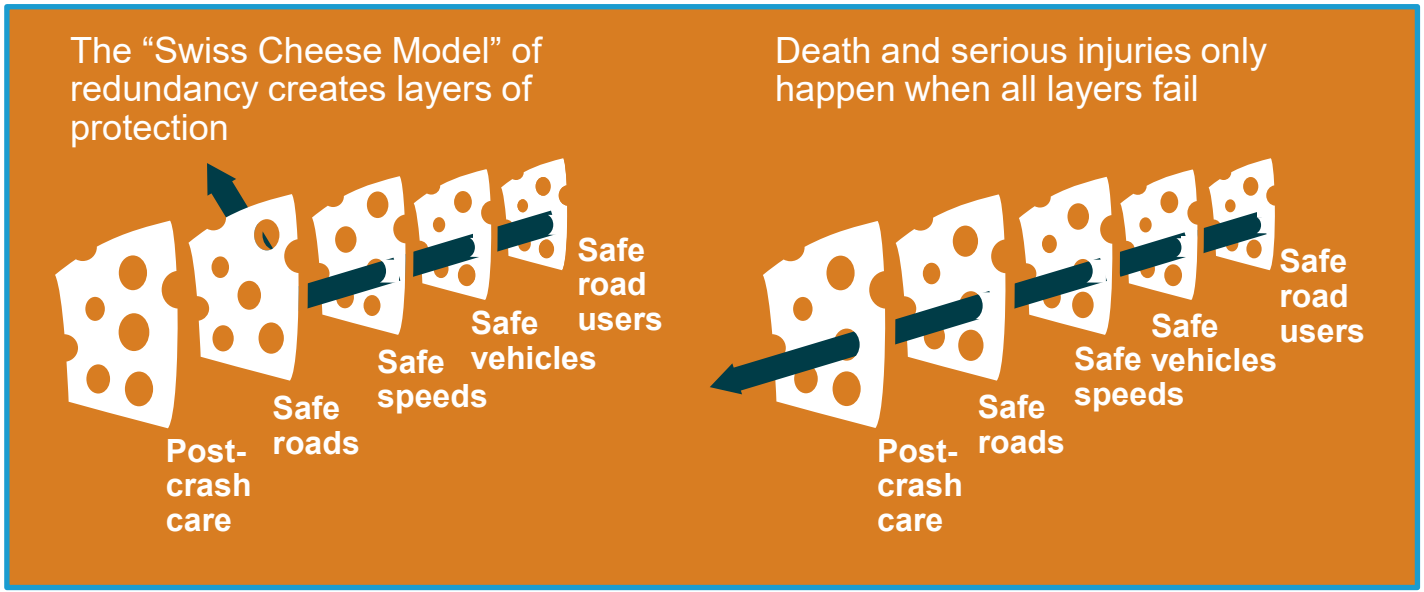
✓We provide lighting for visibility

✓We provide pedestrian hybrid signal and crossing at midblock locations

•Following the rules of the road, restraints and limiting risky behaviors

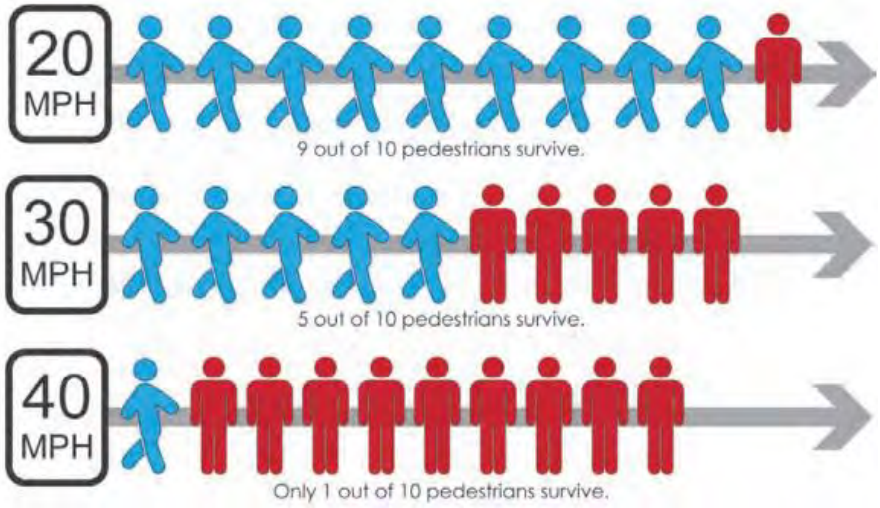
STRENGTHEN ALL PARTS

PROVIDE REDUNDANCY



Source: FHWA

Prevent exposure to large crash forces



Source: Target Zero 2019

Support safe road user behavior

Source: WSDOT

Self explaining and enforcing

- Reducing conflicts between road users
- Providing roads that manage speeds
- Providing clear information
- Reducing exposure, increasing security
- Understanding road users limitations and needs

Source: FHWA.

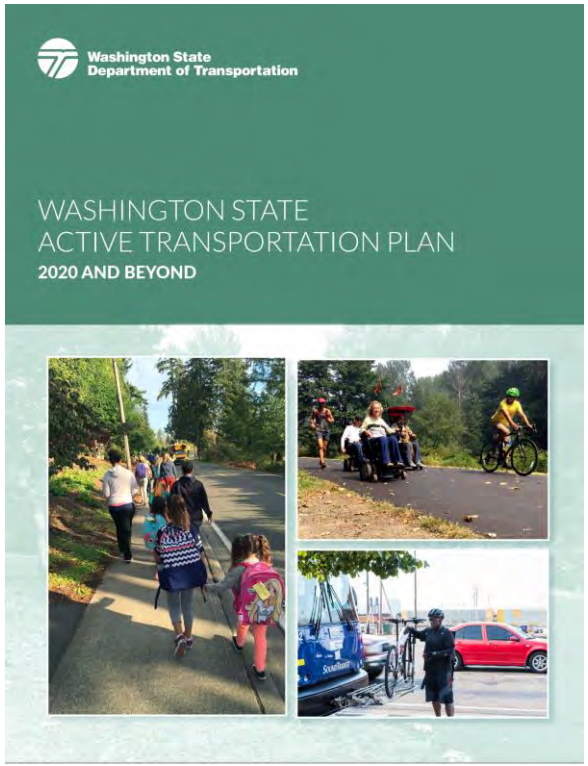
Safe System shift

Traditional		Safe System
Prevent all crashes	→	Prevent fatal and serious crashes
React to crashes	→	Proactive approach to crashes
Blame road users	→	Shared responsibility
Improve human behavior	→	Design and operate for human error
Control speeding	→	Reduce system kinetic energy

Safe System and ITS

Source: FHWA-SA-20-015

Mobility, but not at the expense of safety



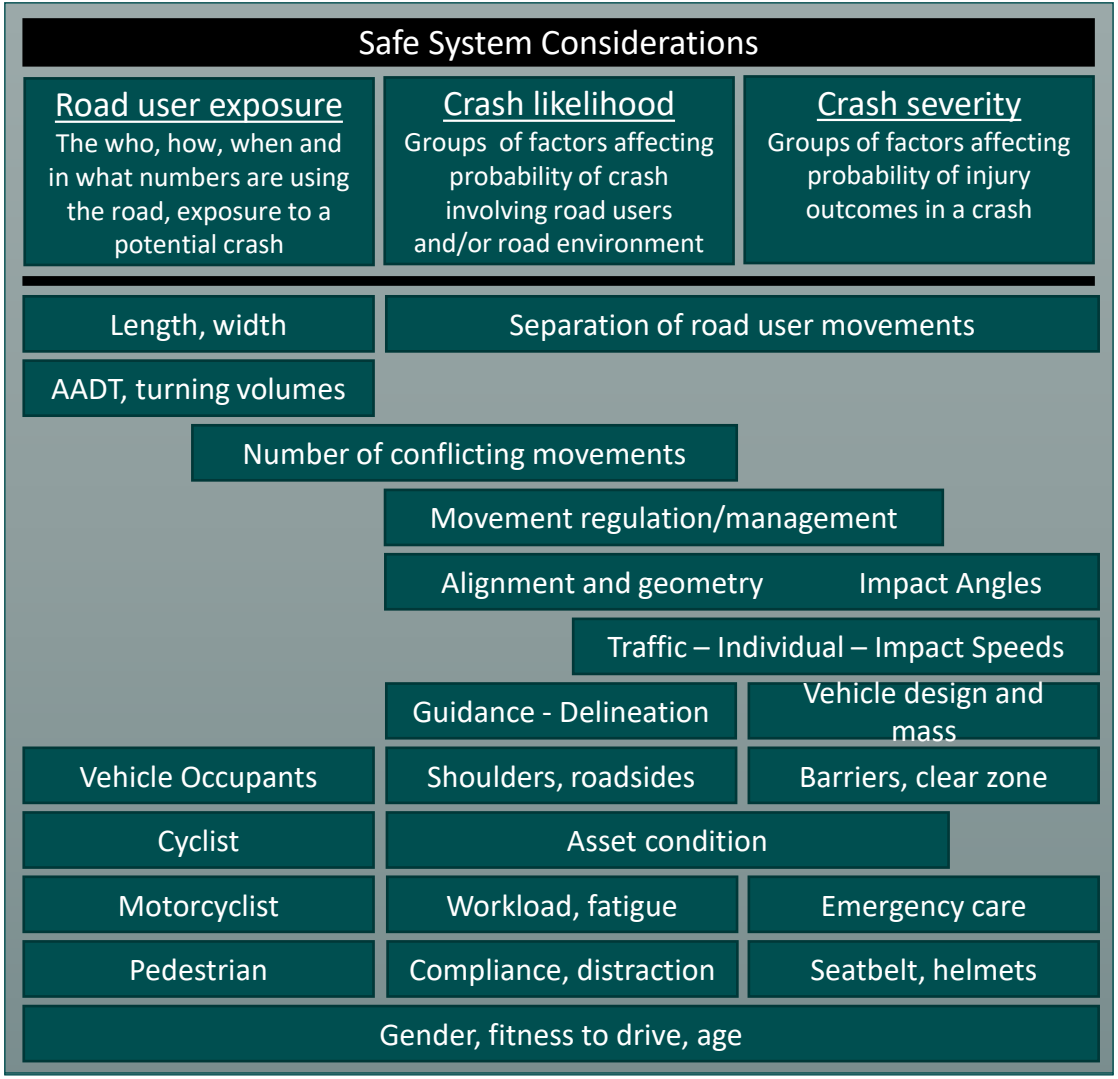
- Active transportation needs as a **mindset in planning design and operations**, rather than an after thought
- Consideration of all road users modifies our concepts of how we design and operate the system
- Equitable mobility and separation will require reallocation and use of ITS and TSMO to be effective
- Safety performance is defined by exposure, crash likelihood and crash severity for all road users
- How can ITS be used to influence these performance characteristics?

WA State Injury Minimization Speed Management Policy and Guidelines Workgroup

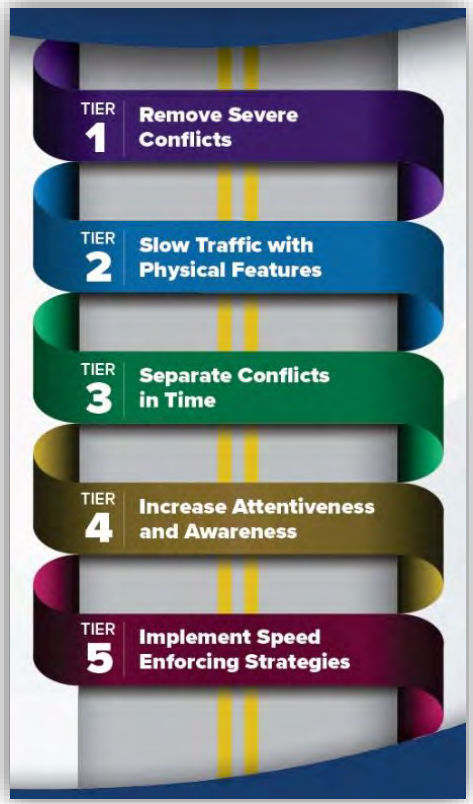
- Use target speed
- Use category-based target speed based on traffic mix
- Use target speed within 5 mph of operating speed
- When greater than 5 mph use iterative speed management to bring speeds down until target achieved

A Driver's Peripheral Vision at 20–25 mph

A Driver's Peripheral Vision at 40+ mph


Safe System Considerations
Road user exposure
The who, how, when and in what numbers are using the road, exposure to a potential crash
Crash likelihood
Groups of factors affecting probability of crash involving road users and/or road environment
Crash severity
Groups of factors affecting probability of injury outcomes in a crash
Length, width
Separation of road user movements
AADT, turning volumes
Number of conflicting movements
Movement regulation/management
Alignment and geometry
Impact Angles
Traffic – Individual – Impact Speeds
Guidance - Delineation
Vehicle design and mass
Vehicle Occupants
Shoulders, roadsides
Barriers, clear zone
Cyclist
Asset condition
Motorcyclist
Workload, fatigue
Emergency care
Pedestrian
Compliance, distraction
Seatbelt, helmets
Gender, fitness to drive, age

Hierarchy of effectiveness



- V2X communication, (P2X, B2X)
- Intelligent traffic management
  - Real time crash and conflict prediction
  - Smart roadside communication at intersections for all road users
  - Variable Speeds
  - Red Light and Speed Safety Cameras
  - Adaptive traffic lights
  - Improved emergency response and on demand services

Break








Transportation System Management and Operations (TSMO)

WSDOT's Definition

Pamela Vasudeva, Statewide TSMO Development Engineer

December 13, 2022

Defining TSMO At WSDOT

A **cost-effective**, **practical decision-making** tool that priorities the **safety, operations, and reliability** of the transportation system to meet **existing** and **future multimodal needs**.

