Washington Transportation Professionals

Forum and Peer Exchange

September 23, 2025

8:30 AM-12:00 PM



Washington State Department of Commerce

Welcome

- Land Use Planning Strategies for Improving Traffic Safety
- Considerations of Levels of Traffic Stress for Multimodal Design
- Case Studies in Active Transportation Intersection and Crossing Treatments
- Practical Uses of Artificial Intelligence in Transportation

Washington Transportation Professionals

- **Formed**
  - Over 40 years ago as the Urban Traffic Engineers Council.
  - By city traffic engineers and focused on traffic operations.

- **Evolution and Growth**
  - All cities, all counties, MPOs/RTPO's, vendors, consultants, nonprofits, & other agencies = Over 400 entities (Over 1000 individuals).
  - Discuss local agency transportation issues of statewide significance.

- **Forums and Peer Exchanges**
  - Facilitated by WSDOT's Local Programs and Active Transportation divisions with help from public agencies, consultants, and vendors.
  - Looking for relevant topics and presenters.

Statewide Participation

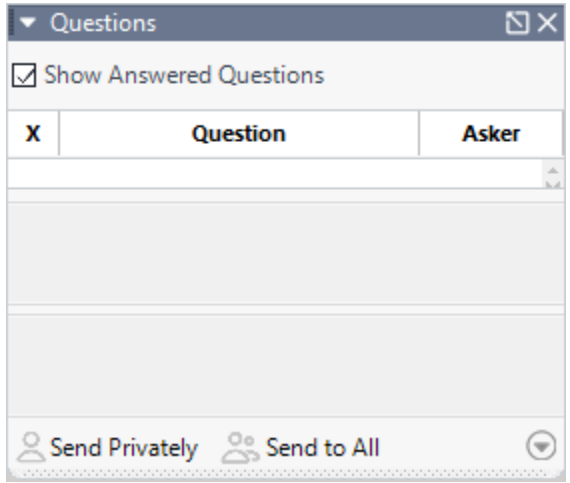
- Cities
- Counties
- Tribes
- WSDOT–All regions, WSF, and HQ
- MPOs/RTPOs
- State Agencies—WTSC, CRAB, TIB, DOH, +others
- Transit, Ports, Railroads, and other transportation providers
- Nonprofit Organizations
- Consultants and Vendors

Webinar Logistics

- Show and hide the GoToWebinar screen: Press the orange arrow toggle button.



- You are in listen-only mode. Please type comments and questions into the “Questions” box. We will read it to the presenter for a response.



Agenda

- Land Use Planning Strategies for Improving Traffic Safety
- Considerations of Levels of Traffic Stress for Multimodal Design
- Case Studies in Active Transportation Intersection and Crossing Treatments
- Practical Uses of Artificial Intelligence in Transportation

Land Use Planning Strategies for Improving Traffic Safety



Jacob Gonzalez

Senior Transportation and Land Use Planner

Washington State Department of Transportation

Safer Land Use

Integrating Land Use with the Safe Systems Approach

Washington Transportation Professionals
Forum and Peer Exchange
September 23, 2025

Safety Challenges

We are not on track to meet Target Zero goals.

Crashes and serious injuries are still increasing due to:

- Speeding
- Reckless driving
- Impaired driving
- Incidents on roadways and work zones

We've focused on driver behavior and road design, but exposure is shaped by land use decisions.

➢ *Local land use determines how many trips end up on state facilities.*

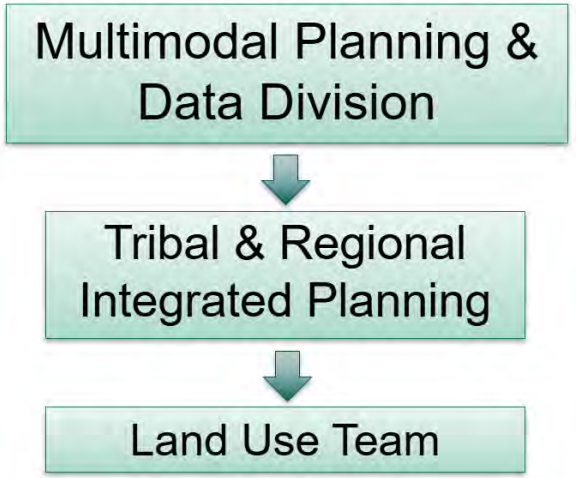


Source: Washington Traffic Safety Commission

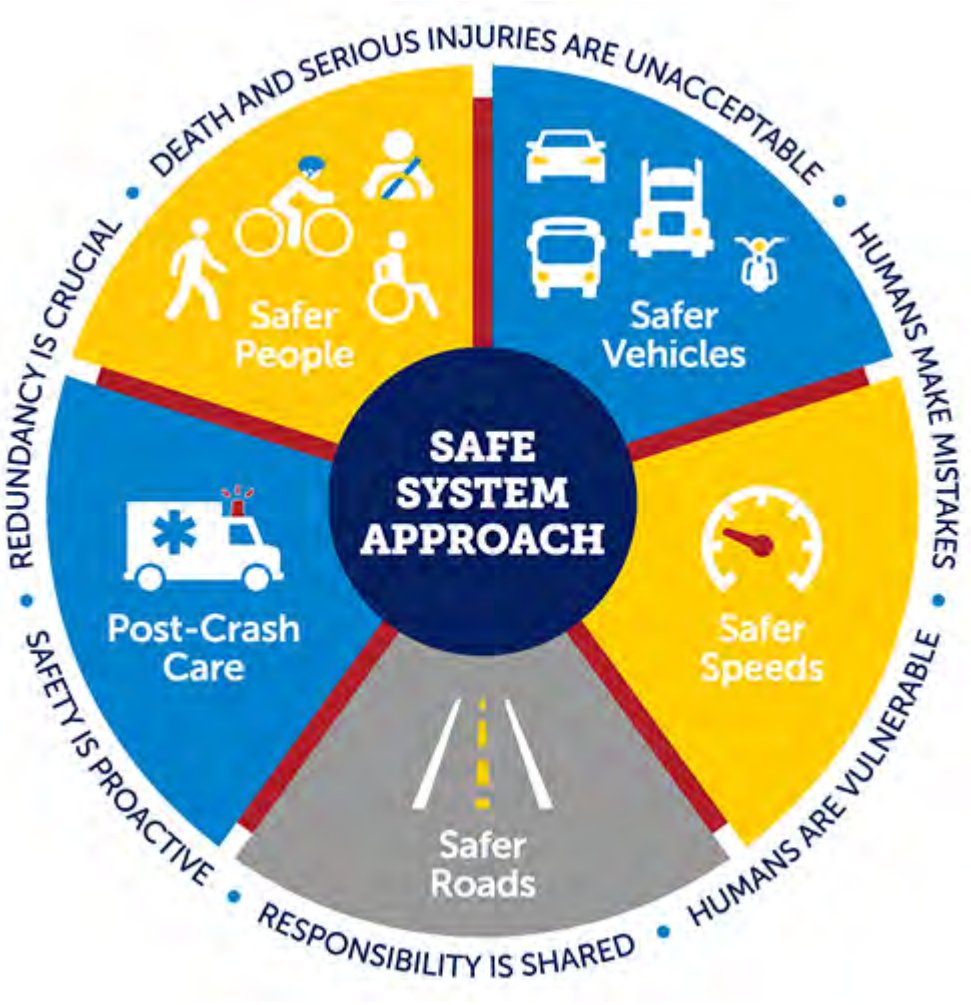
Why Land Use Matters for WSDOT

What is our why?

- **WSDOT owns, operates, and maintains** public assets affected by land use decisions.
- **WSDOT funds, plans, and permits** projects shaped and impacted by land use decisions. Our projects have the capability of enhancing local land use plans.
- **WSDOT can bridge** safety, mobility, housing, and public health through coordinated planning and guidance.



Safe System Approach



FHWA



Washington State Department of Transportation

Safe System Approach

Traditional approaches to road safety	→	Safe System Approach
Focus on total crashes	→	Focus on fatal and serious injuries
Reduce the likelihood of crashes	→	**Strengthen all parts of the system to reduce exposure, likelihood and severity of crashes**
Road user has primary responsibility	→	A shared responsibility exist between those who design, build, operate and use the roads and vehicles.
Change individual road user behavior	→	Support safe road use
Safety is addressed after crashes occur	→	Safety is proactive
Roads are made as safe as practicable	→	Roads are self-explaining and forgiving to to reduce large crash forces

Safe System Approach

Exposure		Likelihood		Severity
• Decreased complexity • Reduce AADT • Think critically about conflicts	X	• Reducing crash types • Lane widths, lighting, curbs, shoulders, signals	X	• Reduce speeds • Angle crashes • Vehicle type/weight

Strategic Highway Safety Plan

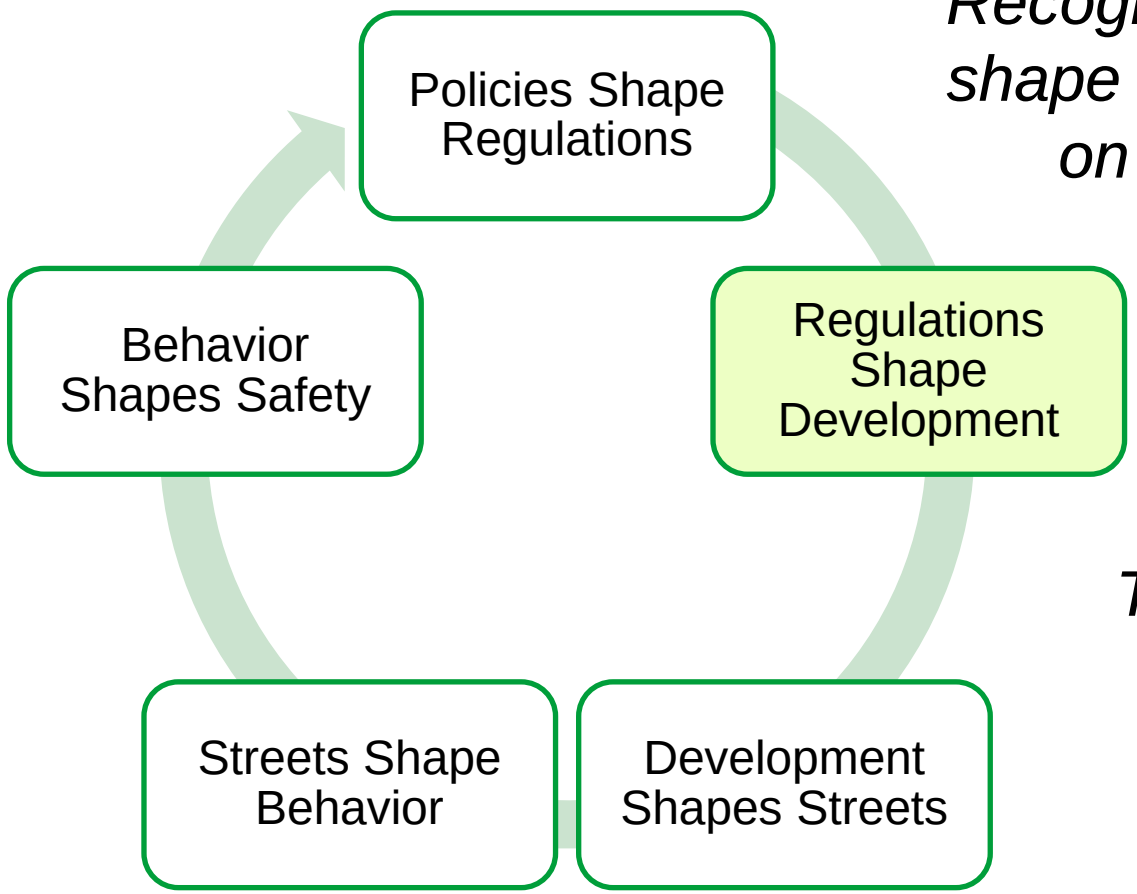
"Zero Deaths and Zero Serious Injuries by 2040"



Transportation safety stats with how we build: land use policies and regulations influence how people get around and how safe those trips are.

Where things are located matters: the design of neighborhoods shapes travel choices, trip lengths, and mobility options.

What is Safer Land Use



Recognizes that the policies and regulations that shape the built environment have a direct impact on how safely people move through their communities.

Transportation Safety is not just a roadway design issue, it is a land use outcome.

Regulatory Factors

We can't solve transportation safety by focusing only on roads. Land use policies and development decisions are a foundation of safety outcomes.

- **Zoning**: Rules that separate residential, commercial, and other land uses –often increasing travel distances and reducing accessibility.
- **Development Standards:** Regulations that govern how land can be developed and designed.
- **Parking Requirements**: Minimum parking mandates that reduce space for people-centered design.
- **Street and Block Length Standards**: Regulations that prioritize wide roads, long blocks, at the expense of pedestrian safety and overall mobility.



Types of Development Standards



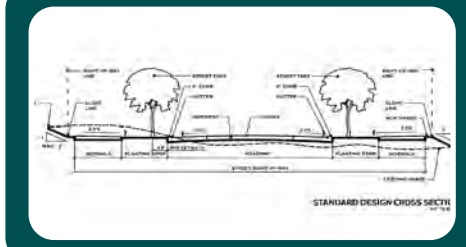
Zoning Code

- What's Allowed:
  - Use permissions (residential, commercial, industrial)
  - Dimensional standards: setbacks, height, lot size and coverage
  - Parking



Subdivision Regulations

- How Land is Divided (platted)
  - Short Plats, Long/Preliminary Plats
  - Lots and blocks
  - Street layout and connectivity



Engineering/Public Works Standards

- How infrastructure is Built
  - Street cross-sections (land widths, sidewalks, curb + gutter, utilities)
  - Materials and construction details

Why They Matter for WSDOT

- Development regulations and standards shape how growth impacts transportation.
- They determine whether projects provide/address:
  - Safety
  - Multimodal Transportation (sidewalks, bike lanes, pedestrian crossings)
  - Safe Connections and Access Management (driveway spacing, turn lanes, frontage, curb cuts)
  - Growth consistent with the Comprehensive Plan (connectivity, concurrency, service extension)
- WSDOT reviews plans/projects for transportation impacts

Standards = Where Policy Meets Practice

Safe Systems Connection

The Safe Systems Approach focuses on reducing crash exposure, likelihood, and severity. Land use plays a key role by:

Reducing Exposure (Mode Choice)

- Increasing proximity between housing, jobs, services, and reducing the length and quantity of trips needed.

Reducing Likelihood (Design & Operations)

- Creating environments where crashes occur at lower speeds and aligning area priorities with transportation needs.

Minimizing Severity (Self-Enforcing Roads)

- Encouraging development patterns that support reduced speeds and high-speed travel near vulnerable users, and appropriately seperating travel modes.

Proximity and Exposure

The more options created for people to live near daily destinations, the fewer and shorter their trips are, lessening likelihood of exposure.

- Understanding the relationship between proximity of uses, vehicle-miles traveled, and exposure.

- Bringing destinations closer reduces travel demand and increases viability of alternative travel options.





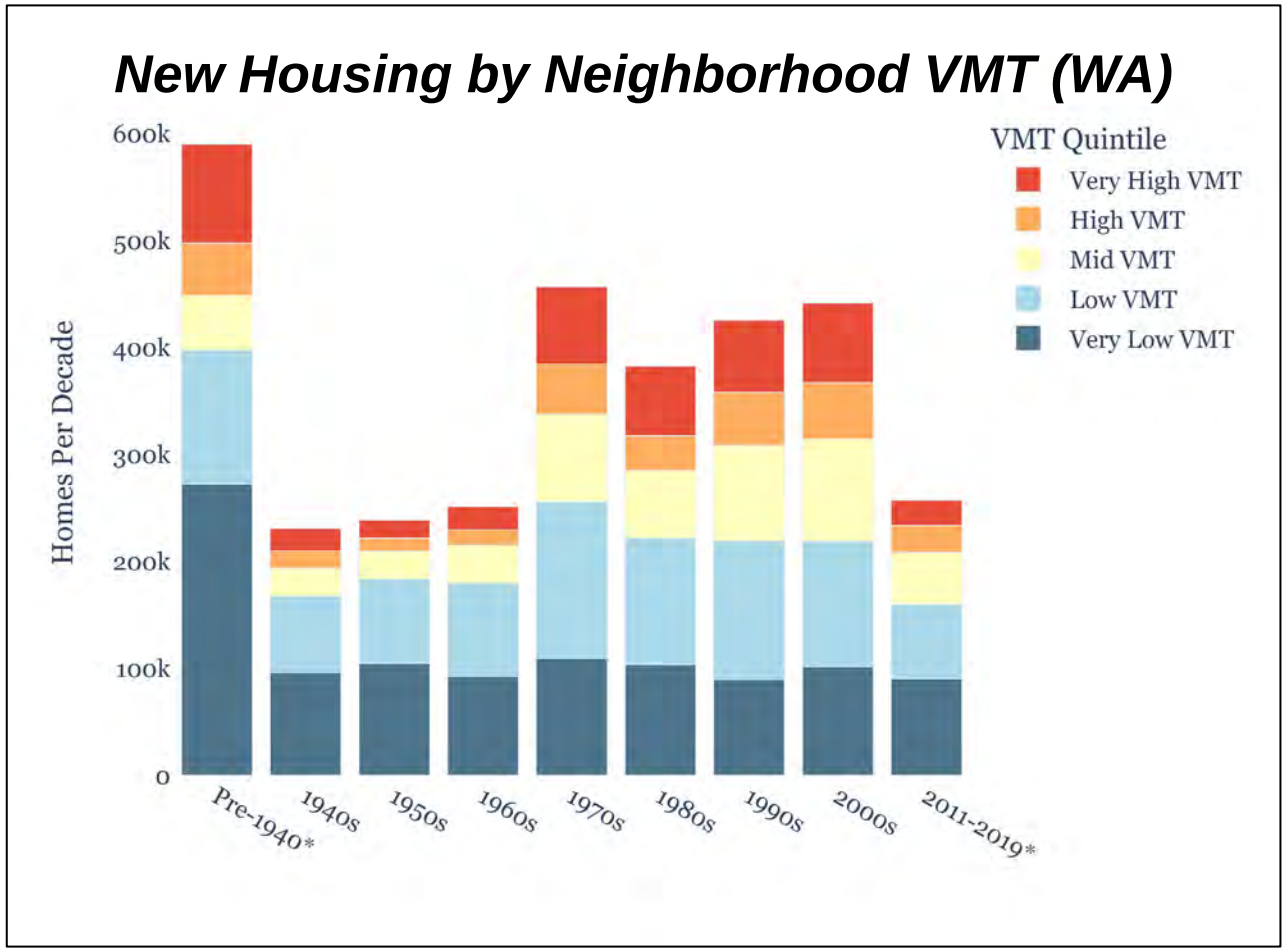
VMT and Housing

Higher VMT = More Exposure

Where are we building?

- Between 2011-2019, 35% of all new housing built in in Very Low VMT areas.

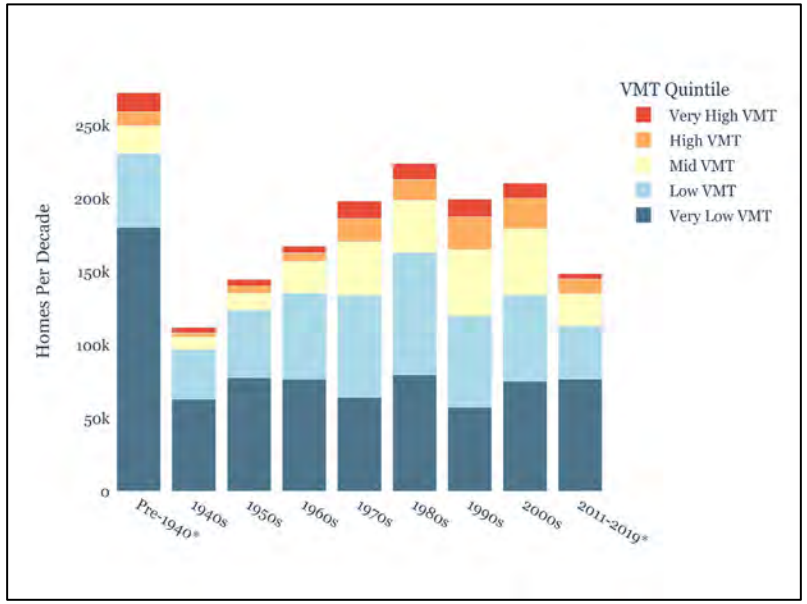
- Average neighborhood VMT for new housing production:
  - WA: 18.6
  - OR: 19.0
  - CA: 21.3
  - National: 23.3



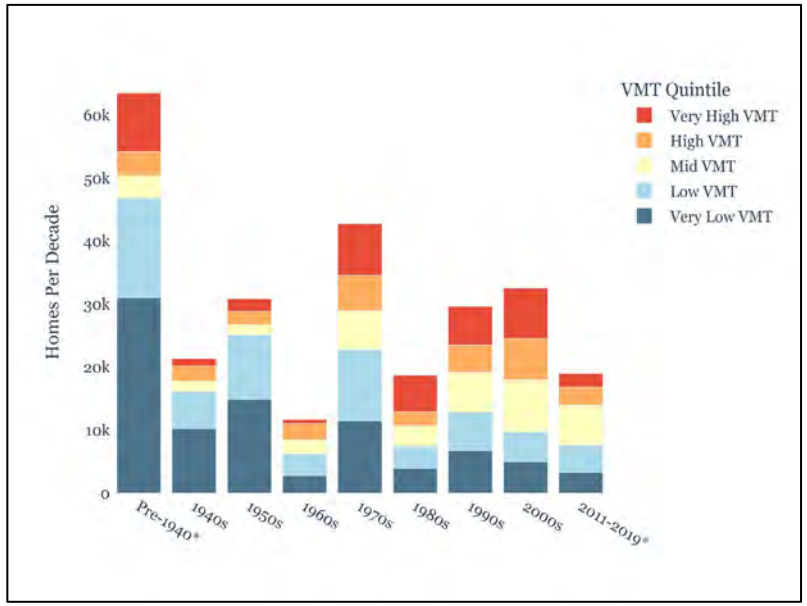
Source: Terner Center for Housing Innovation at UC Berkeley

*Despite our goals to build more housing and reduce VMT, housing is still being built in areas where people **must** drive.*

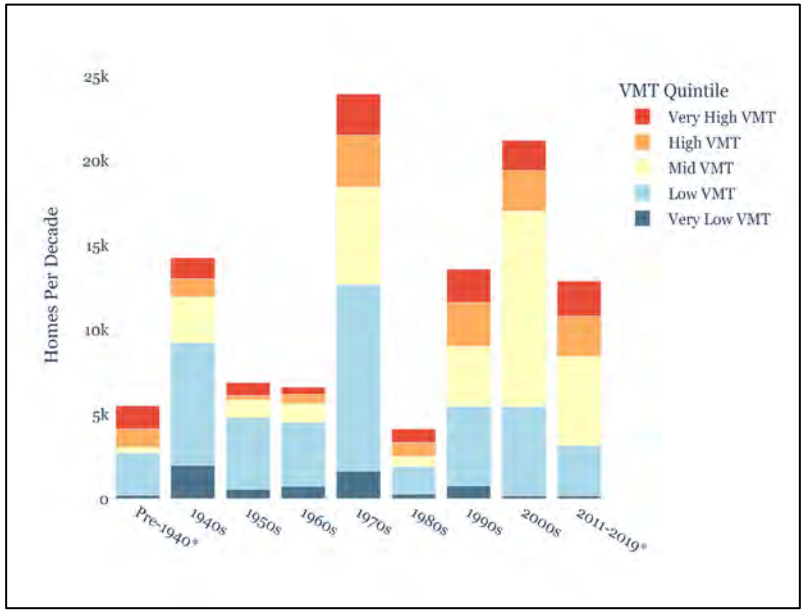
Seattle-Tacoma-Bellevue



Spokane-Spokane Valley



Kennewick-Pasco-Richland



Source: Terner Center for Housing Innovation at UC Berkeley

RCW 47.01.440 - Adoption of Statewide Goals to Reduce VMT by 2050

Land Use Diversity Benefits

A mix of housing and services creates opportunities for increased mobility options and safer transportation outcomes.





Safer Land Use & Public Health

Land use patterns and the built environment influence health outcomes.



Source: Office of Disease Prevention and Health Promotion

- Proximity and land use directly influence access to schools, jobs, food, healthcare, and recreational spaces.
- Low walkability and long travel distances are linked to higher rates of asthma, isolation, cardiovascular disease. (CDC, RWJF)

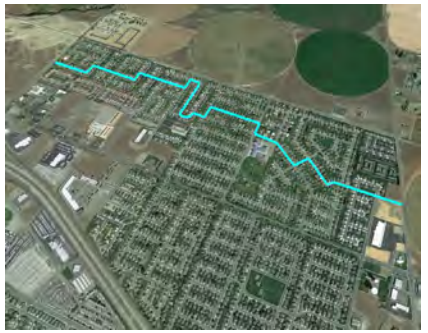




Examples of Safer Land Use

Pasco – Street Connectivity Ordinance

- Required connected street grids and access for new development.
- Improves emergency response, reduces travel distance, increase options, access, and reliability

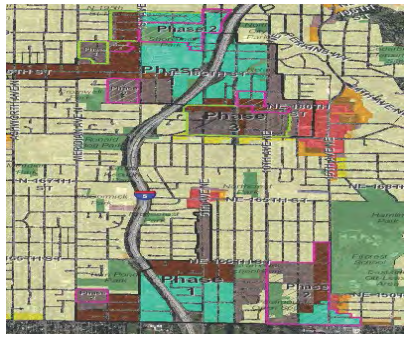




Shoreline – Growth New High-Capacity Transit

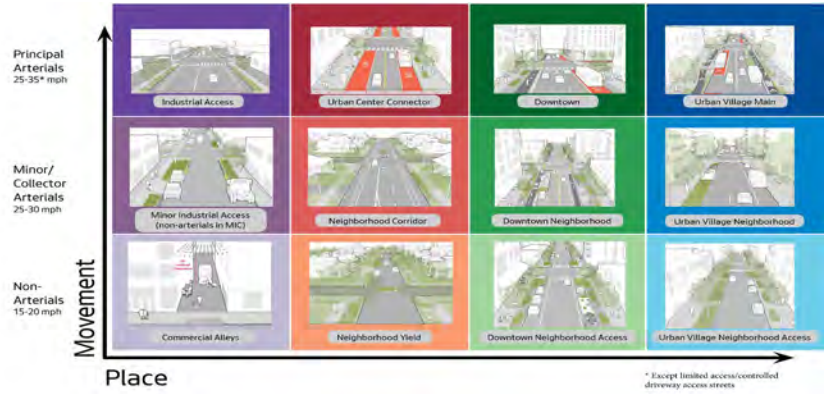
- Focused housing and services around light rail.
- Lowers VMT (and exposure), increases housing options.





Seattle – Context Sensitive Design "Streets Illustrated"

- Linked design standards to land use and neighborhood context.
- Aligns roadway speed, design, and safety.



New Laws Shape Local Planning

New laws shift expectations for cities and changes our approach. We can't meet state goals without linking land use to safety and mobility.

- **HB 1110 (2023)**: Missing Middle Housing
- **HB 1181 (2023)**: Climate Change in Local Comprehensive Planning
- **SB 5412 (2023):** Residential SEPA Streamlining
- **SB 5290 (2023):** Local Project Review Act
- **HB 1491 (2025)**: Transit Oriented Development



Opportunities for Engagement



Comprehensive Planning

- SEPA Scoping, Alternatives, Scenario Planning
- Clear and consistent guidance on transportation – land use integration

Zoning & Development Standards

- Engage, collaborate during the amendment process
- Provide examples
- Coordinate with Dept of Commerce

WSDOT's Role in Safer Land Use

Align Transportation strategies with land use context	Provide data, planning guidance, tools, examples	Shape development connections to state system
• Helps reduce exposure decreasing trip needs and distances.	• Support reducing crash likelihood with better-informed local decisions.	• Aligns access with land use context to support lower crash risk and severity

WSDOT does not regulate land use, but land use decisions drive travel demand, crash risk, and safety outcomes. Our role is to support safer outcomes through planning and partnership.

Next Steps for Safer Land Use

Share and Learn

- Continue sharing Safer Land Use concepts, examples, and resources.

Coordinate and Collaborate

- Strengthen partnerships across local agencies, WSDOT, Commerce, Health, Ecology, to align land use and transportation safety.

Advance Research

- Build objective evidence base linking land use patterns, development standards and the Safe Systems Approach.

Policy Alignment

- Align Safer Land Use strategy with legislative updates, state goals/requirements (VMT Reduction, MMLOS, Climate, Housing)

Support Implementation

- Provide tools, data, and guidance to help integrate transportation safety into local planning and development decisions.

Questions?