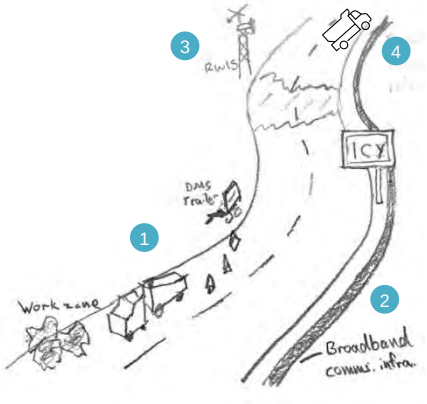
TSMO Projects

- Expansion of WSDOT's Fiber Network
- Advanced Traffic Management System (ATMS)
- Real Time Streaming of Regional Camera Images
- Ramp Meters
- Technology for Corridor Management
- Leading Pedestrian Intervals
- Coordinated Corridor Planning with Locals and Patrol
- Bus on Shoulder
- Transit Signal Priority
- Multimodal Improvements & Implementation of TDM Strategies
- Shared Use Path Expansion
- Compact Roundabouts
- Emergency Operations Center & Traffic Management Center
- Left and Right Turn Restrictions
- Field Assessment Program

TSMO Strategies

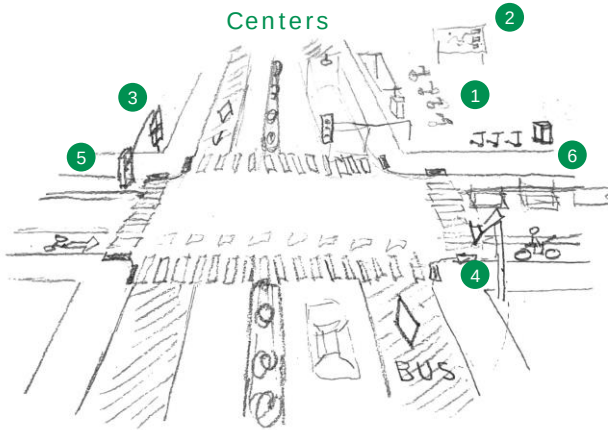
TSMO strategies work in a variety of contexts to deliver a *Safe, Smart, & Sound* transportation system

Rural Highways



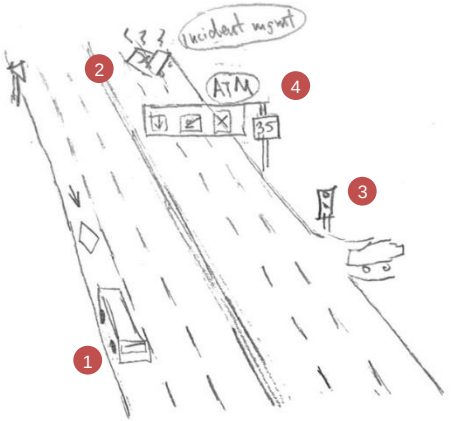
1. Work Zone management to improve safety for workers and travelers in work zones
2. Broadband infrastructure to connect systems and travelers
3. Road weather systems to improve safety during inclement weather conditions
4. Snowplow monitoring to keep roads clear and inform public of conditions

Urban and Town Centers



1. Mobility hub to provide multimodal transportation options
2. Traveler information displays to provide multimodal travel planning
3. Pedestrian and bike signals to provide safe movements for active transportation
4. Near-miss detection to proactively identify safety issues
5. Transit signal priority to improve transit speed and reliability
6. Curb management to manage parking and allocate curb space efficiently

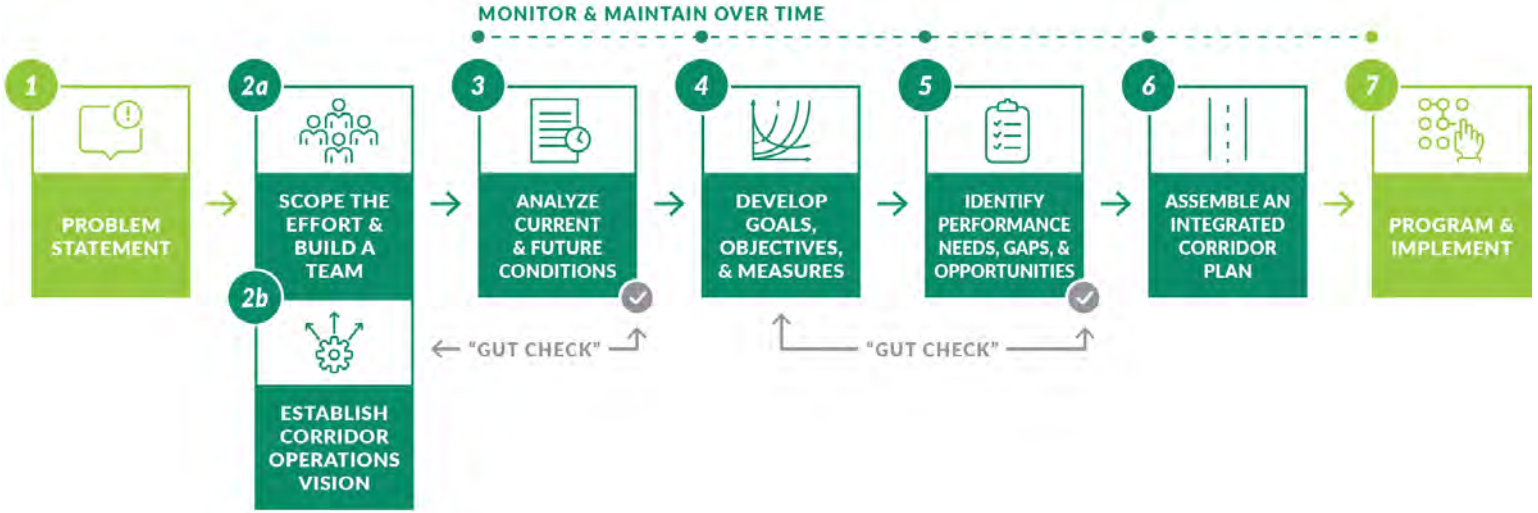
State Routes



1. Bus-on-shoulder operations to move transit reliably
2. Coordinated, multi agency incident response
3. Ramp meters to optimize traffic flow
4. Active Traffic Management to reduce crashes

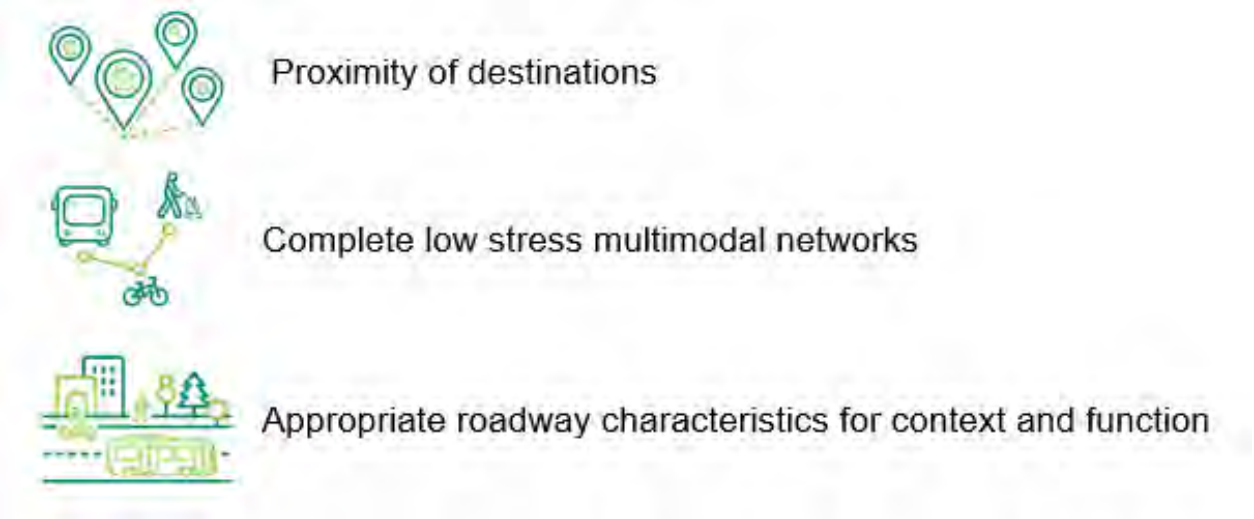
TSMO has Talons!

Corridor Planning and TSMO



TSMO in the planning process **ensures operational needs and solutions are identified** early, resulting in a **balanced plan that provides financial and achievable outcomes**.

Land Use and TSMO



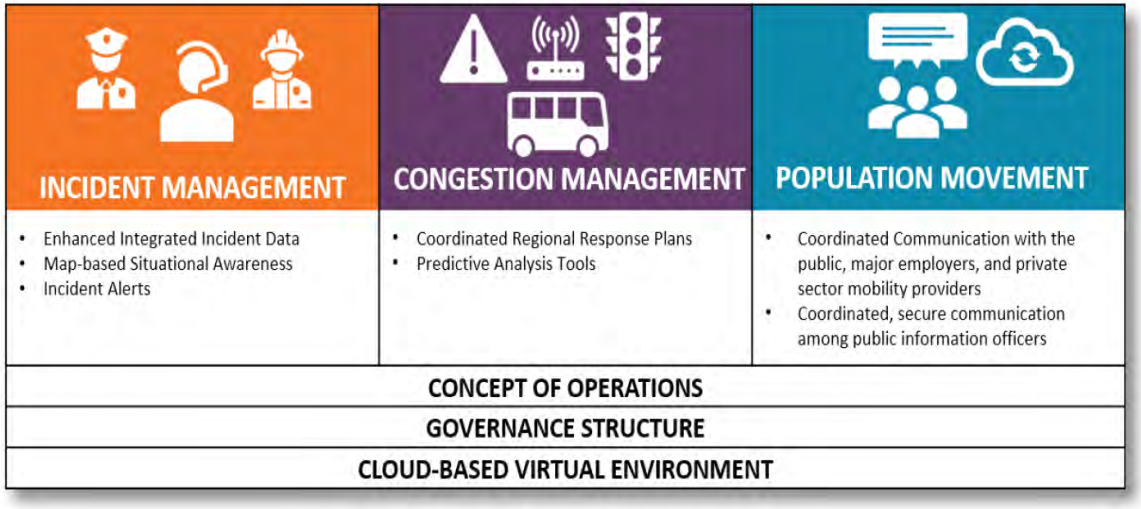
Land use decisions that result in **trip reduction** have a direct positive impact on transportation system operations.

Environmental Justice and TSMO

TSMO tools, practices, and processes can be used to **respond to community needs quickly and efficiently** to ensure **equitable access to reliable and affordable transportation options**.

Examples

Virtual Coordination Center



- Web-based tool allows real-time interagency information sharing & collaboration during major incidents to alleviate congestion and reduce crashes.
- Potential future expansion to other regions within Washington.

Leading Pedestrian Intervals (LPIs)

- WSDOT added LPI at most intersections in the northwest region, giving pedestrians 3-7 second buffer before vehicles get a green light
- LPIs provide time separation for pedestrians to clear the intersection and reduce pedestrian exposure
- Increases awareness of pedestrians crossing

Argonne Road

- Automated Traffic Signal Performance Measures (ATSPMs) installed on the Argonne Road corridor to observe and assess congestion causes
- Signal timing adjustments addressed varying travel demands throughout the day

RESULTS

20%
REDUCTION IN NORTHBOUND TRAVEL TIMES

4%
REDUCTION IN SOUTHBOUND TRAVEL TIMES

19%
REDUCTION IN NORTHBOUND TRAVEL TIMES FROM THE I-90 SOUTHBOUND RAMP TO EAST MONTGOMERY AVENUE DURING THE MIDDAY LUNCH HOUR.

Leavenworth's Pedestrian Crossing

- Christmas Lighting Festival generated significant (4 miles) queues along US 2
- Responsive signals added to keep everyone safe and moving

RESULTS

Mobility

3500 more vehicles were accommodated.

Safety

Increased safety for both pedestrians and vehicles.

Measuring Multimodal Opportunities

Opportunities

Signal performance measures to:

- report on safety and comfort associated with vulnerable road users
- address speeds and flow for all users

Analysis/Goal

- Include operational goal to reduce red light running occurrences
- Identify where and when pedestrian and bike activity is highest
- Use this info to ensure that new timing plans account for all users of the system

Metrics/Data Collection

- Use signal performance measures to minimize red light running occurrences
- Pedestrian calls and bike detection

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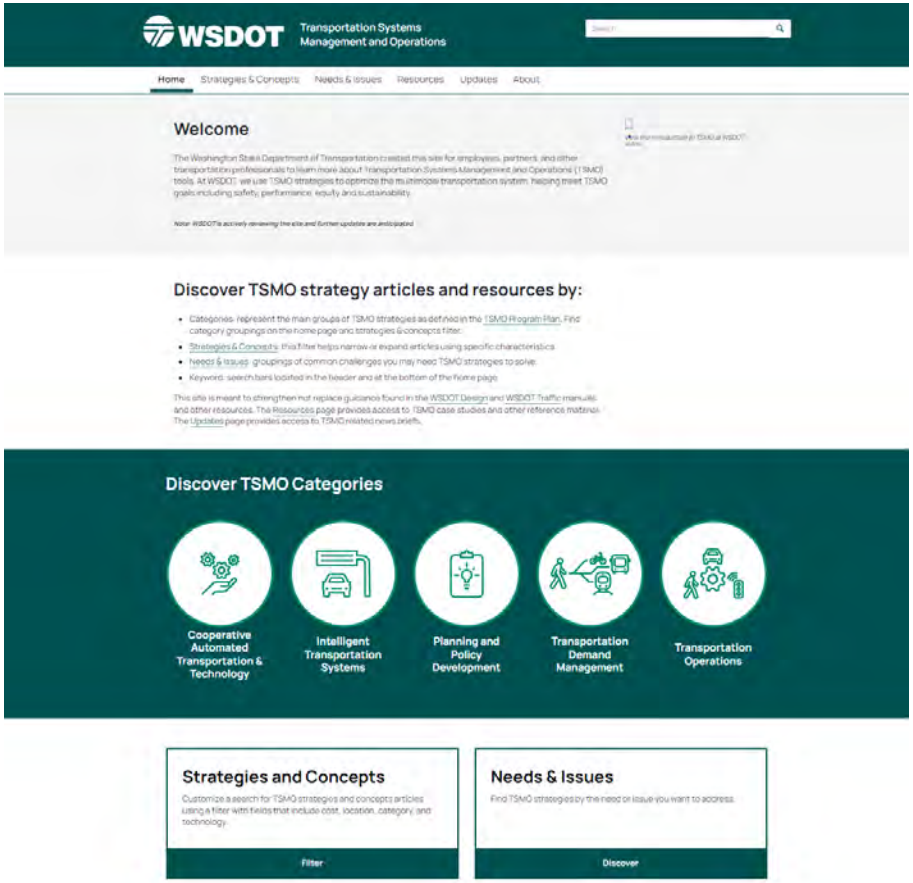
WSDOT
Transportation Systems Management and Operations
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Questions with a TSMO Mindset

PLANNING AND POLICY DEVELOPMENT

Are there opportunities to build partnerships and work collaboratively across jurisdictional boundaries?