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Senior Land Use and Transportation Planner
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Considerations of Levels of Traffic Stress for Multimodal Design



Kenneth Loen, PE

Design Policy and Analysis Manager

Washington State Department of Transportation

WSDOT LTS Overview

WA Transportation Professionals Forum & Peer Exchange

Kenneth Loen, PE, AICP – Assistant State Design Engineer, Active Transportation

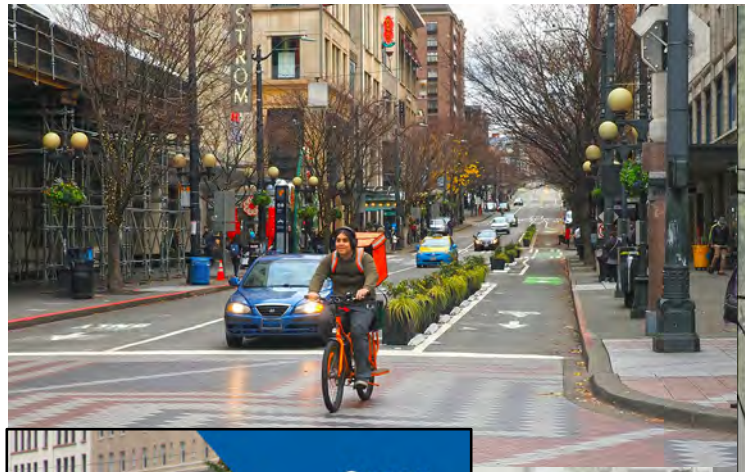
September 23, 2025

Who I Am

Professional Engineer & Certified Planner;
30+ years experience

Professional experience:

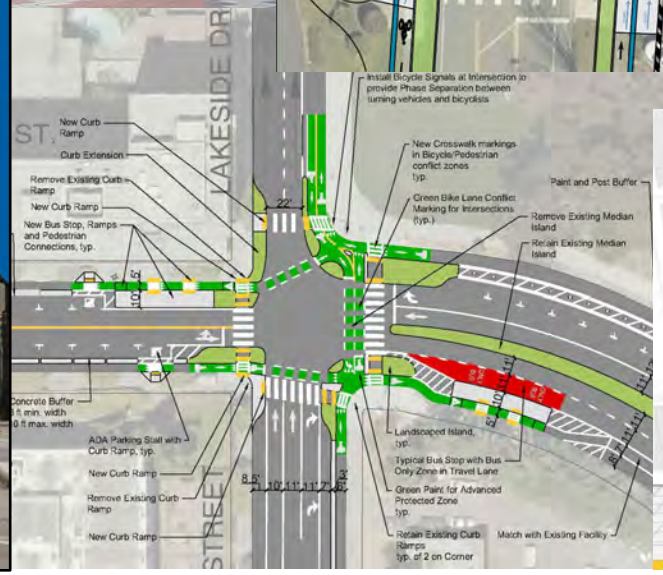
- Started career at WSDOT in 1992, spent 16 years primarily in design
- Worked in private sector 14 years, focused career on active transportation
- Returned to WSDOT in 2022

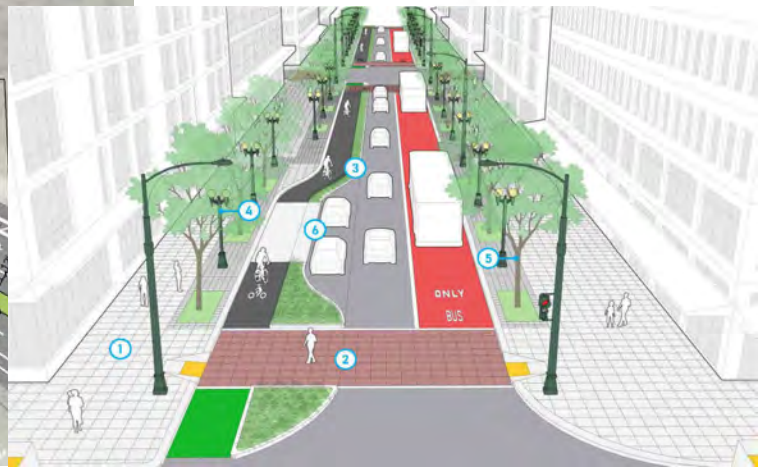












Agenda



Time	Topic
9:20	Introduction
9:25	Law & Policy Framework: • Complete Streets • WSDOT Policy Adjacency • LTS in Support of Policy Framework
9:35	Practical Application of LTS: • Design Manual • Bicycle LTS • Pedestrian LTS
9:45	Questions

Law & Policy Framework

Complete Streets

2003: The term "Complete Streets" coined by Smart Growth America

- Response to an assimilation of decades of critique and analysis of the effects of large-scale highway infrastructure on small towns, large cities, and suburban sprawl.
- Recognizes the negative impacts of reducing, eliminating, or preventing people from being able to comfortably and safely utilize the public right-of-way for access and mobility without the use of a private automobile.
- Based on the idea that the built design of the public right-of-way must honestly accommodate modes of travel other than the private automobile.



Typical American "stroad" that does not embody Complete Streets principles.

Complete Streets

"Complete Streets is an approach to planning, designing, building, operating, and maintaining streets that enables safe access for all people who need to use them, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities."

Smart Growth AMERICA



Complete Streets Principles

Complete Streets is supportive of:

- Safety for all modes of travel
- Transportation equity
- A healthier populace
- Addressing environmental concerns
- Growth Management Act principles and goals
- Transit-Oriented Development (TOD)
- Traditional Neighborhood Development (TND)
- Thriving small town centers and main streets
- Reducing impacts of major highway infrastructure on neighborhoods and communities
- “Aging in Place” principles
- Providing transportation options for people who either cannot or choose not to drive

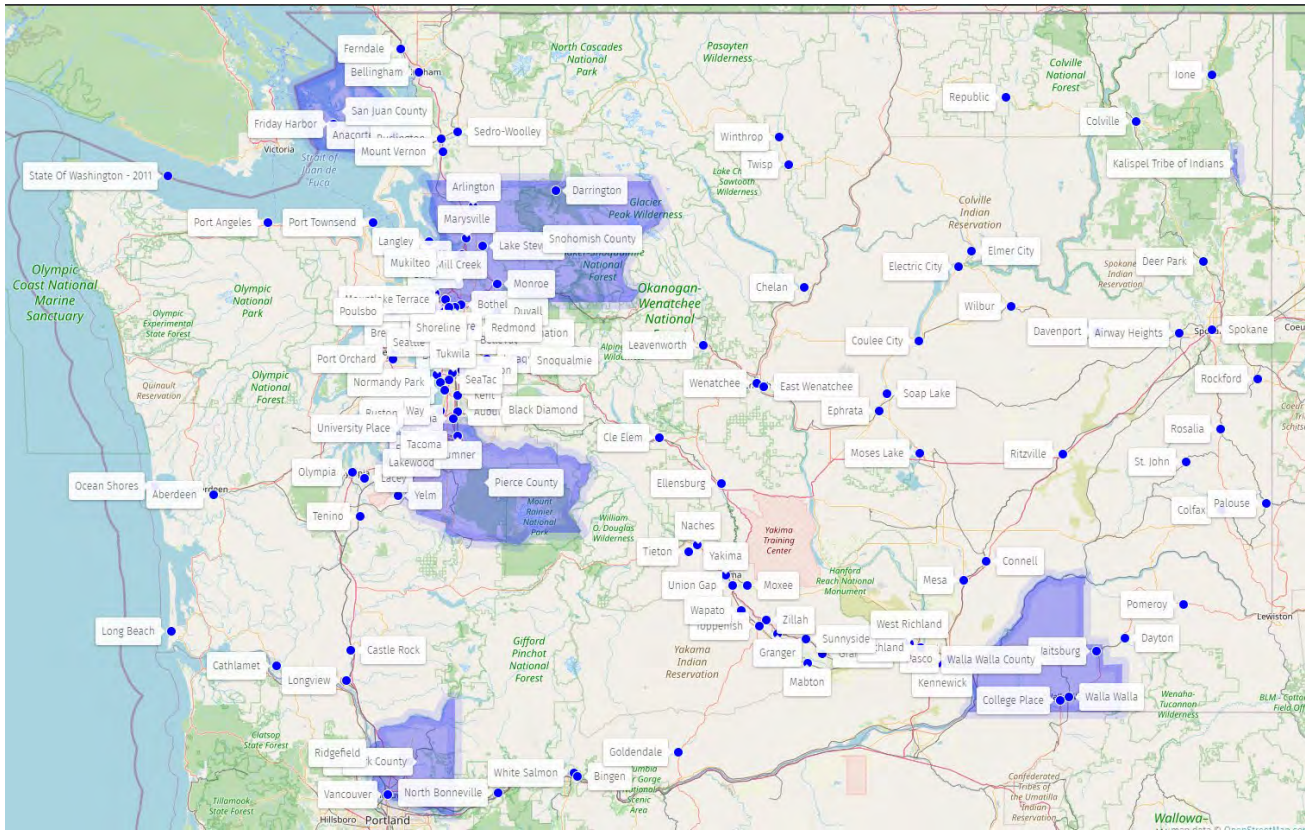




Complete Streets in Washington

- **2011 Complete Streets Grant Program law (RCW 47.04.320):**

- "...to provide safe access to all users, including bicyclists, pedestrians, motorists, and public transportation users, with the goals of:
- Promoting heathy communities by encouraging walking, bicycling, and using public transportation;
- Improving safety by designing major arterials to include features such as wider sidewalks, dedicated bicycle facilities, medians, and pedestrian streetscape features, including trees where appropriate;
- Protecting the environment and reducing congestion by providing safe alternatives to single-occupancy driving; and
- Preserving community character by involving local citizens and stakeholders to participate in planning and design decisions."



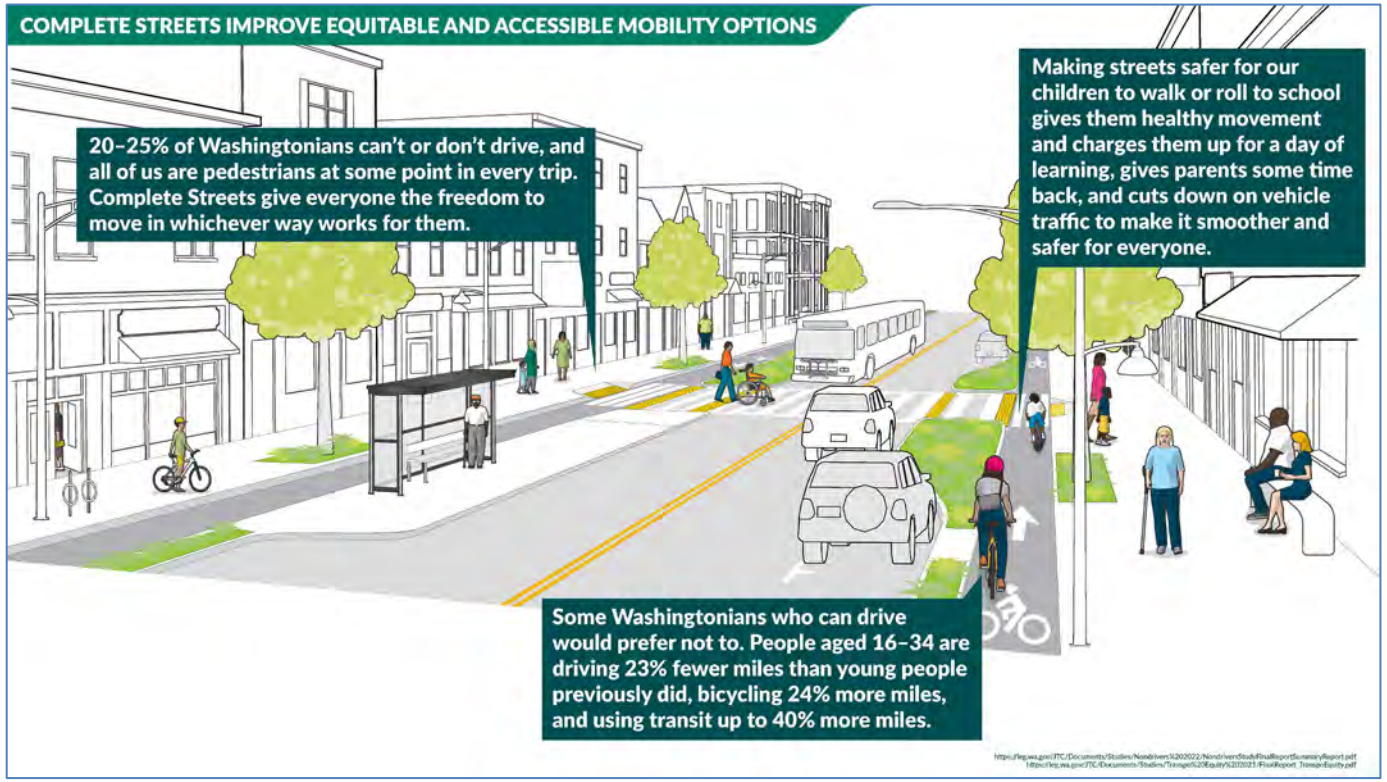
WA Cities, Counties, Tribal Nations with CS ordinances

Complete Streets in Washington

- **2022 Complete Streets WSDOT project law (RCW 47.04.035):**

- Compels WSDOT specifically to “incorporate the principles of complete streets with facilities that provide street access with all users in mind, including pedestrians, bicyclists, and public transportation users.”

- State transportation projects that are $1M or more must:
  - 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;
  - Adjust the speed limit to a lower speed with appropriate modifications to roadway design and operations to achieve the desired operating speed



Policy Adjacency



SAFE SYSTEM APROACH

TARGET ZERO

TARGET ZERO



VMT REDUCTION TARGETS

Policy Adjacency

STRATEGIC PLAN

VISION

Washington travelers have a safe, sustainable and integrated multimodal transportation system.

MISSION

We provide safe, reliable and cost-effective transportation options to improve communities and economic vitality for people and businesses.

VALUES

- Safety
- Engagement
- Innovation
- Integrity
- Leadership
- Sustainability

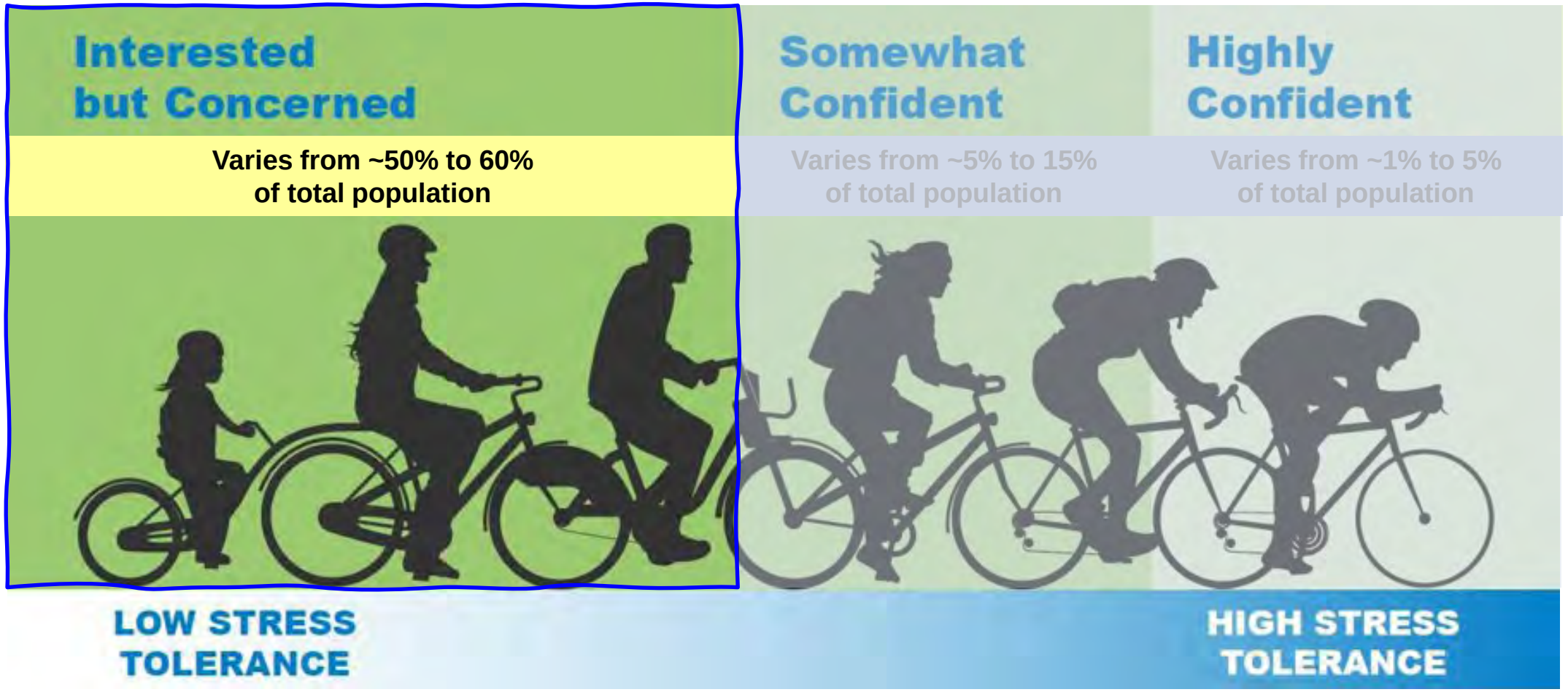
GOALS

- Diversity, Equity, Inclusion
- Resilience
- Workforce Development



“Types” of Bicyclists

- Approximately ¼ to ⅓ of population will not ride a bicycle for transportation
- The percentage of people who would ride a bicycle for transportation fall into 3 general categories:



Metrics of Policy Success

By what unit of measure will WSDOT be able to identify goals and determine success in achieving those goals?

- **Complete Streets Requirements**
- **Safety**
- **Equity**
- **Network Continuity & Completeness**
- **Making Walking & Biking Viable Transportation Alternatives / Improving Comfort of Walking & Biking Facilities**

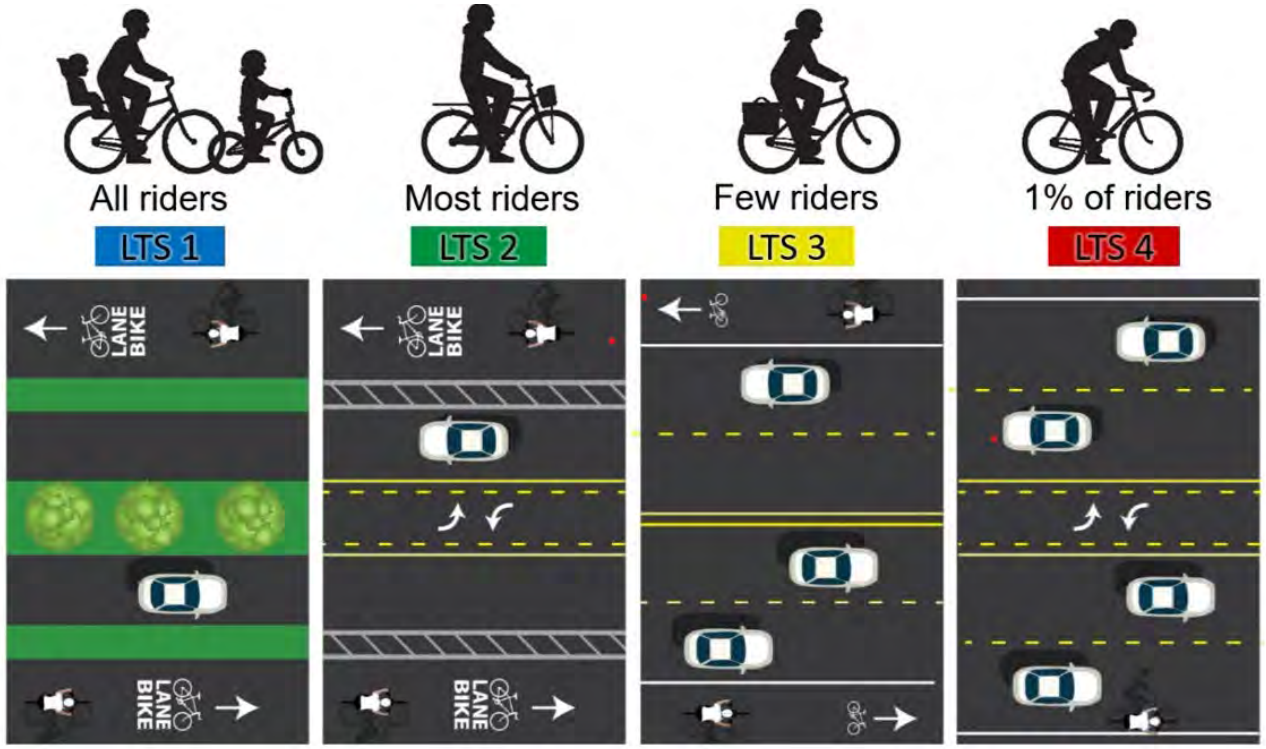


Metrics of Policy Success

By what unit of measure will WSDOT be able to identify goals and determine success in achieving those goals?

Level of Traffic Stress

- Level of Traffic Stress (LTS) is a four-tier system developed to quantify the discomfort or perceived danger cyclists experience near motorized traffic.
- Based on:
  - Number of lanes
  - Traffic volumes
  - Speed of traffic
  - Type of bicycle facility provided



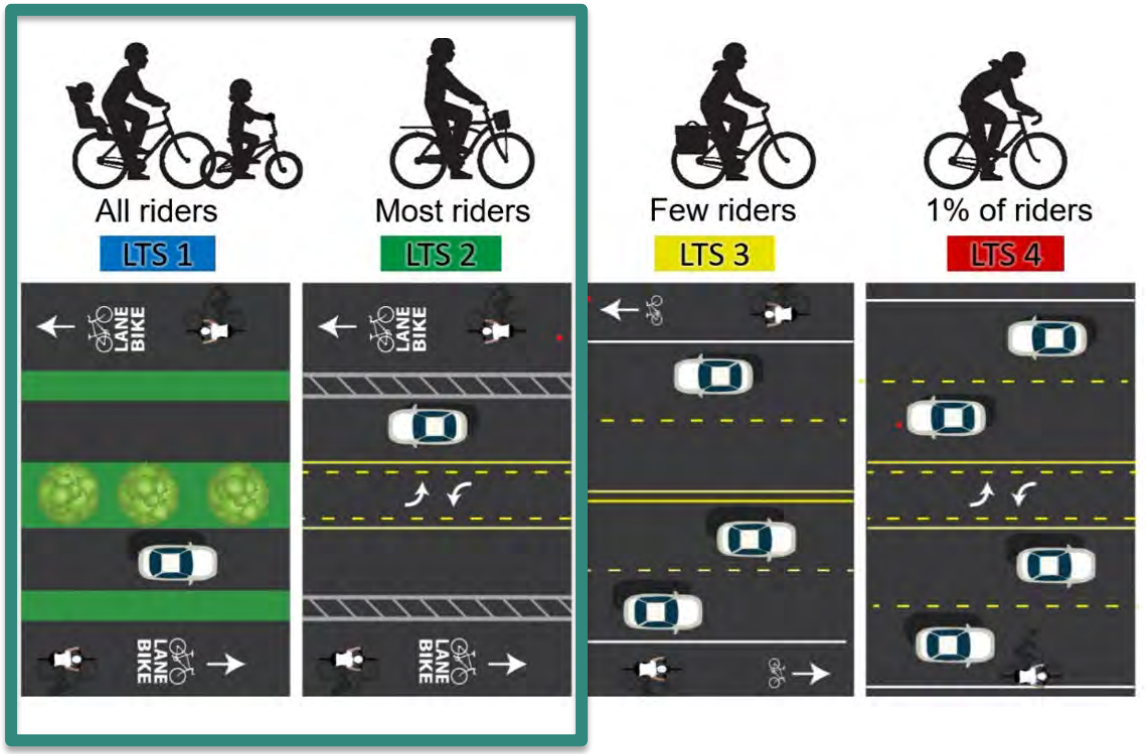
Translation to LTS

Bicycle LTS

Level of Traffic Stress

- Can be correlated to bicyclist “type” range
- LTS 1 and 2 provide facilities that are comfortable for the majority of people who are interested in using a bicycle (~⅔ of total population)

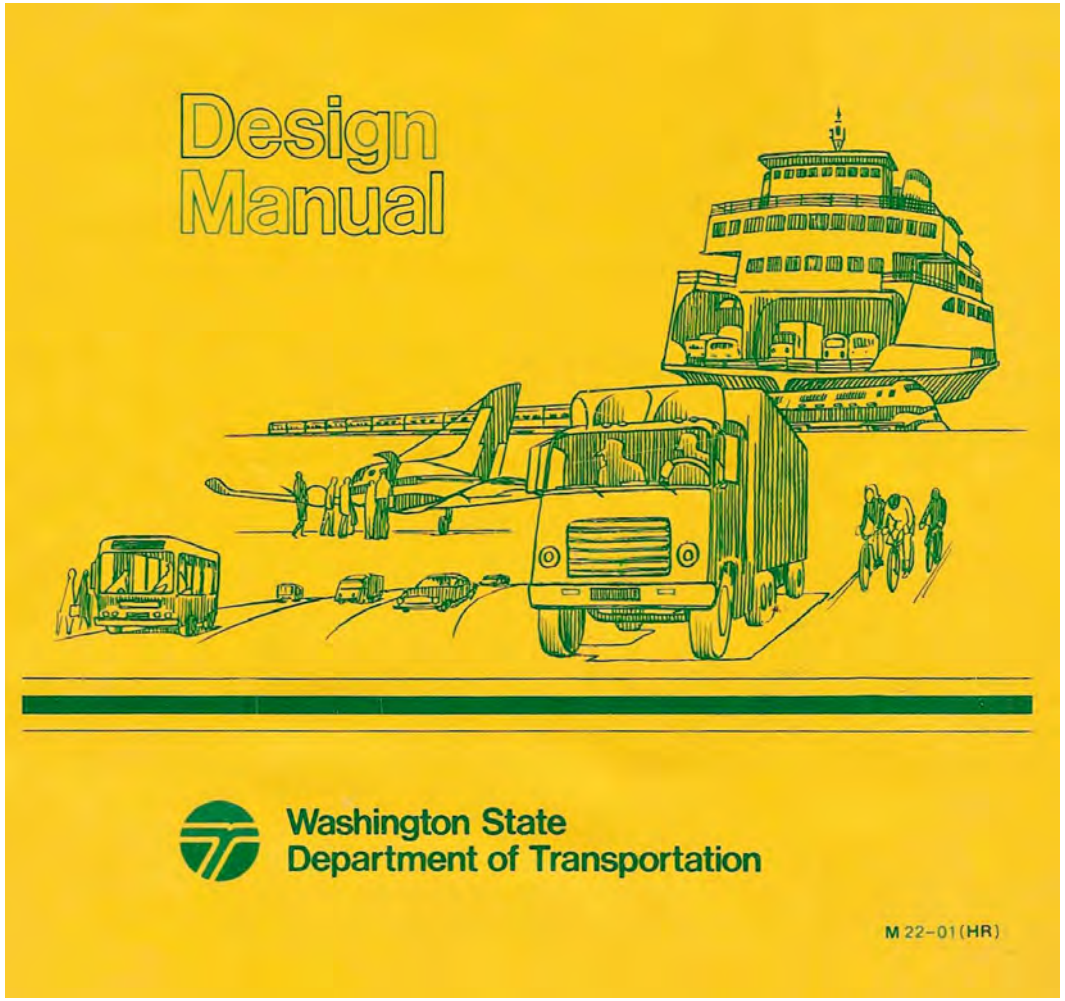




Practical Application of LTS Metric

WSDOT Design Manual

- Primary design guidance source for WSDOT projects
- Referenced as primary design guidance source by many local jurisdictions
- Provides design policies and guidance for bicycle and pedestrian facility design, including determination of LTS



Design Manual Structure

17 Divisions

(78 Chapters, 1,339 pages)

Division 1 – General Information
Division 2 – Hearings, Environmental, and Permits
Division 3 – Project Documentation
Division 4 – Surveying
Division 5 – Right of Way and Access Control
Division 6 – Soils and Paving
Division 7 – Structures
Division 8 – Hydraulics
Division 9 – Roadside Development
Division 10 – Traffic Safety Elements
Division 11 – Practical Design
Division 12 – Geometrics
Division 13 – Intersections and Interchanges
Division 14 – HOV and Transit
Division 15 – Pedestrian and Bicycle Facilities
Division 16 – Roadside Safety Elements
Division 17 – Roadside Facilities



Primary Bike & Ped guidance under Division 15

Active Transportation Chapters

- **PRIMARY GUIDANCE**
  Division 15 – Pedestrian and Bicycle Facilities

  - Chapter 1510 – Pedestrian Facilities
  - Chapter 1515 – Shared-Use Paths
  - Chapter 1520 – Bicycle Facilities



Pedestrian Facilities – DM 1510



- Americans with Disabilities Act of 1990 (ADA) Requirements
  - PCP & PAR
  - Curb ramps & landings
  - Pedestrian pushbuttons
- Pedestrian facility design
  - Sidewalks
  - Crossings
  - Design details
- **Level of Traffic Stress (LTS) tables**

Pedestrian Level of Traffic Stress (PLTS)

Exhibit 1510-1 Pedestrian Level of Traffic Stress (PLTS) no dedicated pedestrian facility, with shoulder

No dedicated pedestrian facility, with shoulder								
Lane configuration	AADT (total)	Target Speed						
		≤20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	2	3	4	4	4	4
	751 - 1500	1	2	3	4	4	4	4
	1501 - 3000	2	2	3	4	4	4	4
	> 3000	2	3	3	4	4	4	4
2 thru lanes per direction	0 – 6000	3	3	3	4	4	4	4
	> 6000	3	3	4	4	4	4	4
3+ thru lanes per direction	Any ADT	4	4	4	4	4	4	4

Exhibit 1510-2 Pedestrian Level of Traffic Stress (PLTS) based on Sidewalk Width

5' to 7.5' Sidewalk with no buffer								
Lane configuration	AADT (total)	Target Speed						
		≤20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	1	2	3	4	4	4
	751 - 1500	1	1	2	3	4	4	4
	1501 - 3000	1	1	2	3	4	4	4
	> 3000	2	2	2	3	4	4	4
2 thru lanes per direction	0 - 6000	2	2	2	3	4	4	4
	> 6000	2	2	3	4	4	4	4
3+ thru lanes per direction	Any ADT	2	2	3	4	4	4	4

Sidewalk 8' or wider with no buffer								
Lane Configuration	AADT (total)	Target Speed						
		≤20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	1	2	2	3	3	4
	751 - 1500	1	1	2	2	3	3	4
	1501 - 3000	1	1	2	2	3	3	4
	> 3000	2	2	2	2	3	3	4
2 thru lanes per direction	0 - 6000	2	2	2	2	3	3	4
	> 6000	2	2	2	2	3	3	4
3+ thru lanes per direction	Any ADT	2	2	2	2	3	3	4

Exhibit 1510-3 Pedestrian Level of Traffic Stress (PLTS) Sidewalk with Buffer

Sidewalk separated by physical separation[1]								
Lane Configuration	AADT (total)	Target Speed						
		≤20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	1	1	2	2	2	2
	751 - 1500	1	1	1	2	2	2	2
	1501 - 3000	1	1	1	2	2	2	2
	> 3000	2	2	2	2	2	2	2
2 thru lanes per direction	0 - 6000	2	2	2	2	2	2	2
	> 6000	2	2	2	2	2	2	2
3+ thru lanes per direction	Any ADT	2	2	2	2	2	2	2

[1] Physical separation typically consists of either a planting strip or other constructed buffer strip, a separated bicycle lane, a parking lane, or traffic barrier. Note that a roadway shoulder or a conventional bicycle lane are not considered physical separation.