TRANSPORTATION OPERATIONS

How is the system operating?

COOPERATIVE AUTOMATED TRANSPORTATION & TECHNOLOGY

What data and technologies are available to improve system efficiency?

Questions with a TSMO Mindset

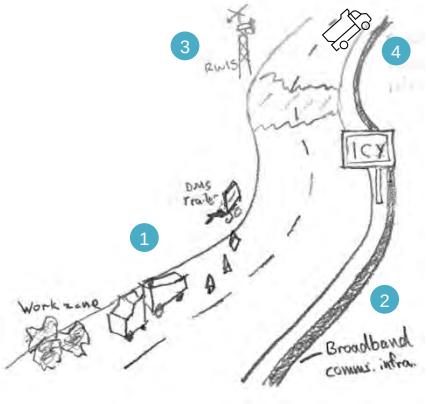
What ITS devices are available to improve situational awareness?

What strategies are available to shift the way people travel on and across the facility?

TSMO Strategies

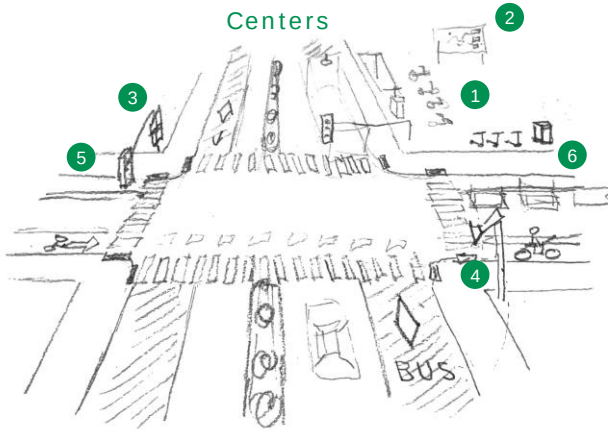
TSMO strategies work in a variety of contexts to deliver a *Safe, Smart, & Sound* transportation system

Rural Highways



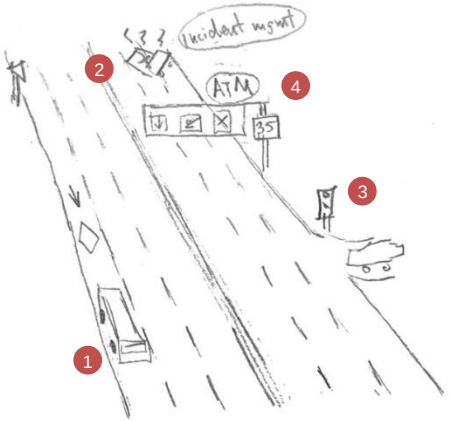
1. Work Zone management to improve safety for workers and travelers in work zones
2. Broadband infrastructure to connect systems and travelers
3. Road weather systems to improve safety during inclement weather conditions
4. Snowplow monitoring to keep roads clear and inform public of conditions

Urban and Town Centers



1. Mobility hub to provide multimodal transportation options
2. Traveler information displays to provide multimodal travel planning
3. Pedestrian and bike signals to provide safe movements for active transportation
4. Near-miss detection to proactively identify safety issues
5. Transit signal priority to improve transit speed and reliability
6. Curb management to manage parking and allocate curb space efficiently

State Routes



1. Bus-on-shoulder operations to move transit reliably
2. Coordinated, multi agency incident response
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4. Active Traffic Management to reduce crashes

To Learn More

Refer to: www.TSMOwa.org

Contact: Pamela Vasudeva - vasudep@wsdot.wa.gov

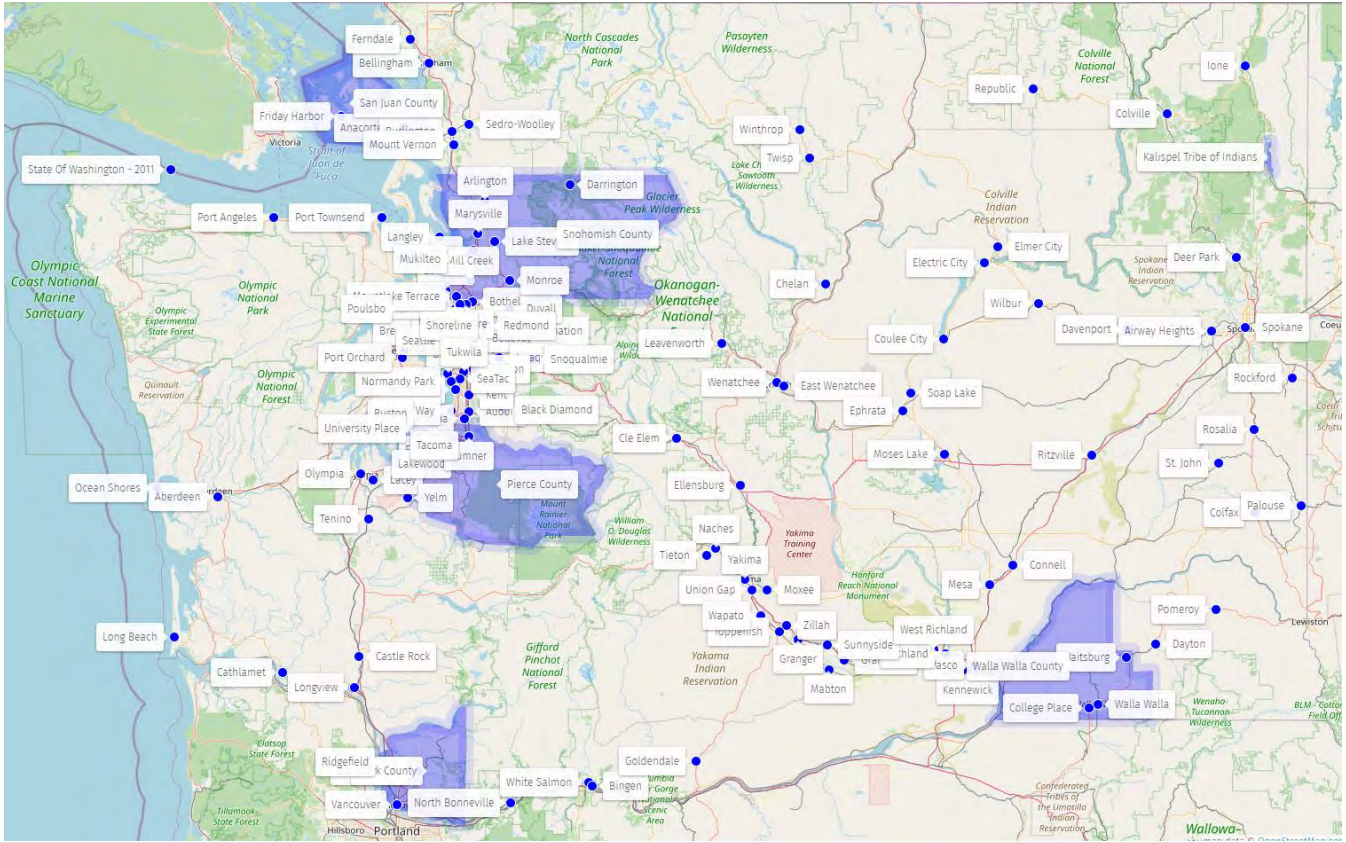
COMPLETE STREETS
IN STATE TRANSPORTATION PROJECTS

Celeste Gilman, Strategic Policy Administrator
Washington State Department of Transportation, Active Transportation Division

December 13, 2022

Complete Streets in Washington

Adopted Complete Streets Policies



Complete Streets Requirement

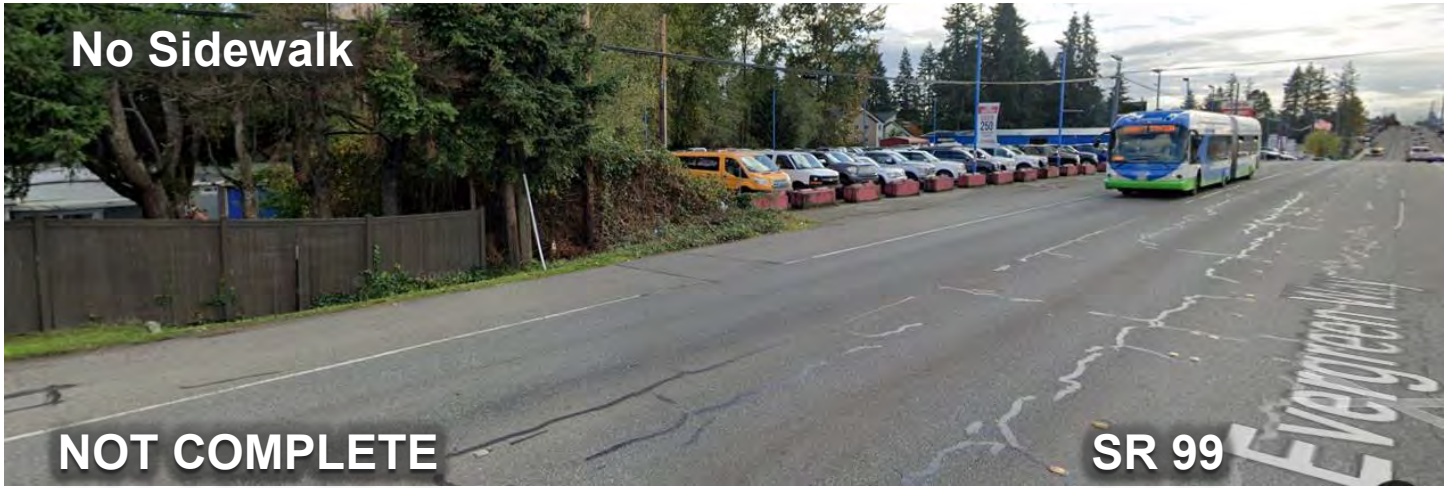
Revised Code of Washington 47.24.060: Street access—Principles of complete streets—Requirements

Purpose: “(1) In order to improve the safety, mobility, and accessibility of state highways, it is the intent of the legislature that the department must incorporate the principles of complete streets with facilities that provide street access with all users in mind, including pedestrians, bicyclists, and public transportation users”

Applies to “state transportation projects starting design on or after July 1, 2022, and that are $500,000 or more”

Complete Streets Requirement

"[M]ust: (a) **Identify those locations on state rights-of-way that do not have a complete and Americans with disabilities act accessible sidewalk or shared-use path**,"



Complete Streets Requirement

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Complete Streets Requirement

"[M]ust: (a) Identify those locations on state rights-of-way … **that do not have bicycle facilities in the form of a bike lane or adjacent parallel trail or shared-use path,"**

Complete Streets Requirement

"[M]ust: (a) Identify those locations on state rights-of-way … **that do not have bicycle facilities in the form of a bike lane or adjacent parallel trail or shared-use path,"**

Complete Streets Requirement

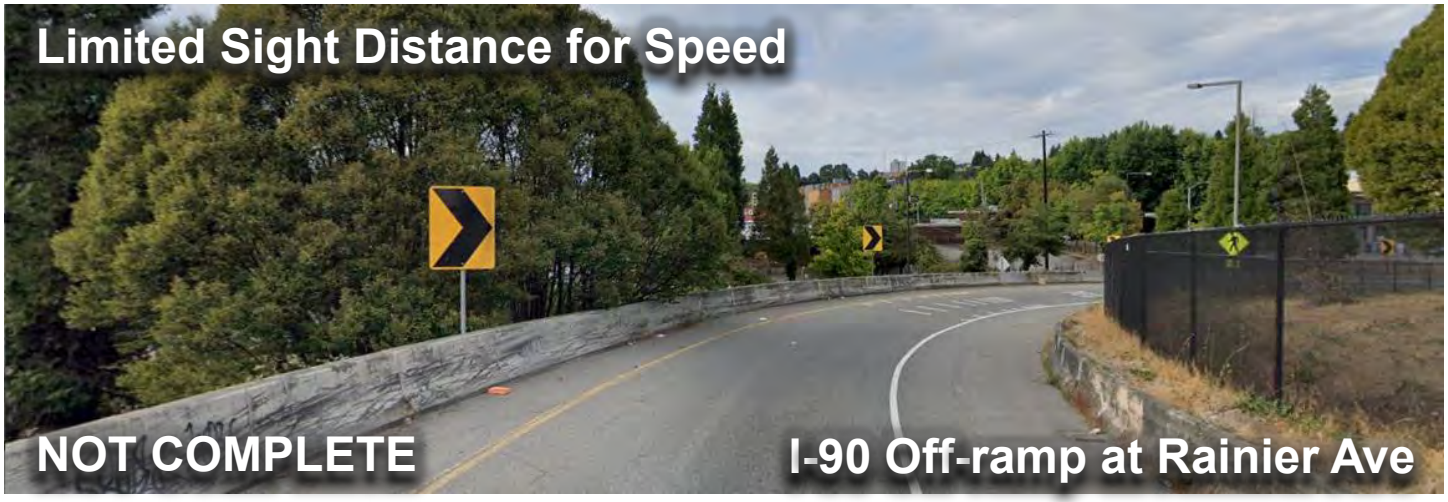
"[M]ust: (a) Identify those locations on state rights-of-way … **that have such facilities on a state route within a population center that has a posted speed in excess of 30 miles per hour and no buffer or physical separation from vehicular traffic for pedestrians and bicyclists**"

Complete Streets Requirement

"[M]ust: (a) Identify those locations on state rights-of-way … **that have such facilities on a state route within a population center that has a posted speed in excess of 30 miles per hour and no buffer or physical separation from vehicular traffic for pedestrians and bicyclists**"

Complete Streets Requirement

"[M]ust: (a) Identify those locations on state rights-of-way … **that have a design that hampers the ability of motorists to see a crossing pedestrian with sufficient time to stop given posted speed limits and roadway configuration**;"