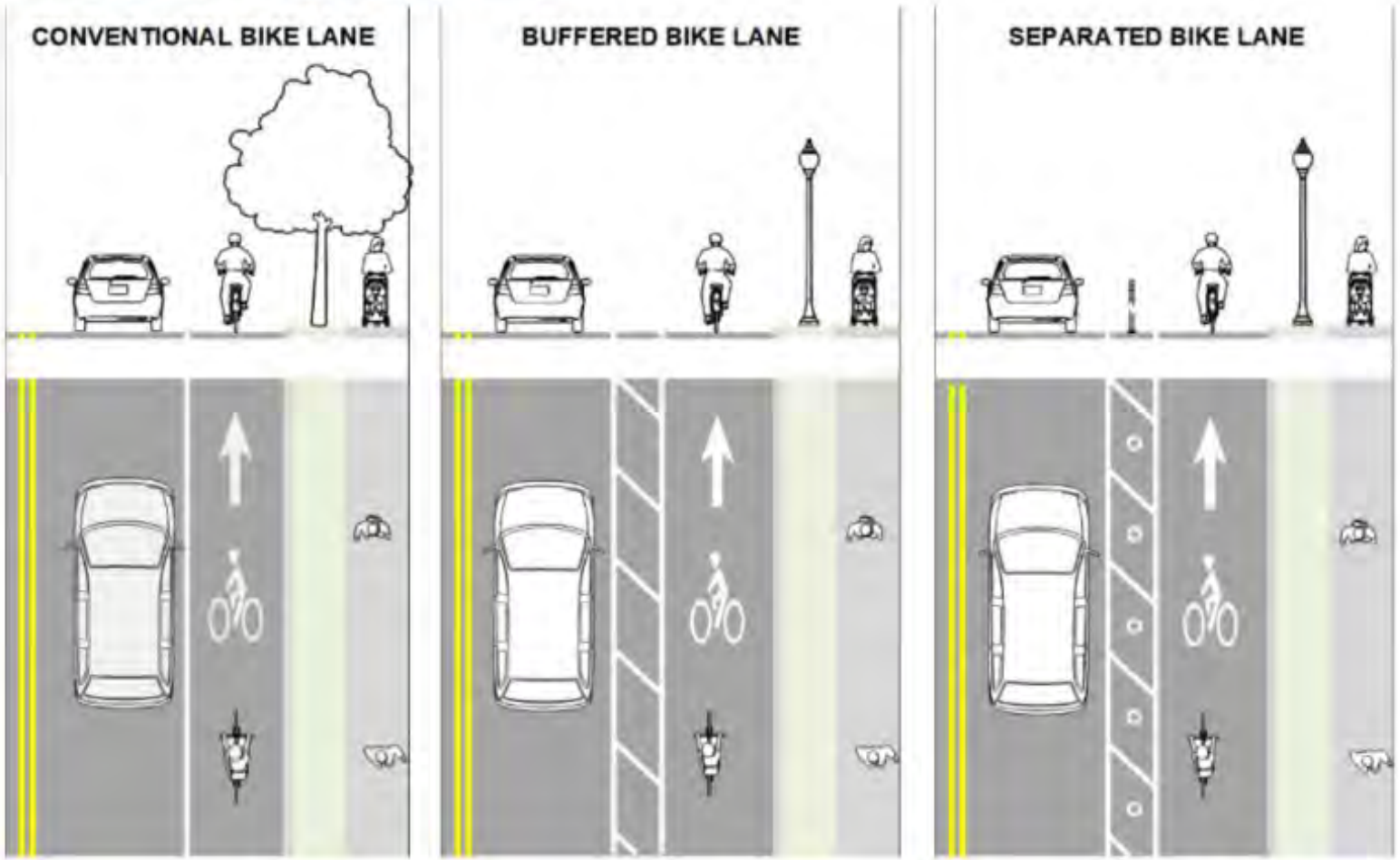
Bicycle Facilities – DM 1520



- Bicycle facility selection considerations
- Bicycle facility types
  - Conventional bike lanes
  - Buffered bike lanes
  - Separated bike lanes
  - Bike boulevards
- Additional treatments
  - Green pavement markings
  - Bikecross markings
  - Two-stage turn boxes
- **Level of Traffic Stress (LTS) tables**

Bicycle Facilities – DM 1520

Exhibit 1520-1 Roadway Bicycle Facilities



- Bicycle facilities selected to support Safe Systems Approach – targeting four goals:
  - Reduce operating speeds of roadway
  - Reduce bicyclist exposure to potential crashes
  - Increase predictability of motor vehicle/bicycle interactions
  - Increase conspicuity

Bicycle Level of Traffic Stress (BLTS)

Exhibit 1520-5 Bicycle Level of Traffic Stress in mixed traffic (no bicycle facility)

BLTS in mixed traffic (no bicycle facility)								
Lanes	AADT	Target Speed						
		≤20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	2	3	4	4	4	4
	751 - 1500	1	2	3	4	4	4	4
	1501 - 3000	2	2	3	4	4	4	4
	> 3000	2	3	3	4	4	4	4
2 thru lanes per direction	0 - 6000	3	3	3	4	4	4	4
	> 6000	3	3	4	4	4	4	4
3+ thru lanes per direction	Any ADT	4	4	4	4	4	4	4

Exhibit 1520-6 Bicycle Level of Traffic Stress for Conventional Bike Lane

Conventional Bike Lanes (5' or greater)								
Lane Configuration	AADT (total)	Target Speed						
		≤20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0-750	1	1	2	3	4	4	4
	751-1500	1	1	2	3	4	4	4
	1501-3000	1	1	2	3	4	4	4
	3000+	2	2	2	3	4	4	4
2 thru lanes per direction	0-6000	2	2	2	3	4	4	4
	>6000	2	2	3	3	4	4	4
3+ thru lanes per direction	Any ADT	3	3	3	4	4	4	4

Exhibit 1520-7 Bicycle Level of Traffic Stress for Buffered Bike Lane

Buffered Bike Lanes (minimum 2' buffer / greater than or equal to 7 feet total)								
Lane Configuration	AADT (total)	Target Speed						
		≤20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0-750	1	1	2	3	4	4	4
	751-1500	1	1	2	3	4	4	4
	1501-3000	1	1	2	3	4	4	4
	3000+	2	2	2	3	4	4	4
2 thru lanes per direction	0-6000	2	2	2	3	4	4	4
	>6000	2	2	3	3	4	4	4
3+ thru lanes per direction	Any ADT	3	3	3	4	4	4	4

Exhibit 1520-8 Bicycle Level of Traffic Stress for Separated Bike Lane

Separated Bicycle Lane								
Lane Configuration	AADT (total)	Target Speed						
		≤20	25	30	35	40	45	50+
1 thru lane per direction (or 1 lane one-way street)	0-750	1	1	1	2	2	2	2
	751-1500	1	1	1	2	2	2	2
	1501-3000	1	1	1	2	2	2	2
	3000+	2	2	2	2	2	2	2
2 thru lanes per direction	0-6000	2	2	2	2	2	2	2
	>6000	2	2	2	2	2	2	2
3+ thru lanes per direction	Any ADT	2	2	2	2	2	2	2

Shared Use Paths – DM 1515

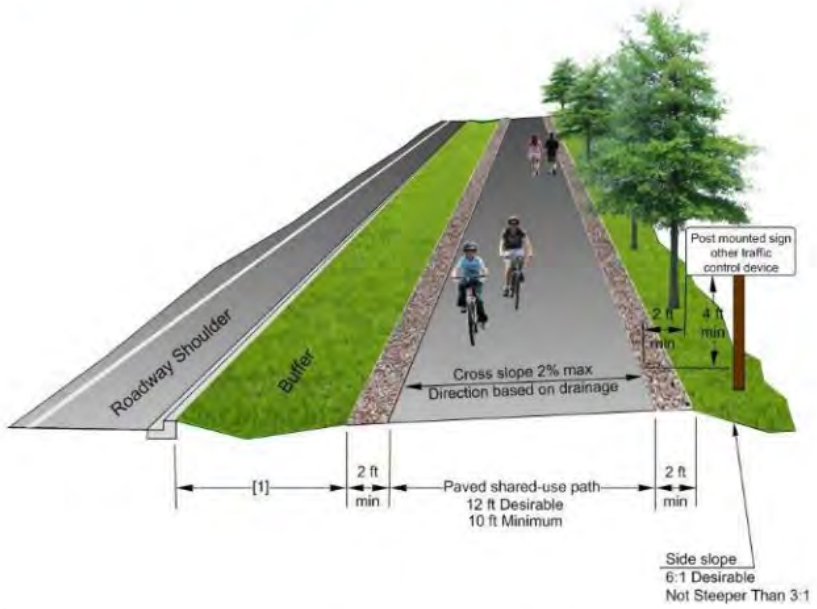
- Shared use paths are defined by three characteristics:
  - Physical separation from motor vehicle traffic (lateral offset or continuous barrier/railing)
  - Designed to minimize interactions with motor vehicle traffic
  - Designed to accommodate a mix of uses



Shared-Use Paths

- A shared-use path that meets the requirements of Chapter 1515 by definition meets the requirements of an LTS 2 or better facility for both bicyclists and pedestrians.

Exhibit 1515-4 Two-Way Shared-Use Path: Adjacent to Roadway (≤ 35 mph)



Note:

[1] 3 ft minimum. Provide as much separation from the roadway as practicable.



Separated Bicycle Lanes vs Shared-Use Paths

- Both facilities can provide Bicycle LTS 2 or better, so they are both key tools to meet Complete Streets requirements.
- Separated bicycle lanes create space just for bicyclists, which may offer a better user experience and greater clarity to motorists.
- Separated bicycle lanes can be one-way or two-way; shared-use paths are two-way.
- Shared-use paths do not require signal phase separation at intersections; however, their two-way operation needs to be considered.
- Separated bike lanes may require signal phase separation at intersections.



Achieving LTS 2

Level of Traffic Stress

- Level of Traffic Stress (LTS) is a four-tier system developed to quantify the discomfort or perceived danger pedestrians and cyclists experience near motorized traffic.
- Based on:
  - Number of lanes
  - Traffic volumes **- usually fixed**
  - Speed of traffic
  - Type of facility provided

Roadway width reallocation



Speed limit changes



Increase separation



Contact Information

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Assistant State Design Engineer, Active Transportation
Kenneth.Loen@wsdot.wa.gov
425-507-3900

Case Studies in Active Transportation Intersection/Crossing Treatments

David Paine
City Transportation Planner, City of Kent

Shane P Sullivan
City Transportation Engineer, City of Bellingham

Ben Margetic
Transportation Planner, City of Seattle



Typical Project Section, Completed
W Meeker Street
looking East to 64th Ave S

Mid-Block Crosswalk

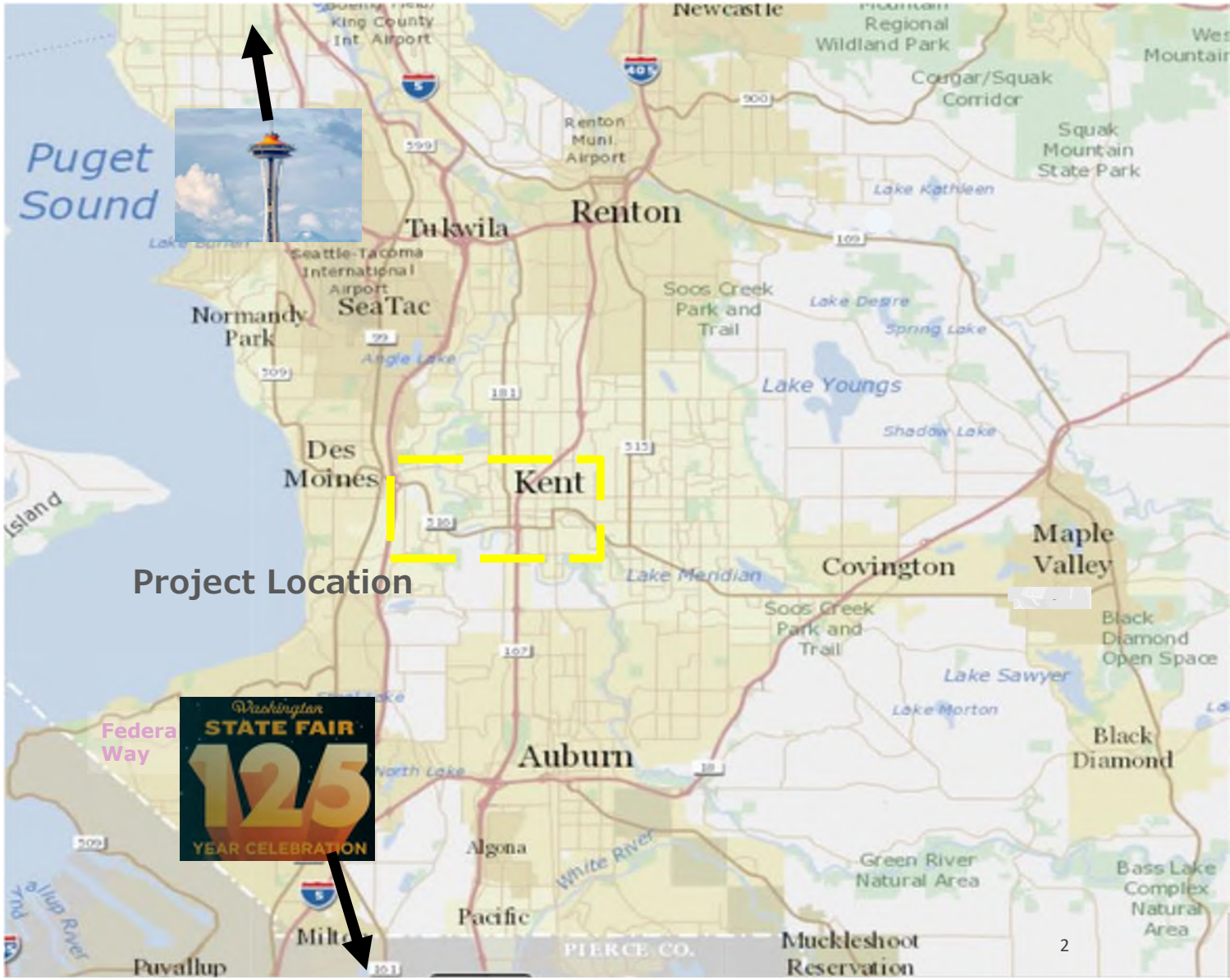
Meet Me on Meeker Project
City of Kent

WASHINGTON TRANSPORTATION PROFESSIONALS FORUM AND PEER EXCHANGE

9.23.25

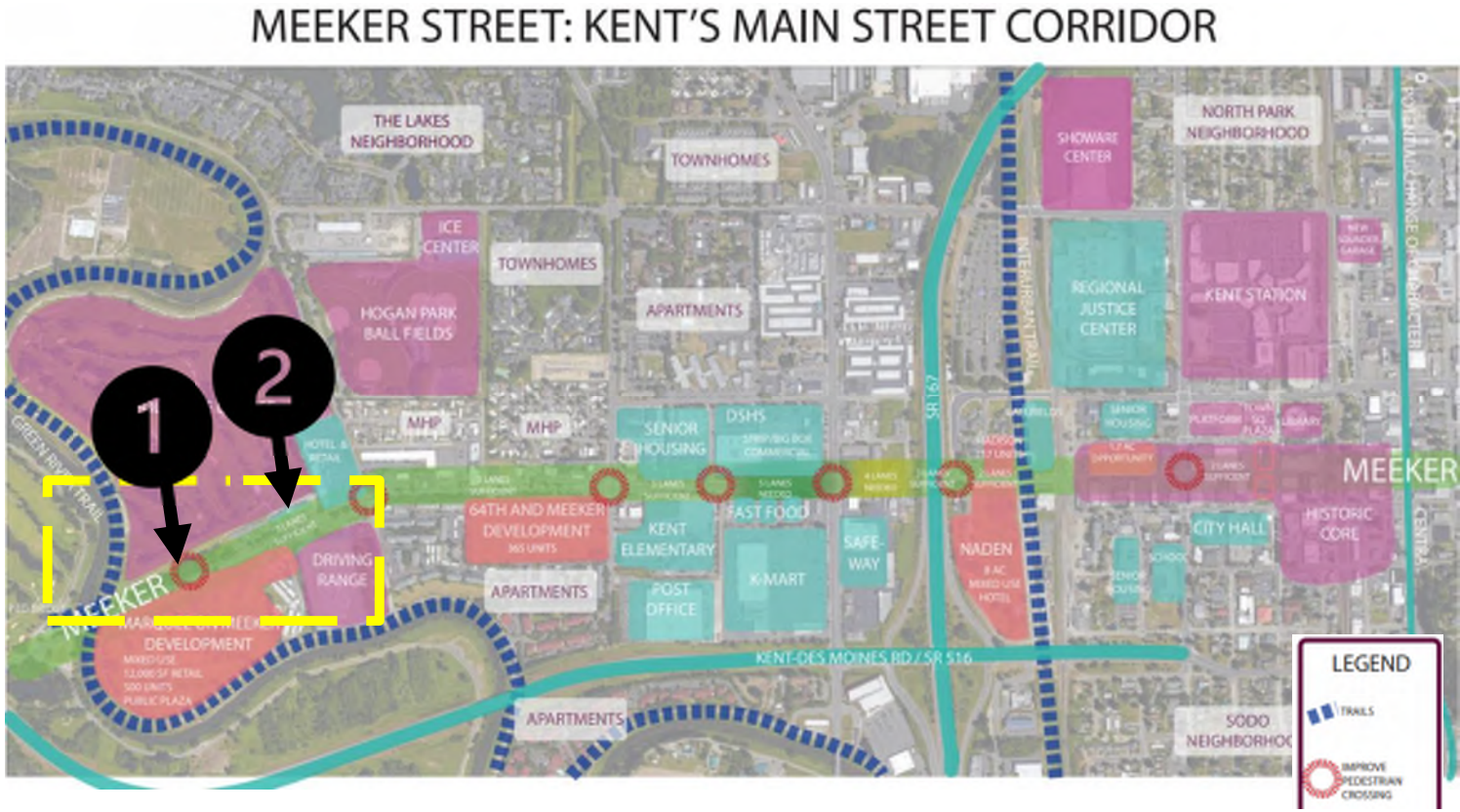
Location

- Meeker Corridor



The Plan

- 1.7 mi length
- Two-way, separated bikeway and sidewalk with buffer zones
- Regional trail connection
- Mid-block Crosswalks



https://www.kentwa.gov/departments/econ-community-dev/city-planning

Project One

- Mid-Block Crosswalk

  Before



Project One

- Mid-Block Crosswalk

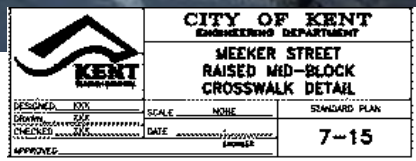
  After



Project Two

- Mid-Block Crosswalk





https://www.kentwa.gov/home/showpublisheddocument/11038/636639773958170000

Project Two

- Pedestrian Experience



Stats

- Before / After

Type	Cost	7/2015-6/2018	Annualized Societal Cost	1/2022-12/2024	Annualized Societal Cost	Annual Reduction
Fatal Crash (K)	$4,445,300	0	$0	0	$0	
Serious Injury Crash (A)	$4,445,300	0	$0	0	$0	
Minor Injury Crash (B)	$315,500	0	$0	1	$105,200	
Possible Injury Crash (C)	$186,000	5	$310,000	0	0	
Property Damage Only (PDO)	$18,600	20	$124,000	14	$86,800	
Totals		**25**	**$434,000**	**15**	**$192,000**	**$242,000**

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists, compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

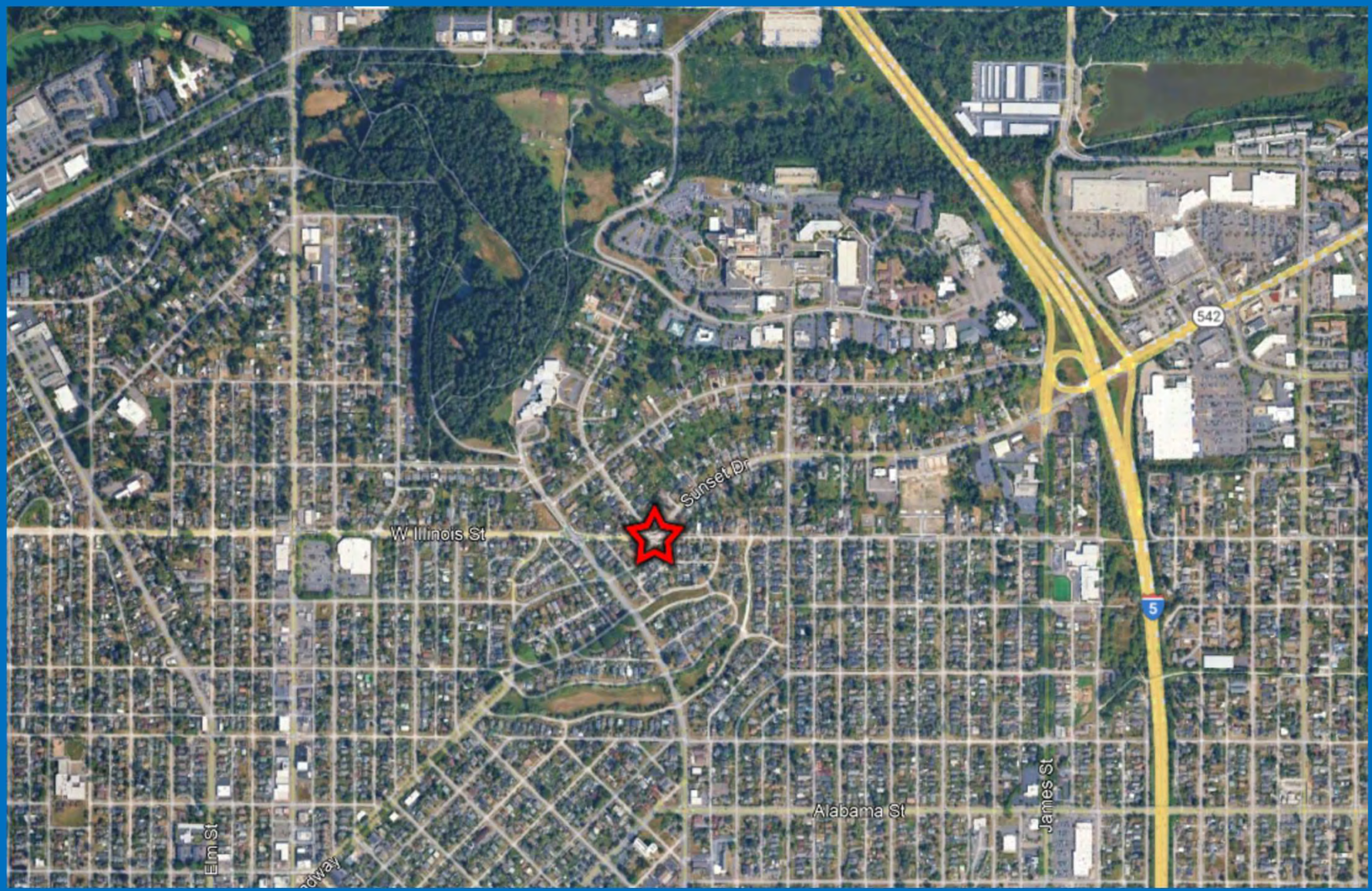
Lessons Learned:
Sunset Dr / W Illinois St Roundabout



Shane Sullivan, PE, PTOE

City of Bellingham WASHINGTON

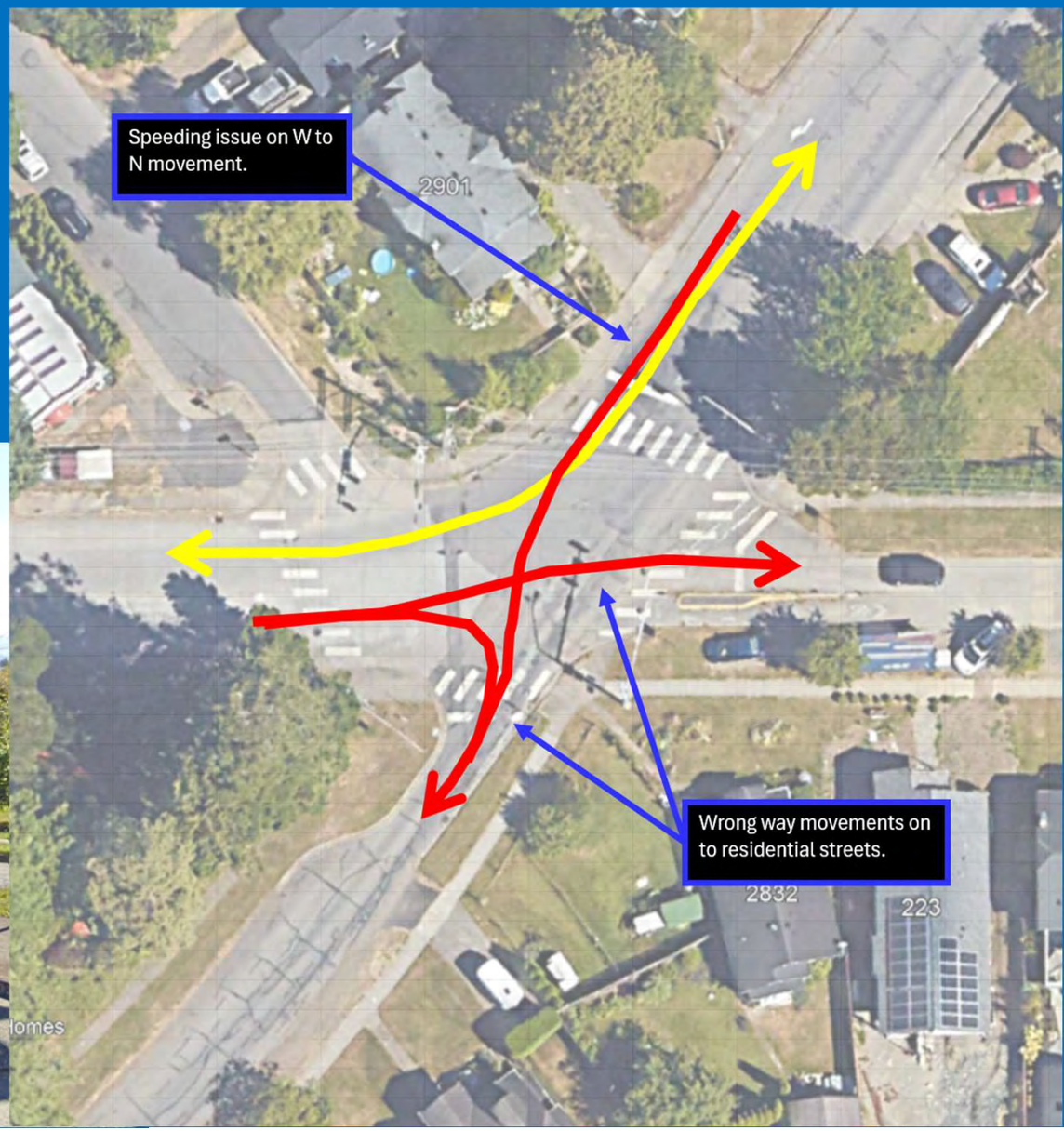
Project Location



Pre-project Conditions

- High speeds along the Sunset-Illinois movement during green phases
- Frequent wrong way traffic into Sunset to the south (restricted for residential street)
- Frequent wrong way traffic on to EB Illinois (restricted for bike boulevard)