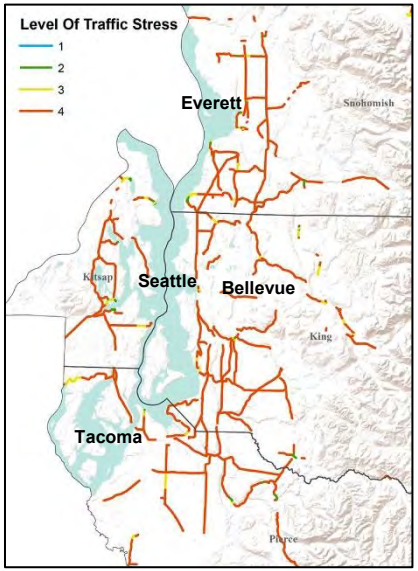


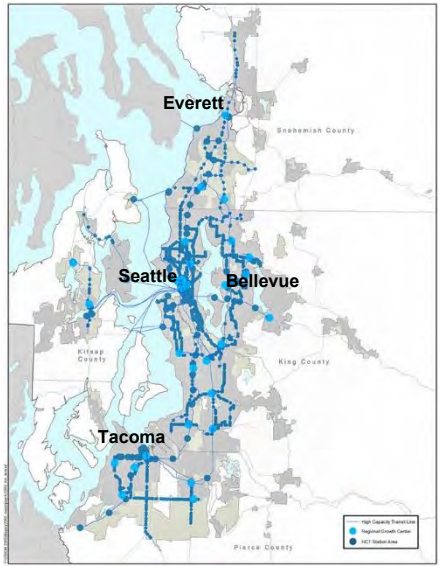
Complete Streets Requirement

"[M]ust: (a) Identify those locations on state rights-of-way … **that have a design that hampers the ability of motorists to see a crossing pedestrian with sufficient time to stop given posted speed limits and roadway configuration**;"

Complete Streets Requirement

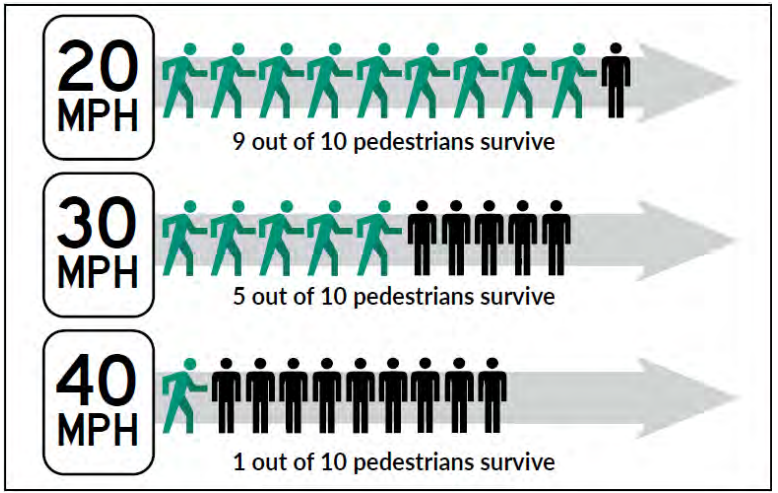
"(b) Consult with local jurisdictions to confirm existing and planned active transportation connections along or across the location; identification of connections to existing and planned public transportation services, ferry landings, commuter and passenger rail, and airports; the existing and planned facility type(s) within the local jurisdiction that connect to the location; and the potential use of speed management techniques to minimize crash exposure and severity;"





Complete Streets Requirement

"(c) Adjust the speed limit to a lower speed with appropriate modifications to roadway design and operations to achieve the desired operating speed in those locations where this speed management approach aligns with local plans or ordinances, particularly in those contexts that present a higher possibility of serious injury or fatal crashes occurring based on land use context, observed crash data, crash potential, roadway characteristics that are likely to increase exposure, or a combination thereof, in keeping with a safe system approach and with the intention of ultimately eliminating serious and fatal crashes;"



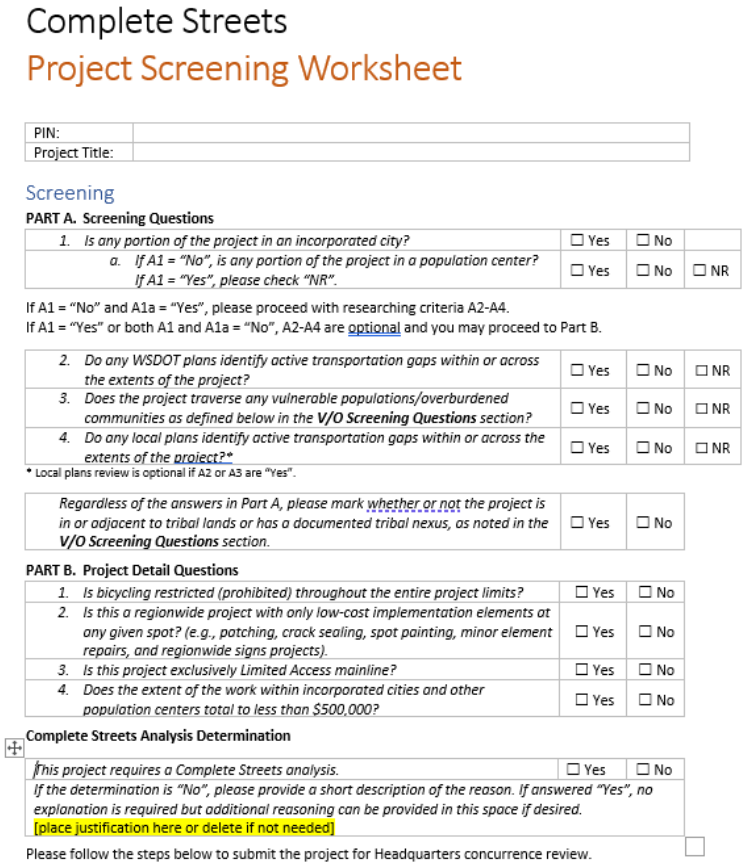
Complete Streets Requirement

"(d) Plan, design, and construct facilities providing context sensitive solutions that contribute to network connectivity and safety for pedestrians, bicyclists, and people accessing public transportation and other modal connections, such facilities to include Americans with disabilities act accessible sidewalks or shared-use paths, bicyclist facilities, and crossings as needed to integrate the state route into the local network."

If –
reque

Screening of Projects

- Screening of all projects over $500,000
- Focus on projects
  - in incorporated cities,
  - and other population centers where active transportation gaps have been identified in WSDOT or local plans, or projects touch overburdened communities
- ~350 projects screened statewide (with design start dates between 2022 and 2028)
- Complete Streets applies to some portion of ~52% of projects



Complete Streets

Project Screening Worksheet

PIN:	
Project Title:	

Screening

PART A. Screening Questions

1. *Is any portion of the project in an incorporated city?*	☐ Yes	☐ No	
a. *If A1 = "No", is any portion of the project in a population center? If A1 = "Yes", please check "NR".*	☐ Yes	☐ No	☐ NR

If A1 = "No" and A1a = "Yes", please proceed with researching criteria A2-A4.
If A1 = "Yes" or both A1 and A1a = "No", A2-A4 are optional and you may proceed to Part B.

2. *Do any WSDOT plans identify active transportation gaps within or across the extents of the project?*	☐ Yes	☐ No	☐ NR
3. *Does the project traverse any vulnerable populations/overburdened communities as defined below in the **V/O Screening Questions** section?*	☐ Yes	☐ No	☐ NR
4. *Do any local plans identify active transportation gaps within or across the extents of the project?**	☐ Yes	☐ No	☐ NR

* Local plans review is optional if A2 or A3 are "Yes".

*Regardless of the answers in Part A, please mark whether or not the project is in or adjacent to tribal lands or has a documented tribal nexus, as noted in the **V/O Screening Questions** section.*	☐ Yes	☐ No

PART B. Project Detail Questions

1. *Is bicycling restricted (prohibited) throughout the entire project limits?*	☐ Yes	☐ No
2. *Is this a regionwide project with only low-cost implementation elements at any given spot? (e.g., patching, crack sealing, spot painting, minor element repairs, and regionwide signs projects).*	☐ Yes	☐ No
3. *Is this project exclusively Limited Access mainline?*	☐ Yes	☐ No
4. *Does the extent of the work within incorporated cities and other population centers total to less than $500,000?*	☐ Yes	☐ No

Complete Streets Analysis Determination

This project requires a Complete Streets analysis.	☐ Yes	☐ No
If the determination is "No", please provide a short description of the reason. If answered "Yes", no explanation is required but additional reasoning can be provided in this space if desired. [place justification here or delete if not needed]		

Please follow the steps below to submit the project for Headquarters concurrence review.

Implementation Policies

WSDOT Complete Streets Webpage: Complete Streets Implementation Project Delivery Memo

- Direction includes:
  - Involving community addressing needs of overburdened communities
  - Eliminating active transportation gaps
  - Separating active travelers from drivers where speeds exceed 30 mph
- "Highways are assessed with respect to the performance of biking, walking and other pedestrian modes using **Level of Traffic Stress** (LTS) and **route directness**."

"Provide bicycle and pedestrian facilities that offer LTS 1 or 2"

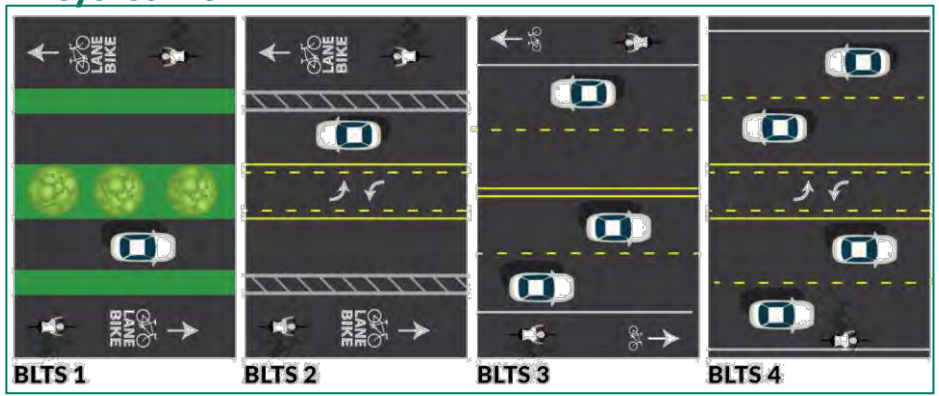
SR 503 at NE 76th ST—high LTS roads and crossings!

Level of Traffic Stress—WSDOT Characterization

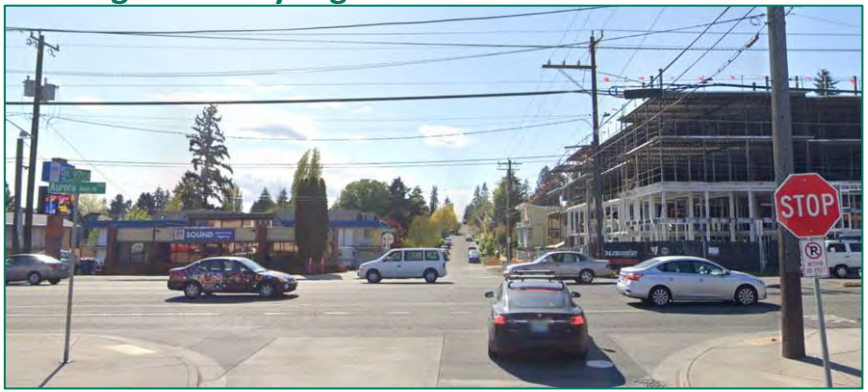
Characteristics	LTS 1	LTS 2	LTS 3	LTS 4
Stress	minimal/none	low	moderate	high
Required attentiveness (to traffic)	minimal/none	low	moderate	high
Unsupervised Suitability	all ages and abilities	8 years and up	adult	adult
Accessibility	all ages and abilities	possible limitations for wheeled mobility device	likely limitations for wheeled mobility device	presents barrier to wheeled mobility device use
Traffic conditions	low speeds and volumes if facilities are near traffic	moderate speeds and volumes	higher speeds and volumes	highest speeds and volumes, typically multilane roadways