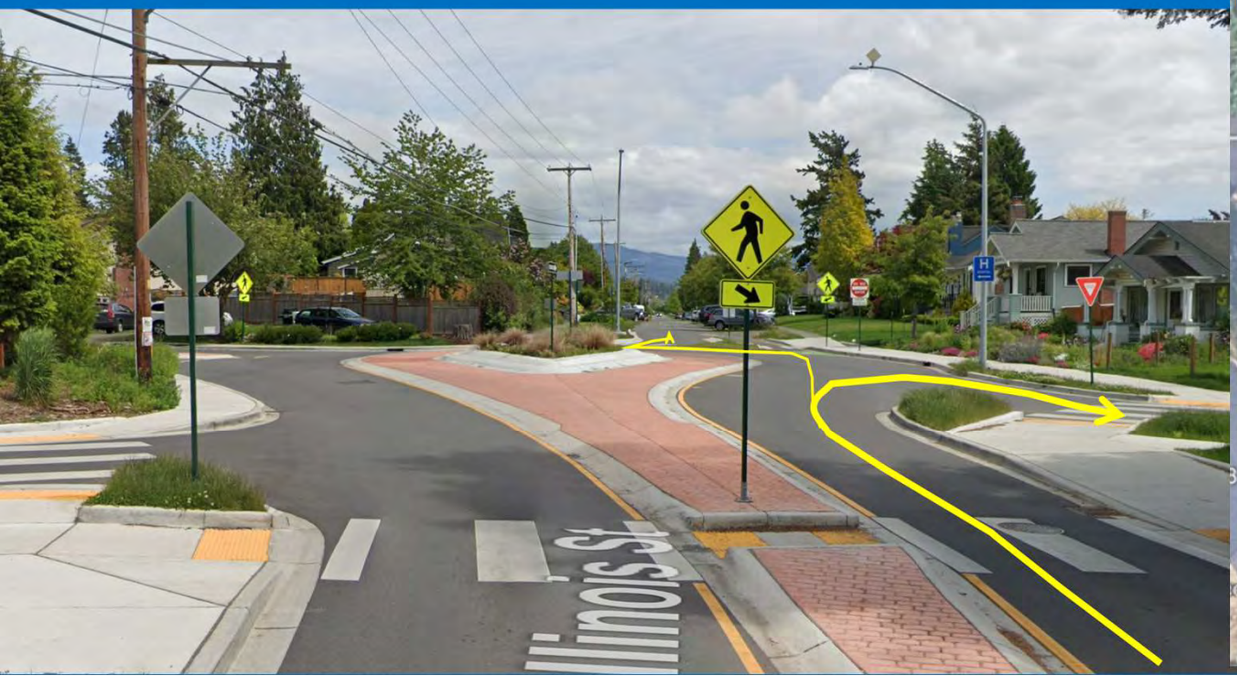


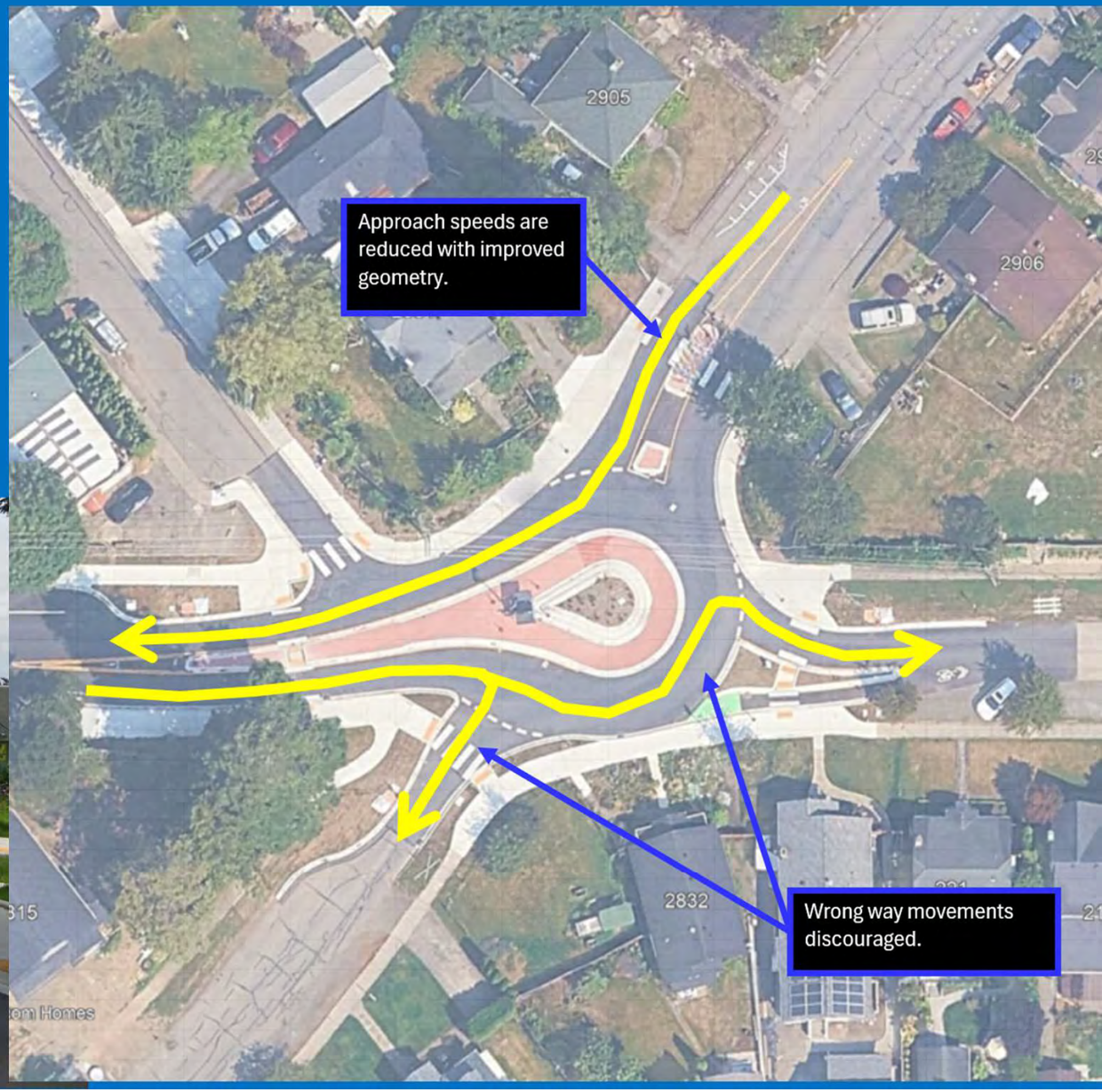

DO NOT
ENTER
EXCEPT
BICYCLES


ONLY
NO
TURN
ON
RED
W Illinois St
DO NOT
ENTER
DO NOT
ENTER

Post-project Conditions

- Reduced speeds along mainline movements due to improved geometry at RAB
- Wrong way traffic on to residential streets discouraged or prohibited.





Post-project Conditions:
Illinois and Coolidge Crosswalks

Improvements:

- Vehicle speeds are reduced post-project
- Ped crossings reduced to 12’ for 2-stage, 16’ for single stage
- Median signage improves visibility

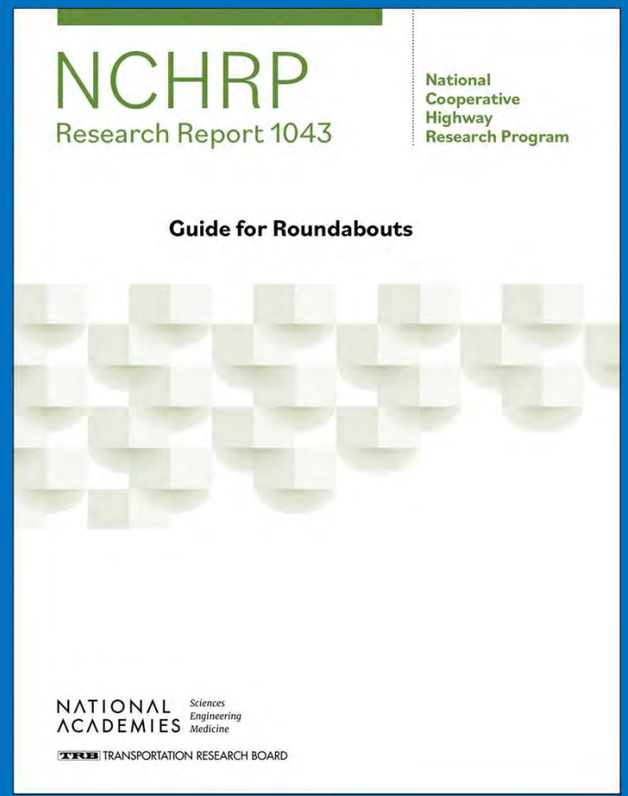
Remaining concerns:

- Vehicle SSD was estimated at 83’ based on NCHRP fastest path
- Actual measured speeds are 20.8 mph, so actual SSD is 115’
  - This required additional vegetation abatement
- Pedestrian crossing sight distance is significantly longer @ 201’

New(ish) Guidance



NCHRP 834 (2017)
Provides guidance for improving ped crossings at RABs and CRTs.



NCHRP 1043 (2023)
Updated roundabout design guide.

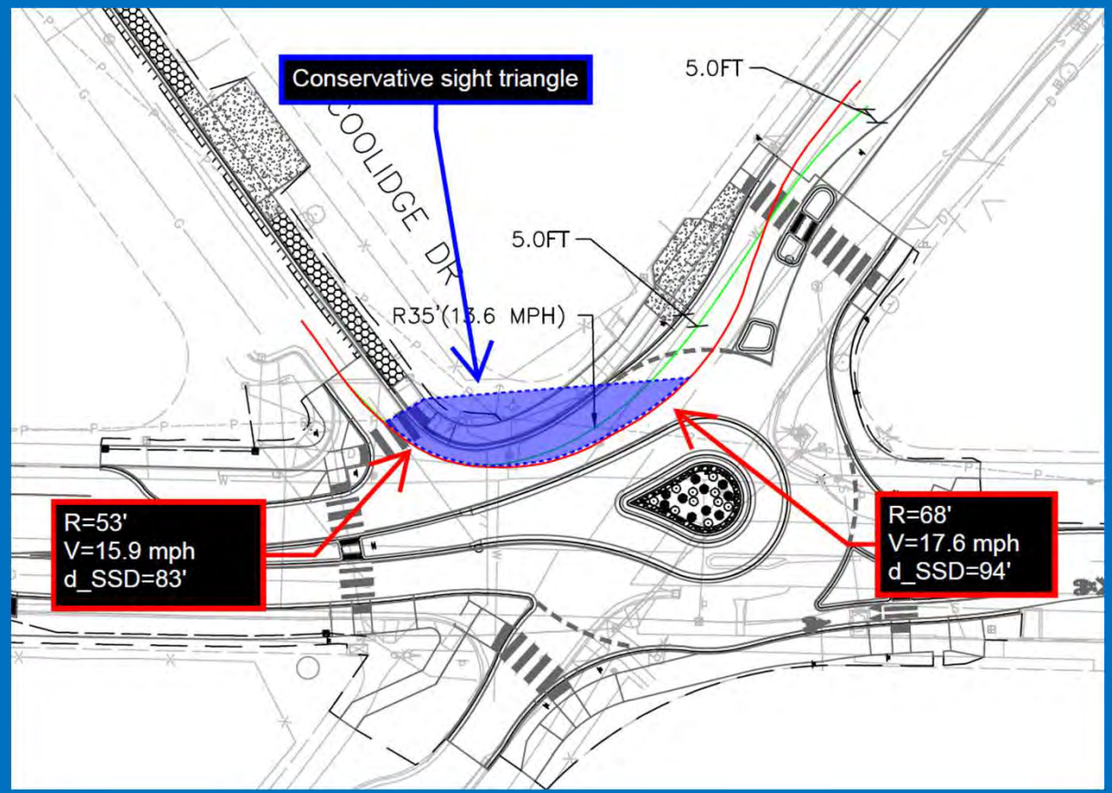
Lessons Learned:
Illinois and Coolidge Crosswalks

Several resident concerns

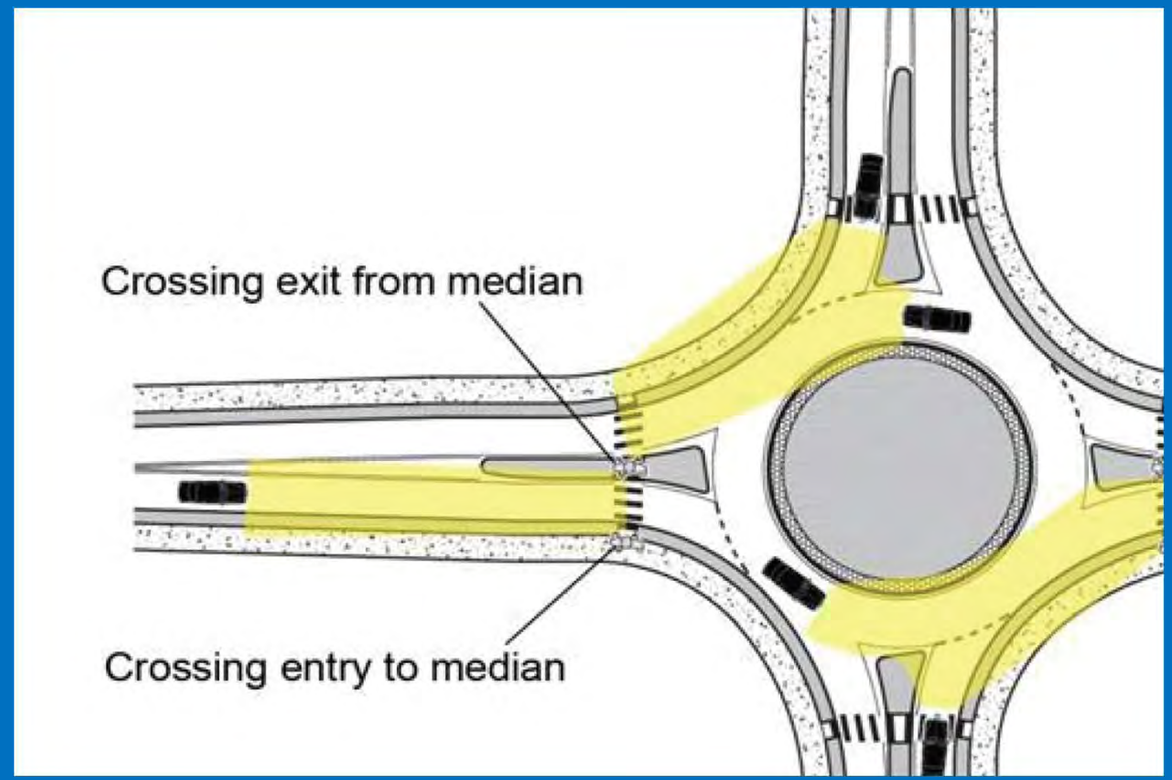
- Feeling unsafe crossing Illinois and Coolidge
- Concerns about vehicle speeds on crosswalk approaches
- Concerns about visibility from pedestrian perspective
- Crosswalks on school walking route



Lessons Learned:
Illinois and Coolidge Crosswalks



Theoretical design stopping sight distance for R_5 path= 83’



Pedestrian crossing sight distance from NCHRP 834 = 201’

Lessons Learned:
Illinois and Coolidge Crosswalks



Actual design stopping sight distance



Actual pedestrian crossing sight distance

Lessons Learned:
Illinois and Coolidge Crosswalks

Future considerations

- Fastest paths are only theoretical, additional approach devices may be needed to improve actual vehicle speeds.
- Identify conservative sight triangles early, acquire R/W as needed and plan for vegetation removal/landscaping.
- Pedestrian crossing sight distance is key if crosswalk improvements are a project need.



Thank you!

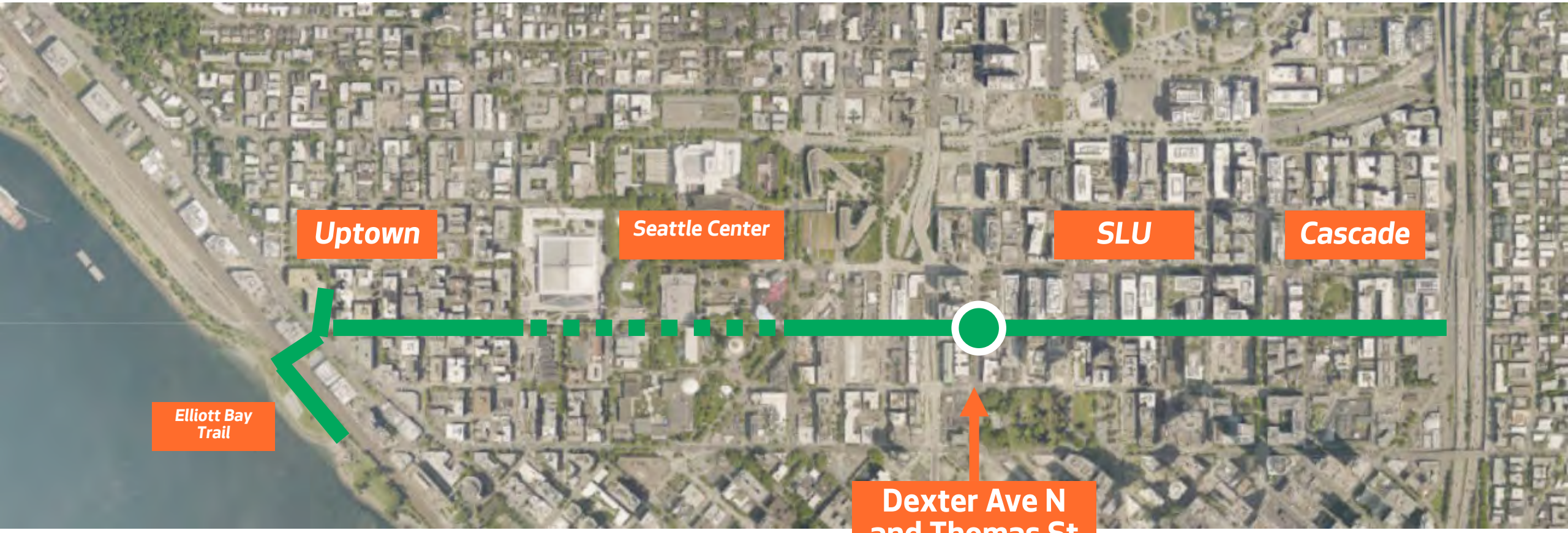
Presented by: Shane Sullivan, PE, PTOE
City Transportation Engineer – Bellingham Public Works
spsullivan@cob.org
360-778-7877