Level of Traffic Stress

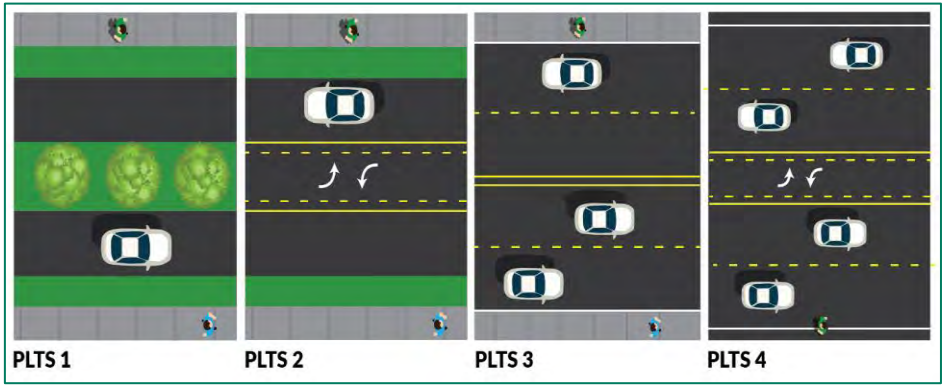
Bicyclist LTS



Crossing LTS—Very High

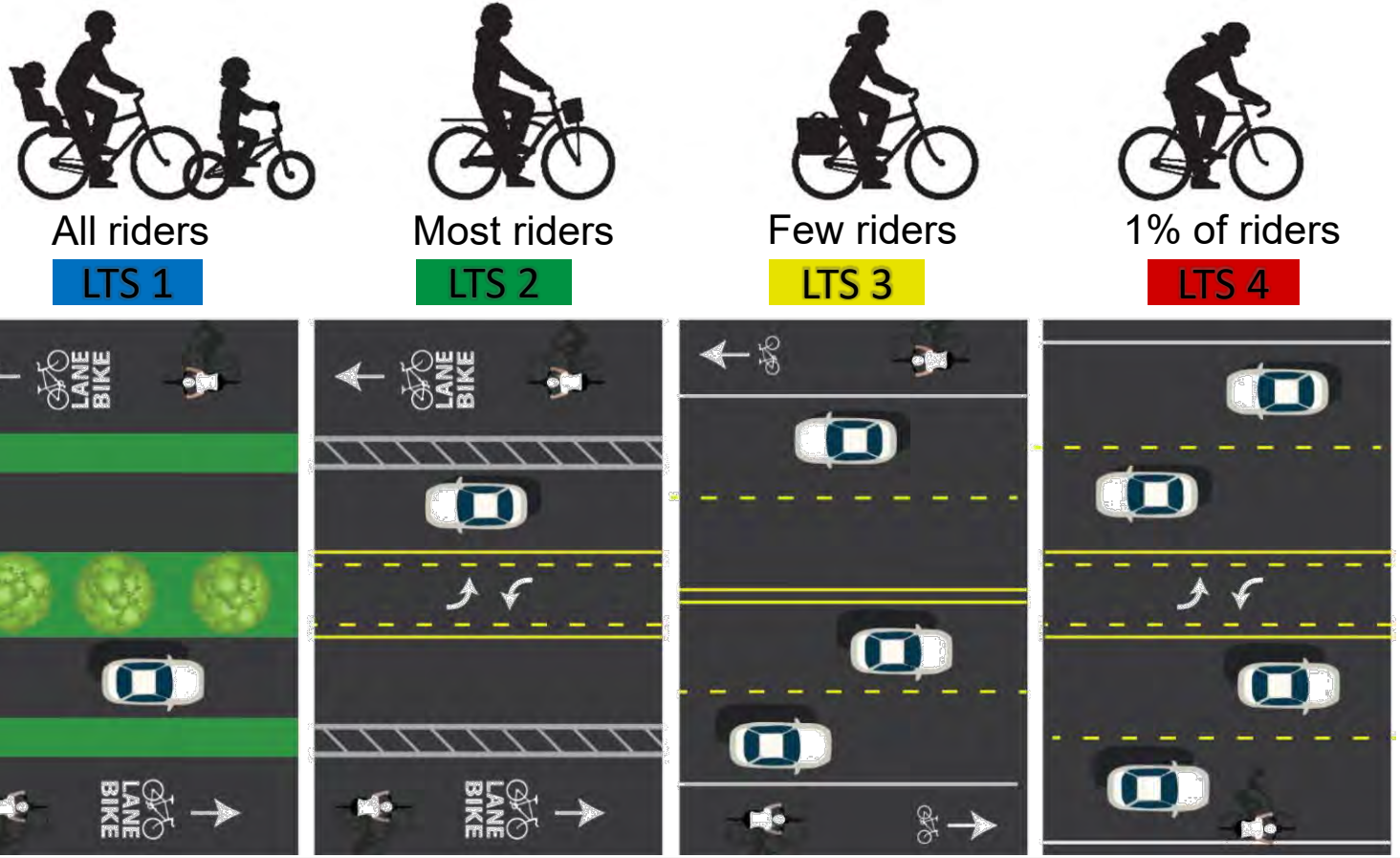


Pedestrian LTS

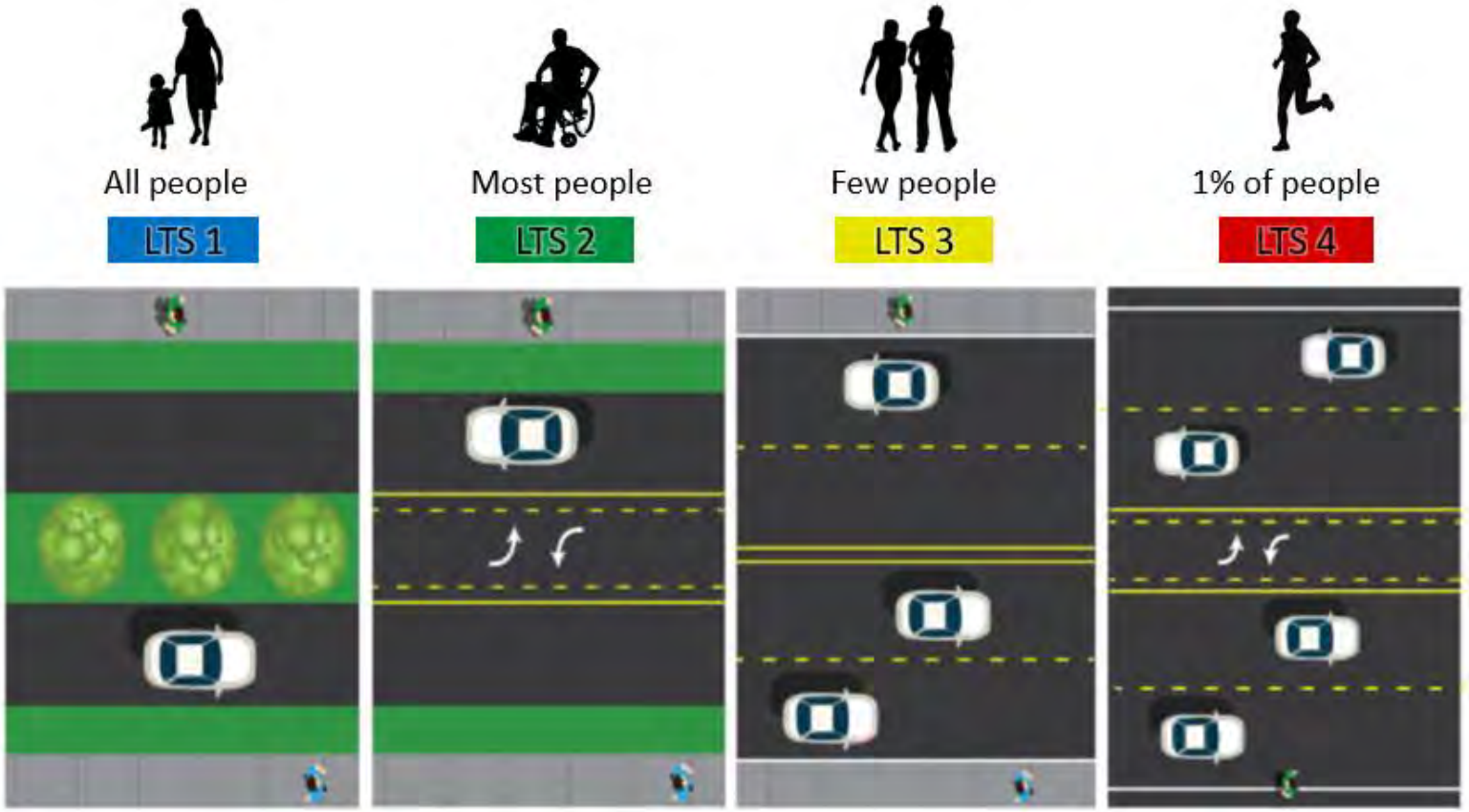


Crossing LTS—Better, but still high due to speed

Level of Traffic Stress - Bicycle



Level of Traffic Stress - Pedestrian



Route Directness

Route Directness Index (RDI)

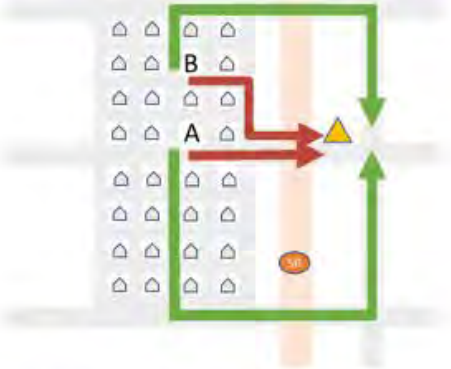
- "How far out of my way do I need to go to cross the highway?"
- WSDOT Multimodal Permeability Pilot
- RDI tied to LTS

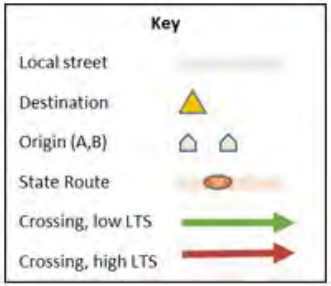
Physically high RDI:

Person B must go out of their way to reach a destination due to network design

Functionally high RDI:

Both person A and B must go out of their way to find a reasonable crossing.





Route Directness

Allowable Solutions

Project Delivery Memo:

“Include a design option in the Basis of Design alternatives analysis that limits the expansion of the roadway footprint (road diet). Potential modifications to the highway’s layout (e.g., narrowing of lanes, road diet or elimination of lanes) may reduce the highway’s vehicular Level of Service (LOS), but provide for the introduction of Complete Streets design features at lower cost. Options that reduce vehicle LOS are acceptable on a case-by-case basis in cooperation with the local agency. Consult with your ASDE to assess the potential for mode shift as part of this analysis.”

PRIVATE MOTOR VEHICLES
600–1,600/HR

NACTO

MIXED TRAFFIC WITH FREQUENT BUSES
1,000–2,800/HR

TWO-WAY PROTECTED BIKEWAY
7,500/HR

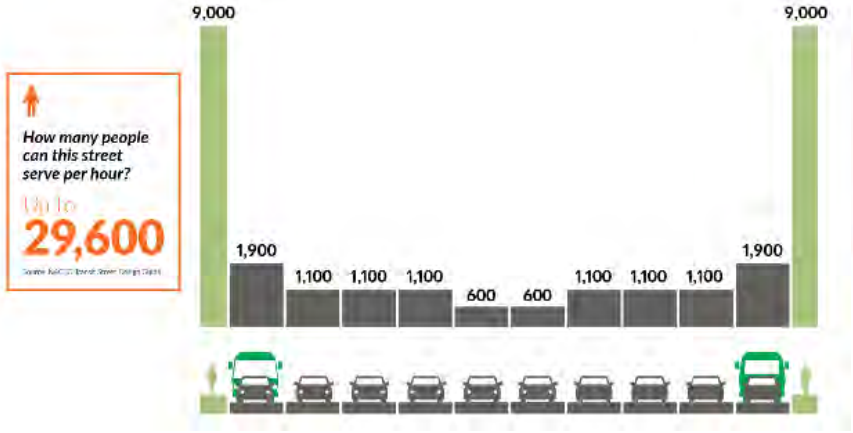
DEDICATED TRANSIT LANES
4,000–8,000/HR

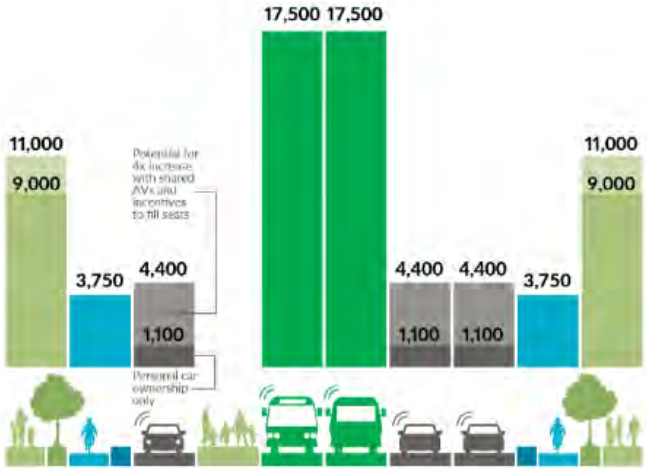
SIDEWALK
9,000/HR

ON-STREET TRANSITWAY, BUS OR RAIL
10,000–25,000/HR

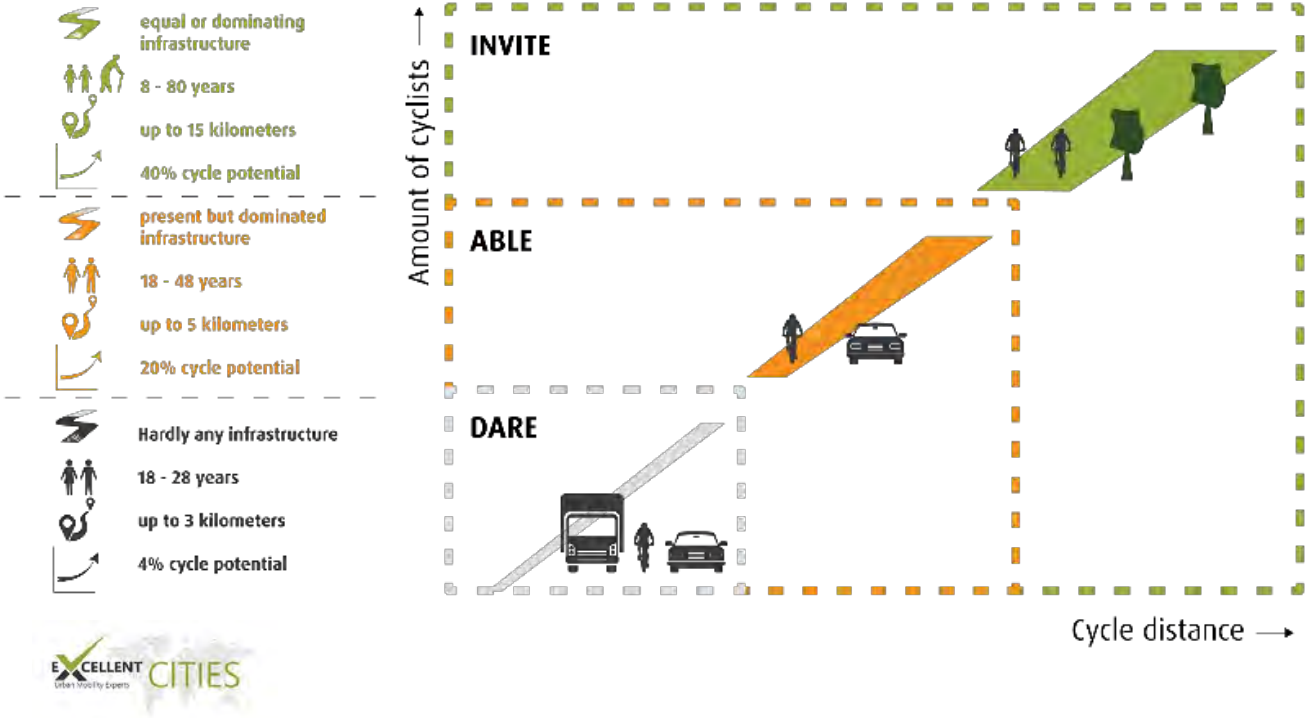
From: NACTO Transit Street Design Guide

A More Balanced, Equitable, and Resilient Transportation System





A More Balanced, Equitable, and Resilient Transportation System



More value from our public investments

- Completing the walking and bicycling network is now a baseline need.
- Efficiencies of one design and construction cycle to address multiple deficiencies.
- Stewarding our mature highway system while adding to our under-developed active transportation system.
- Building infrastructure that aligns with our state and community goals.

Walla Walla

REGION COMPLETE STREETS TEAMS

Team Leads and Contact Information

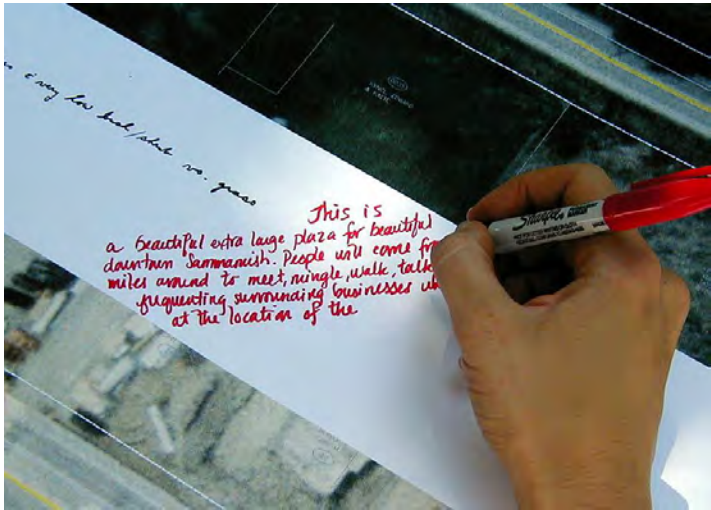
Region	Lead	Contact Email
Olympic Region	Yvette Liufau	OR_CSteam@wsdot.wa.gov
Southwest Region	Chelsey Martin	swrcompletestreets@wsdot.wa.gov
South Central Region	Keith Hall	hallkei@wsdot.wa.gov
North Central Region	Kathy Murray	murraka@wsdot.wa.gov
Eastern Region	Shea Suski	wsdotercompletestreetsteam@wsdot.wa.gov
Northwest Region	Lisa Ballard (SnoKing) Elizabeth Sjostrom (Mt Baker Area)	NWRCompleteStreetsTeam@wsdot.wa.gov MBACompleteStreetsSupport@wsdot.wa.gov

Questions

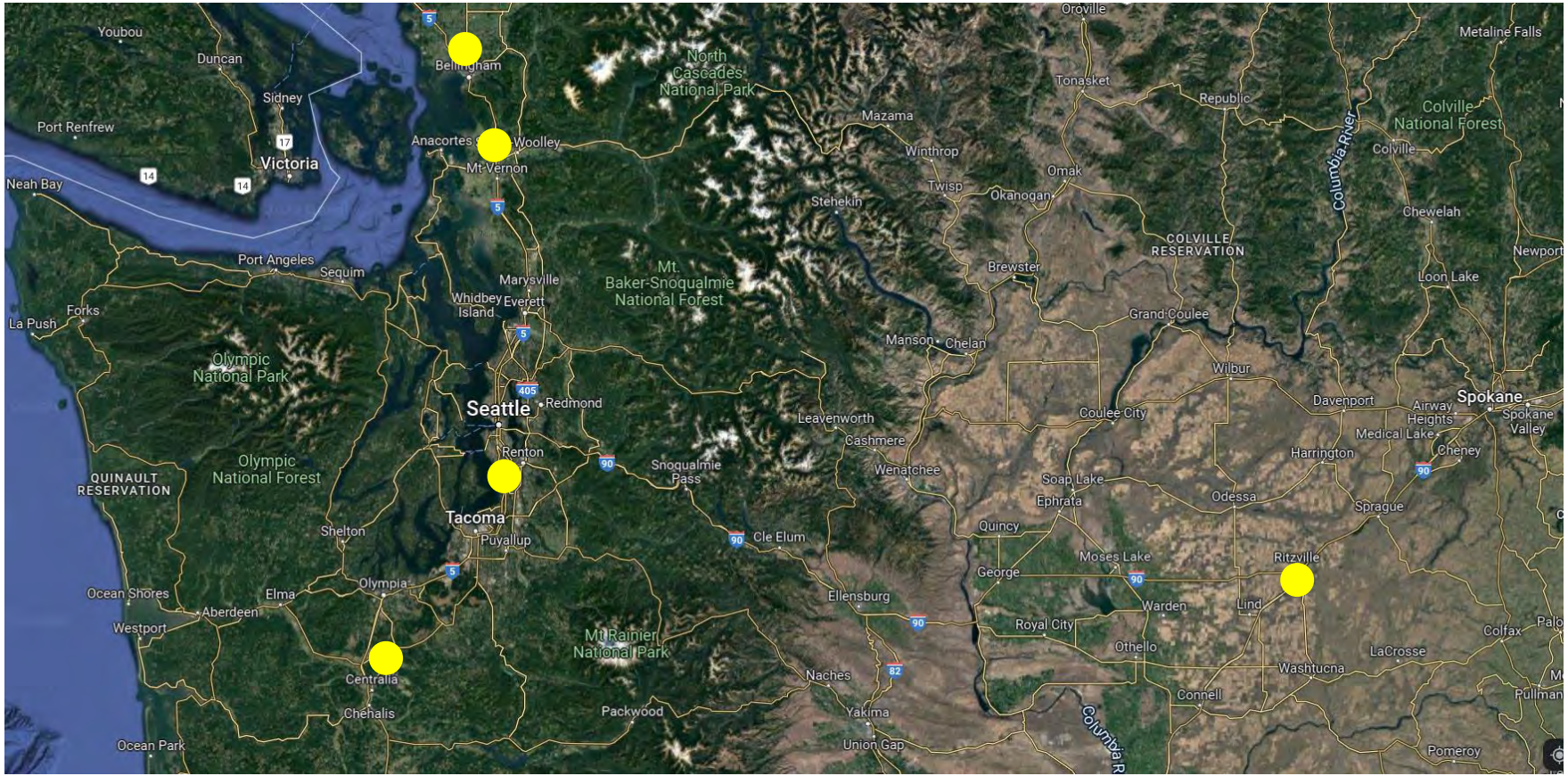
Lunch

Charrette Intro

- ❑ Select a table for the problems you most wish to address
- ❑ Pick a table where you know the fewest people
- ❑ Pick a table leader, and a presenter
- ❑ Follow the handout instructions
- ❑ Mark up the maps, take notes



Map of project locations



Bellingham

Projects: SR 539/I-5 Fish Passages, Paving, ADA

Located in:

- Identified as an overburdened community
- AADT 51,000, T2 freight route
- Transit route, no pick-ups along this busy corridor
- Gaps identified in WSDOT's Active Transportation Plan
- City of Bellingham ADA and Walking Plans identified needs
- Bicycle route identified off this corridor, this more comfortable route – not fully developed

Lots of activity squeezed into a small space

Burlington

Project: SR 20 Paving

Location:

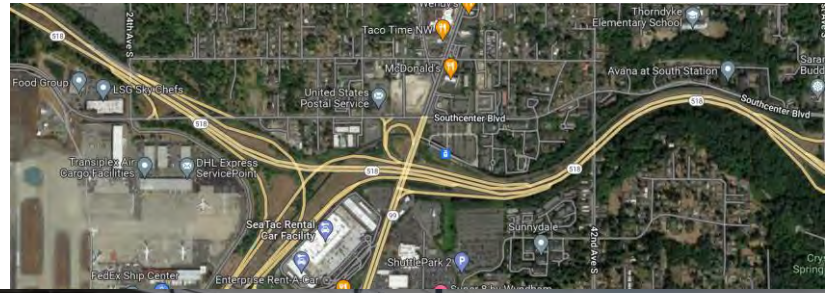
- Identified as a portion of an overburdened community
- Gaps are identified in WSDOT's Active Transportation Plan
- The City of Burlington is excited for the opportunity to partner with WSDOT to identify improvements needed on and off the highway system to support active transportation and transit

SeaTac/Tuckwila

Project: SR 99/SR 518 Pedestrian Improvements

Location

- Ramp termini
- Existing light rail station
- Bus Rapid Transit in design
- Overburdened community (Environmental Health Disparity Map rank 10)
- Gaps identified by cities, Sound Transit, and WSDOT
- Strategy identified in SR 518 Corridor Study

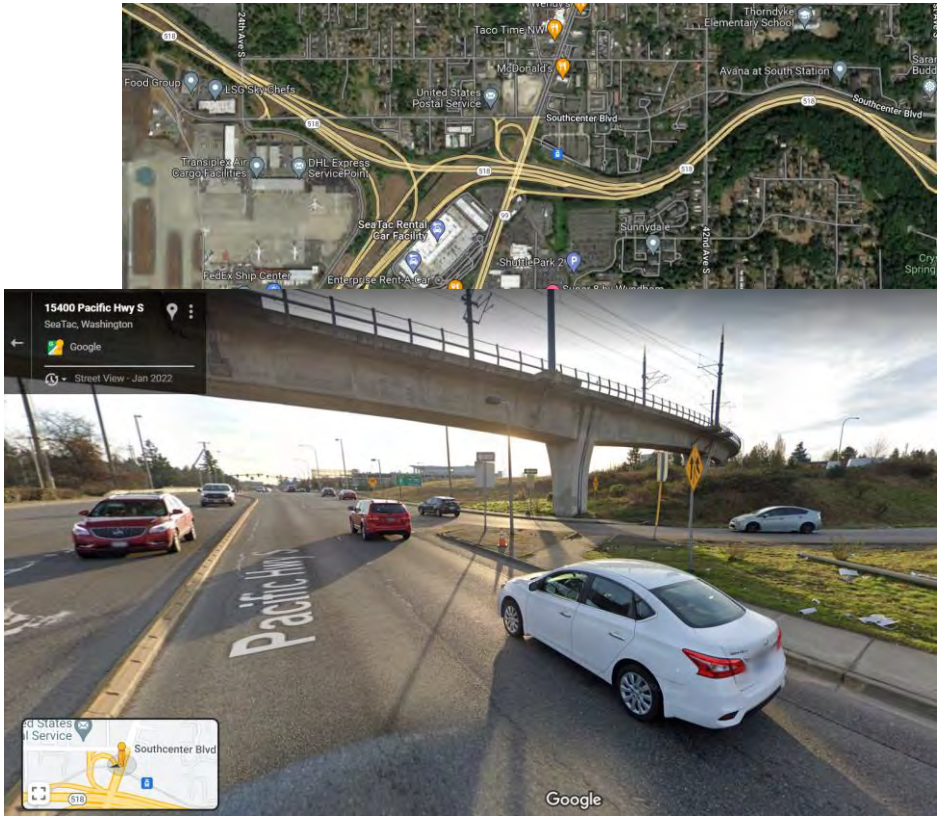


SeaTac/Tuckwila

Project: SR 99/SR 518 Pedestrian Improvements

Location

- AADT 32,320
- Freight classification T-2
- Posted speed 40 mph
- SR 518 BRT in median with pedestrian bridge connection to light rail and possible southside redevelopment or SR 518 on-ramp
- Metro A Line on SR 99
- Transit oriented development
- Rental car facility

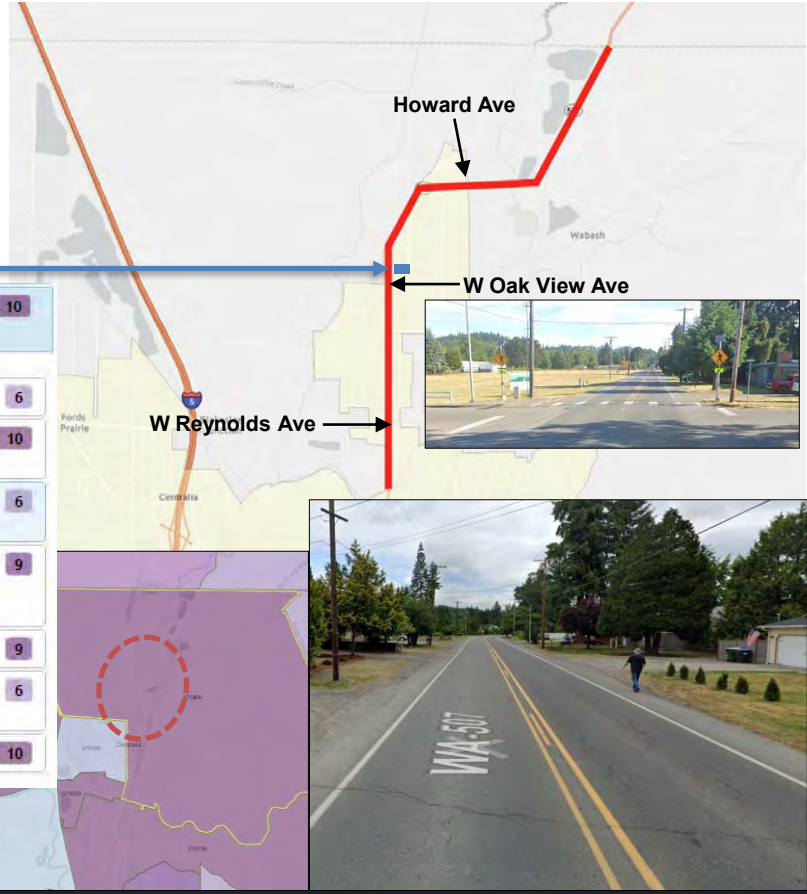


Centralia

Projects: SR 507/Skookumchuck River to Thurston Co Line – Pavement Rehabilitation

Characteristics:

- Oakview Elementary School
- AADT 9,400 at Reynolds, 3,800 at City limits
- 35 mph posted speed within City limits
- Designated T-3 Freight Route with significant potential for freight development to the north
- RuralTRANSIT - Route 4 stop to the south

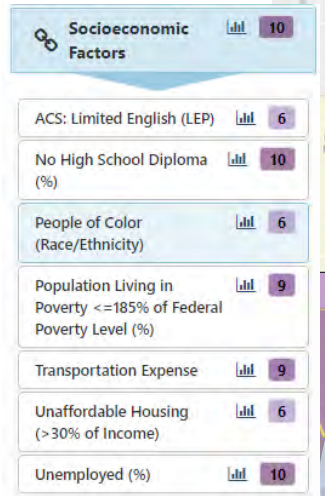


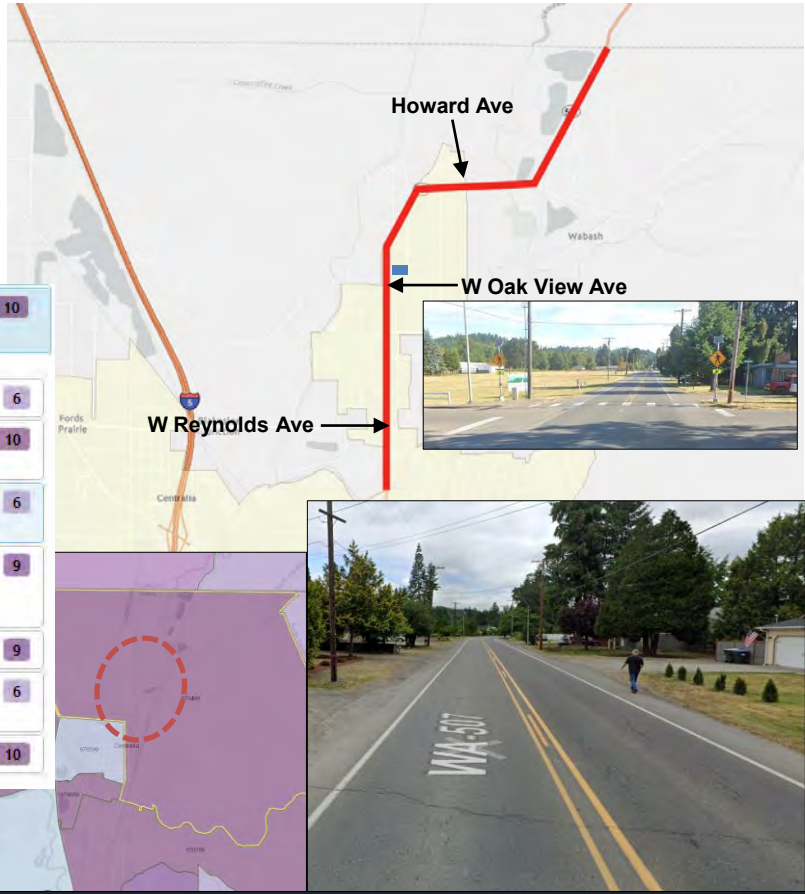
Centralia

Projects: SR 507/Skookumchuck River to Thurston Co Line – Pavement Rehabilitation

Characteristics:

- Significant flooding potential
- Mixture of residential and commercial, more commercial towards W Reynolds Ave
- Little to no sidewalk, unpaved shoulders, one enhanced crossing at W Oak View Ave
- Setback utilities = approx. WSDOT right of way available for improvements





Ritzville

Project: I-90/SR 261 EB Bridge Rehab (SR 261 between I-90 ramps)

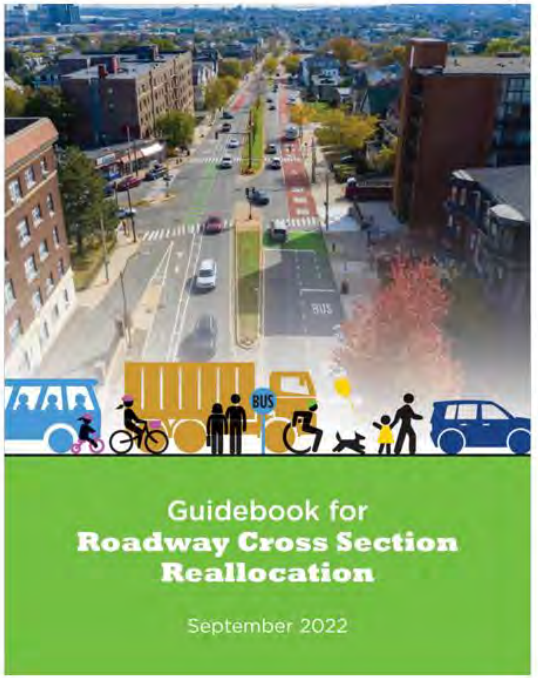
Location:

- City of Ritzville
- Gaps are identified in WSDOT's Active Transportation Plan
- New mixed-use development will increase demand for active transportation
- WSDOT project will explore what can be implemented within the constrained space under the existing I-90 bridges
- City study will identify additional active transportation strategies for the area, including long-term solution under I-90 for when bridges are replaced

NCHRP 15-78: Guidebook for Roadway Cross Section Reallocation

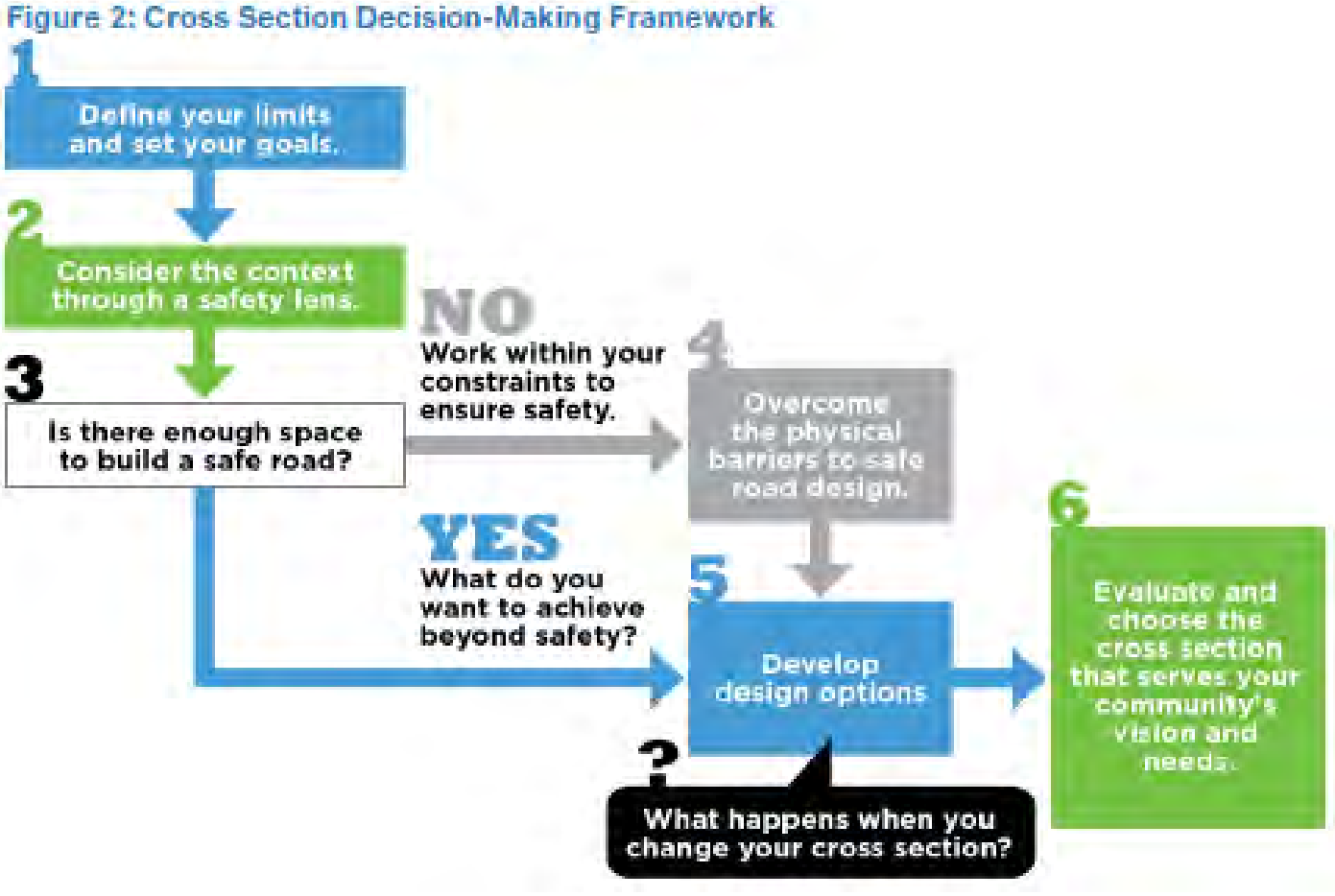
GUIDEBOOK CONTENT

1. Introduction
2. Choosing a cross section that serves your vision
3. Opportunities to change a cross section
4. Planning context
5. Safety for everyone
6. Overcoming barriers to safe design
7. Cross section elements
8. Making and evaluating cross section changes



Guidebook and cross section reallocation tool pre-publication: https://www.trb.org/Publications/Blurbs/182870.aspx

NCHRP 15-78: Guidebook for Roadway Cross Section Reallocation



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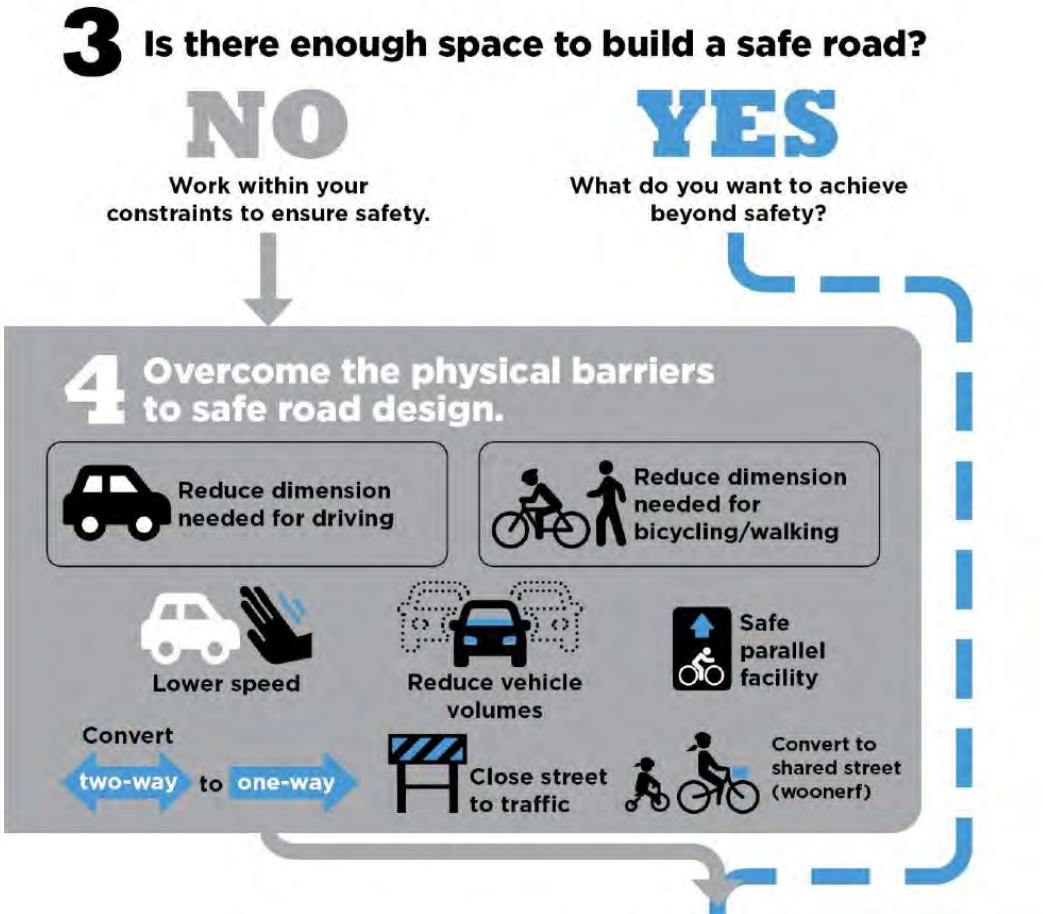

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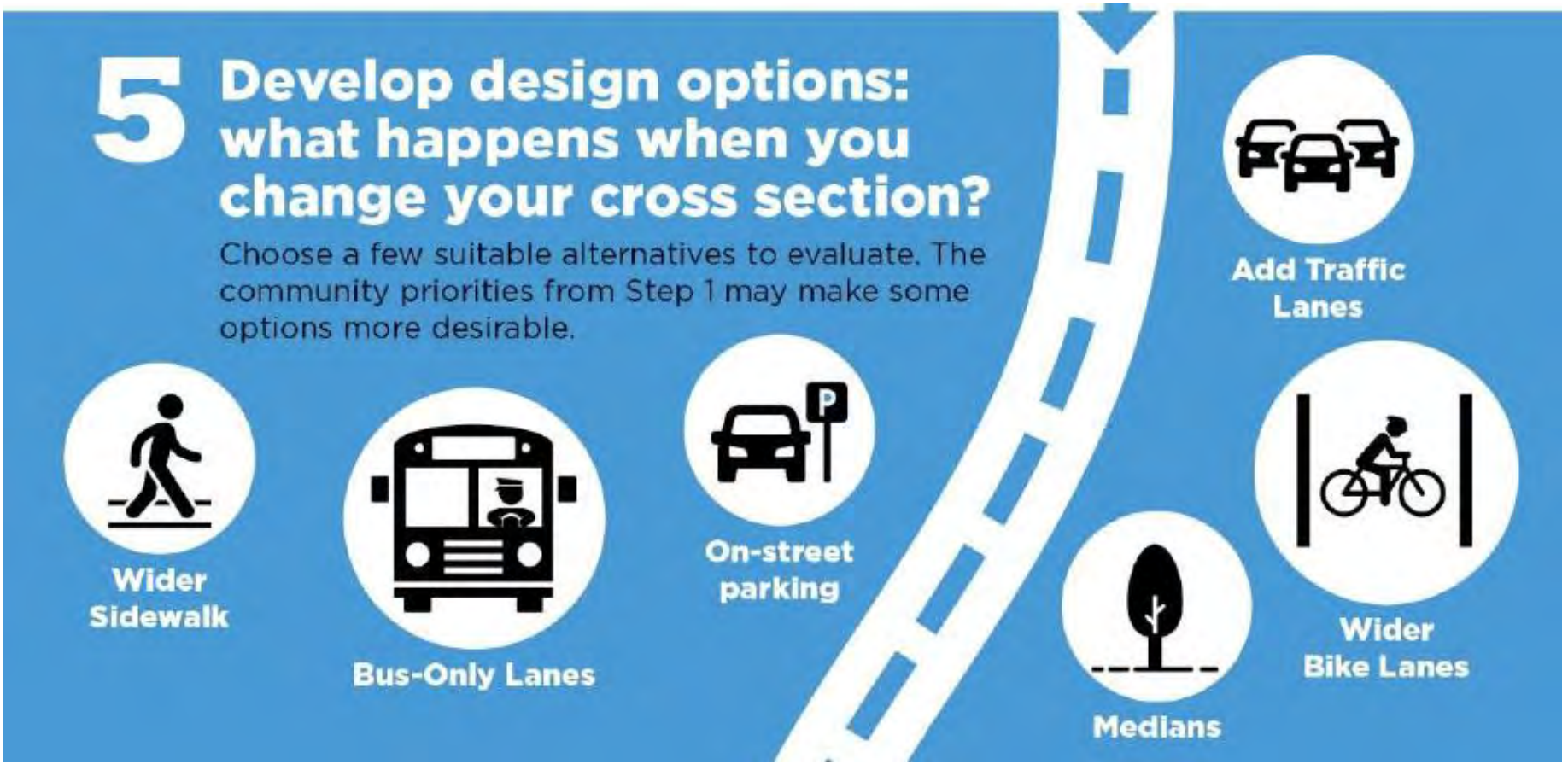

NCHRP 15-78: Guidebook for Roadway Cross Section Reallocation

NCHRP 15-78: Guidebook for Roadway Cross Section Reallocation

Figure 35: Communicating all-day impacts of cross-sectional reallocation at intersections

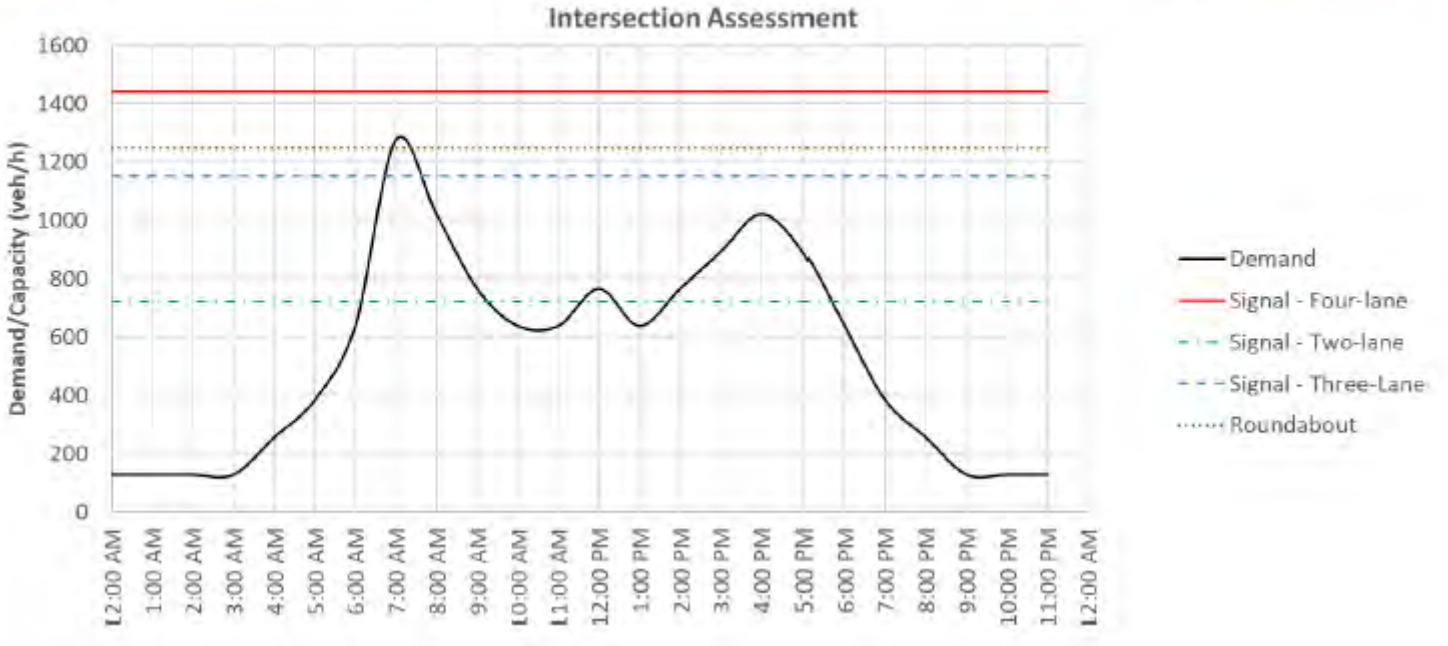

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Figure 45: Recommended Bike Lane and Buffer Widths

≤20 MPH

Vehicle Volume (ADT)	# of Travel Lanes	Facility Type (Width)	Street Buffer Type (Width)	On-Street Parking Location (Additional Buffer Width)	Supported By
<2000	No centerline	Mixed traffic (15-19 feet)	Not applicable (Not Applicable)	Curbside (Not Applicable)	MassDOT*, CROW
2000-4000					
>4000		Bike lane (5.5 feet)	Paint (Not Applicable)		FHWA, MassDOT, CROW

*FHWA = Schultheiss et al. 2019; NACTO = NACTO 2014; MassDOT = MassDOT 2015; CROW = Koster 2016

25 MPH

Vehicle Volume (ADT)	# of Travel Lanes	Facility Type (Width)	Street Buffer Type (Width)	On-Street Parking Location (Additional Buffer Width)	Supported By
<1500	No centerline	Mixed traffic (15-19 feet)	Not applicable (Not Applicable)	Curbside (Not Applicable)	NACTO, MassDOT
1500-3000	1 lane per direction	Bike Lane (5.5 feet)	Paint (Not Applicable)	Curbside (1 foot)	NACTO, MassDOT, CROW
3000-6000		Buffered bike lane (5.5 feet)	Paint (1 foot)	Curbside (1 foot)	FHWA, NACTO, MassDOT, CROW
>6000	2 lanes per direction	Separated bike lane (6 feet)	Light separation* (1 foot)	Floating (2 feet)	NACTO, MassDOT, CROW
		Raised bike lane (6 feet)	Light separation (2 feet)		
		Two-way bike lane (10 feet)	Light separation (2 feet)	Floating (1 foot)	

*Light separation includes flexposts, some rigid bollards, plastic planter boxes, rubber curbs, or precast concrete curbs/parking stops.

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NCHRP 15-78: Guidebook for Roadway Cross Section Reallocation

Figure 48: Recommended sidewalk and buffer widths

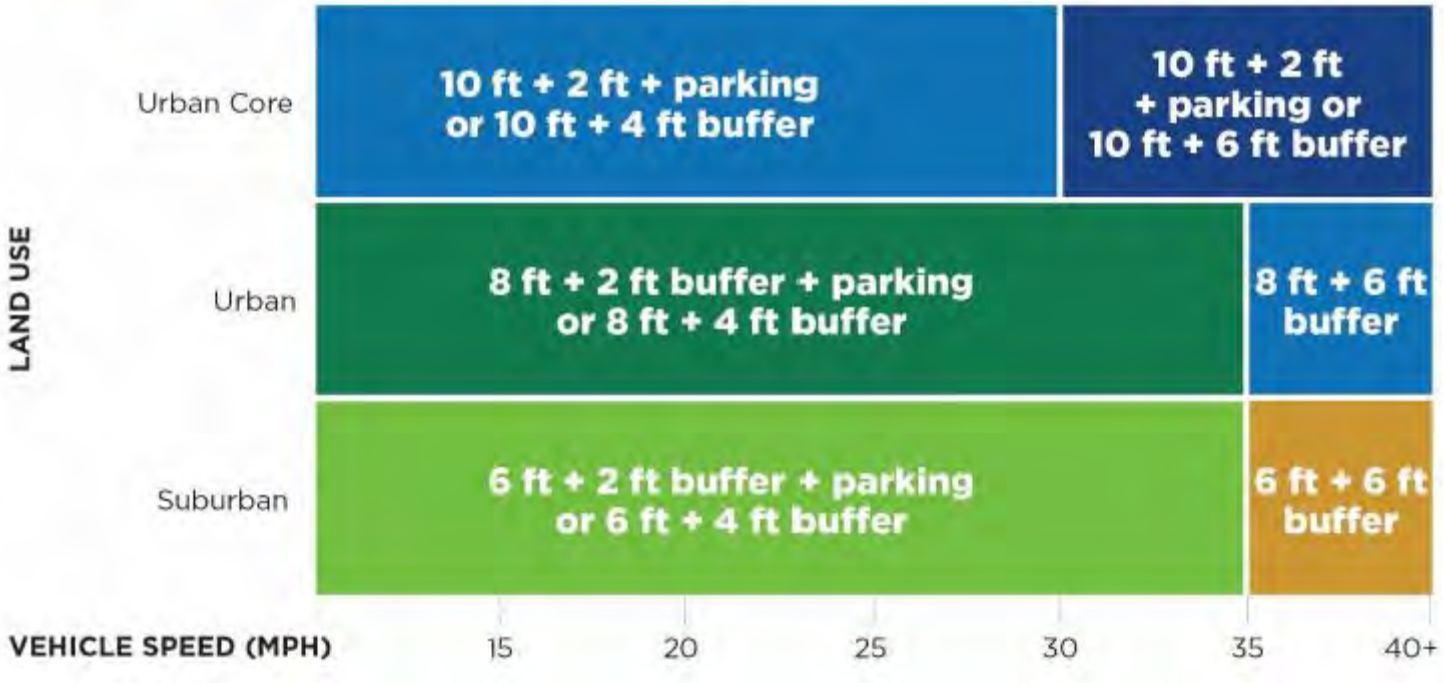

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Figure 49: Recommended Maximum Crosswalk Spacing

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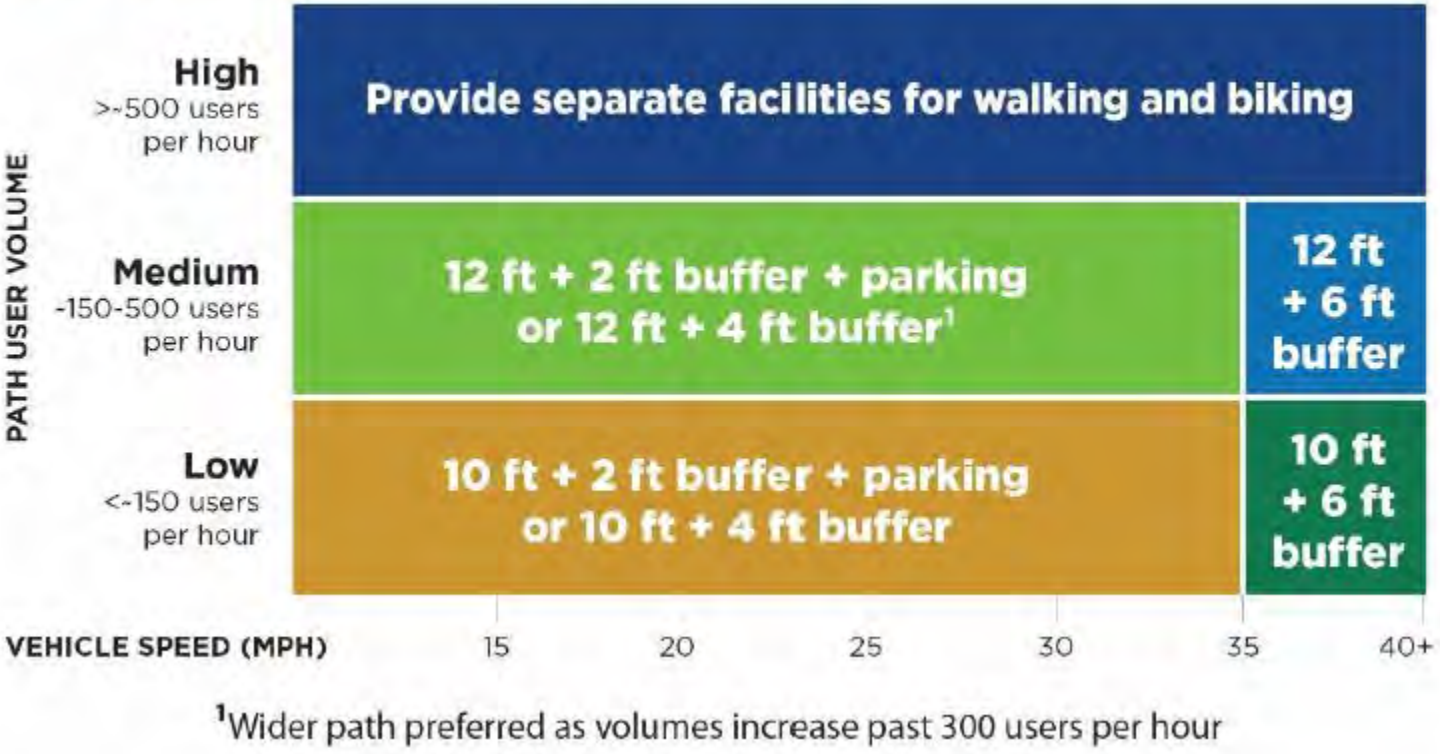
Figure 53: Recommended sidepath and buffer widths



[1]Wider path preferred as volumes increase past 300 users per hour

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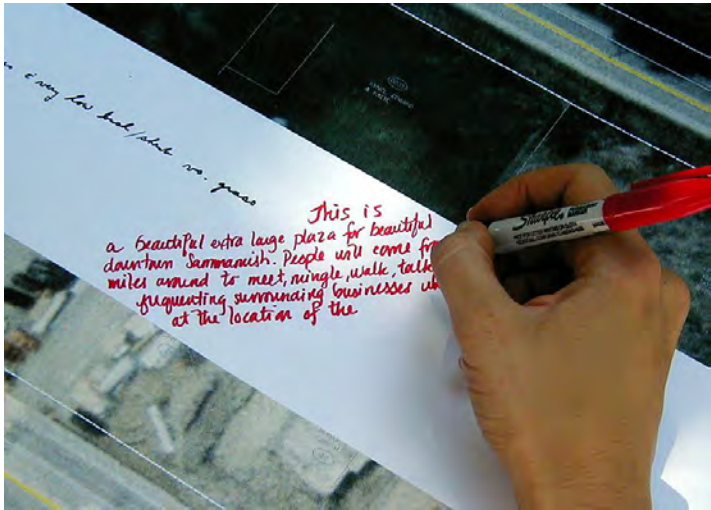
Charrette Intro

- ❑ Select a table to address the problem you wish to address
- ❑ Pick a table where you know the fewest people
- ❑ Pick a table leader, and a presenter
- ❑ Follow the handout instructions
- ❑ Mark up the maps, take notes



Report out

- What did your table define as the problem, challenge, opportunity?
- Focus on your design solutions
- What common solutions were arrived at
- What is unique about your approach

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