Thomas and Dexter Protected Intersection

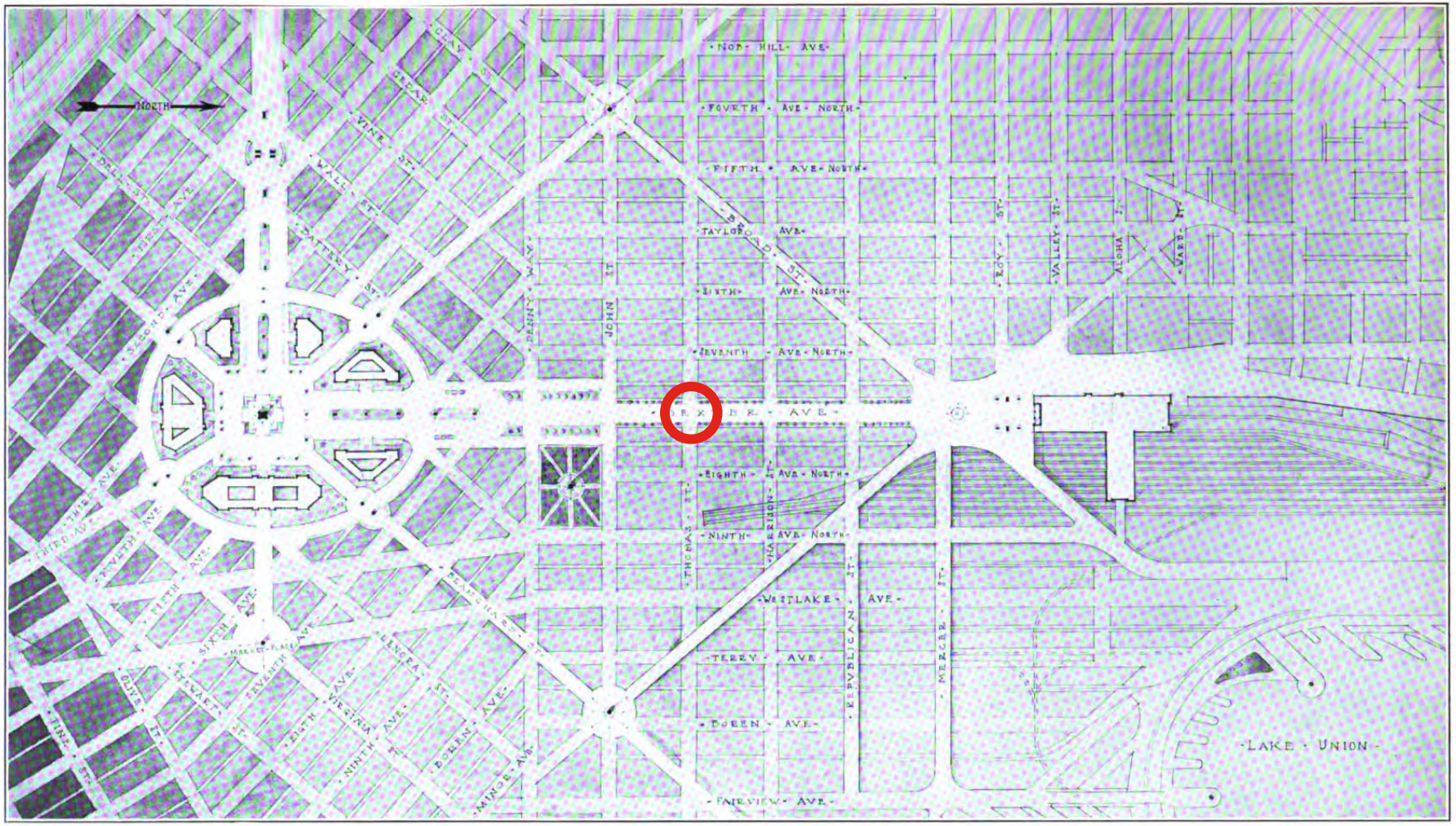
Seattle Department of Transportation

Project area



Seattle Department of Transportation

Dexter Ave



Seattle Department of Transportation



History: Pre-viaduct removal

Thomas/Dexter Intersection



2008



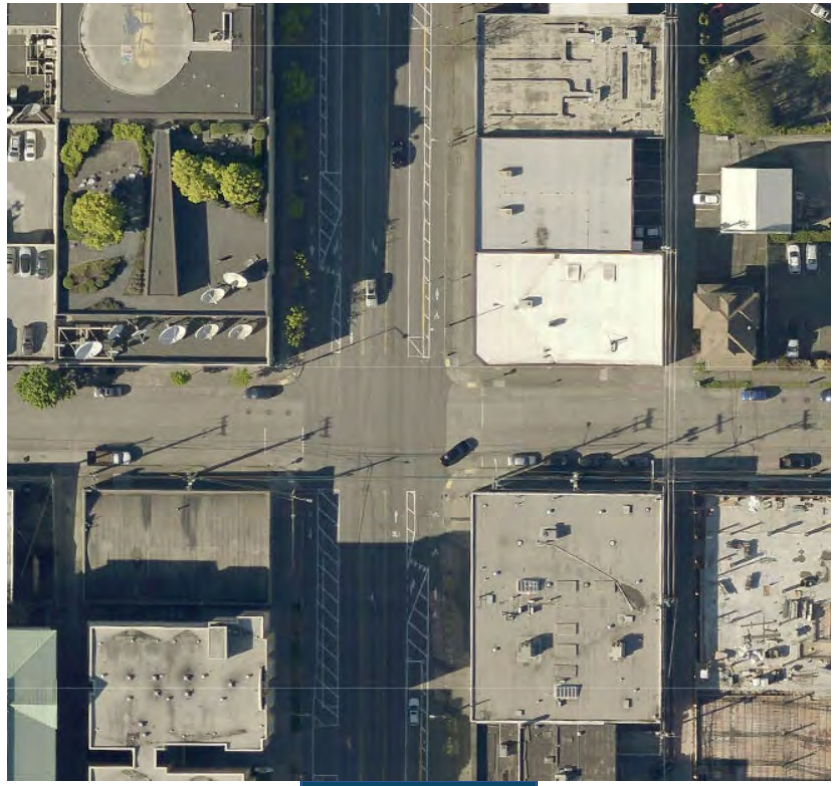
2014

Seattle Department of Transportation

Thomas/Dexter Intersection



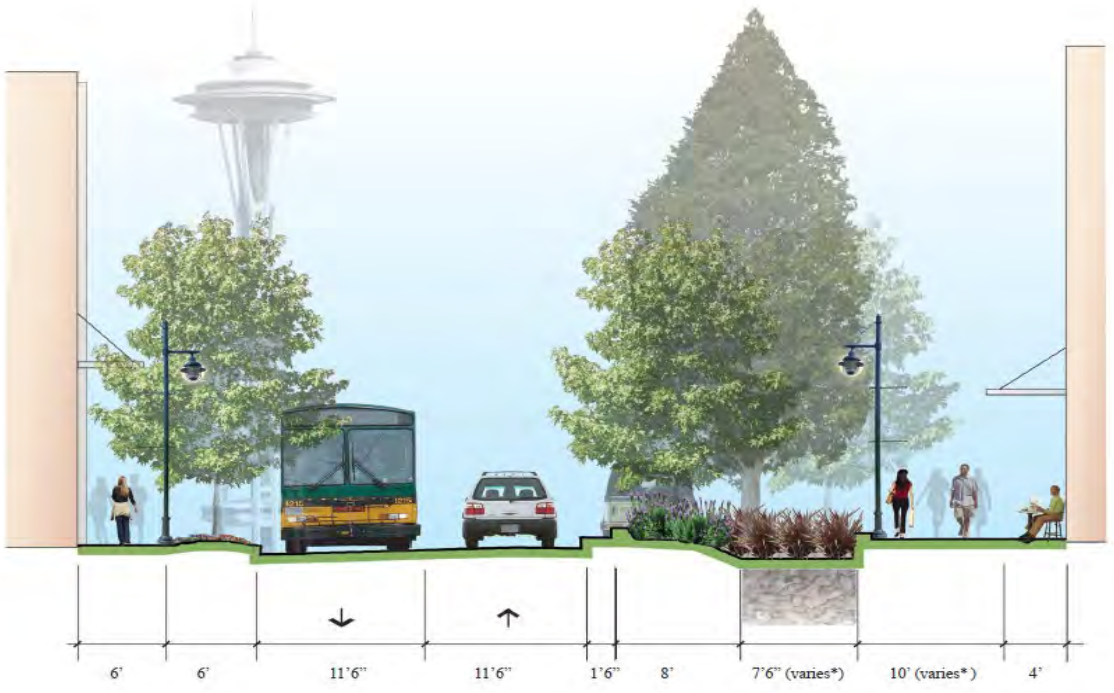
2007



2014

Seattle Department of Transportation

2013 Thomas Green Street Concept Plan:

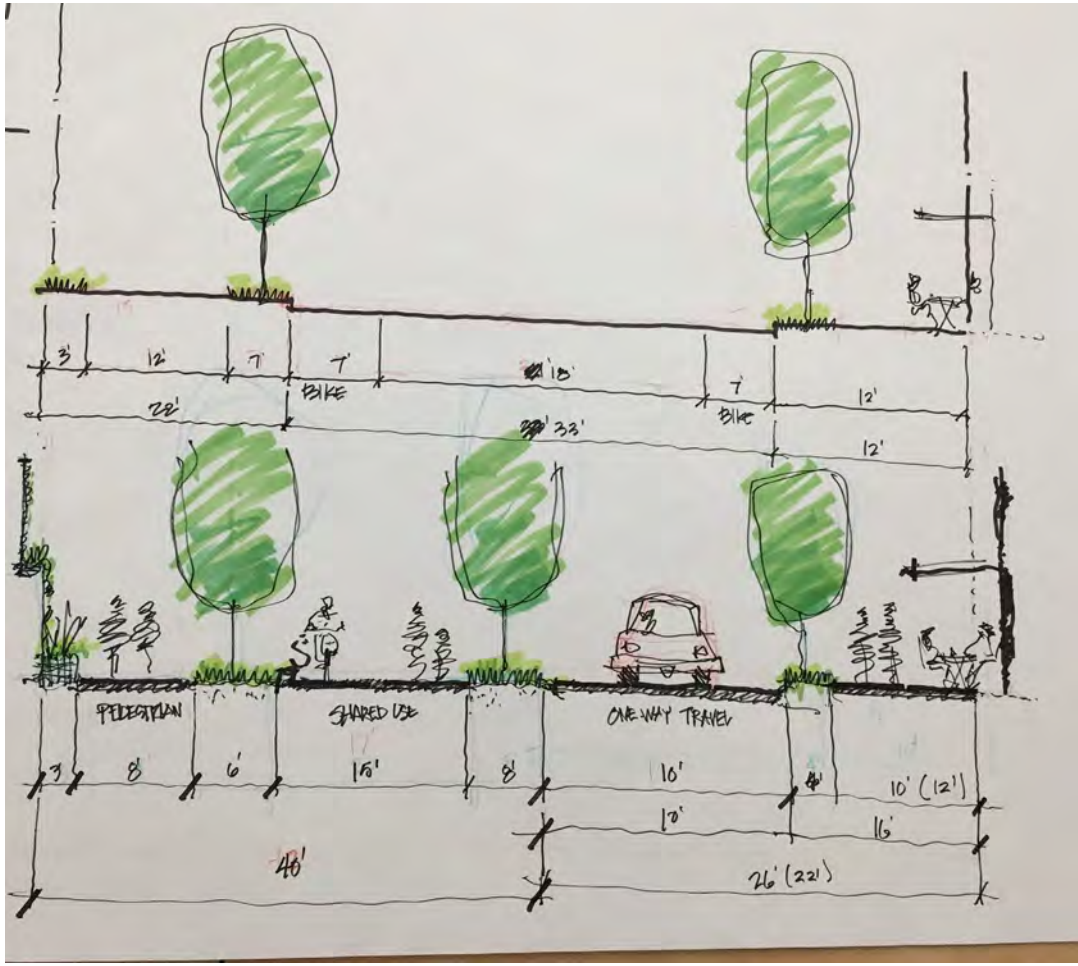




Seattle Department of Transportation

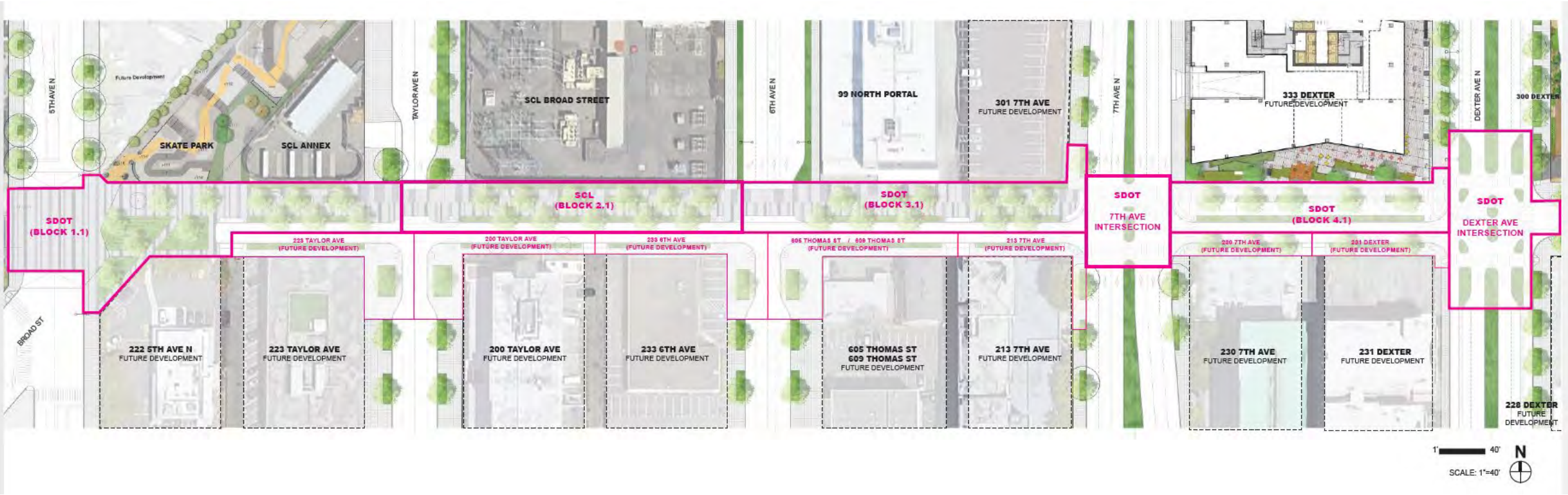
2019 Thomas Street Charrette: 5th to Dexter Tables Takeaway





Seattle Department of Transportation

Thomas St Redefined - 5th to Dexter



Seattle Department of Transportation

Thomas St Redefined – 6th to Dexter

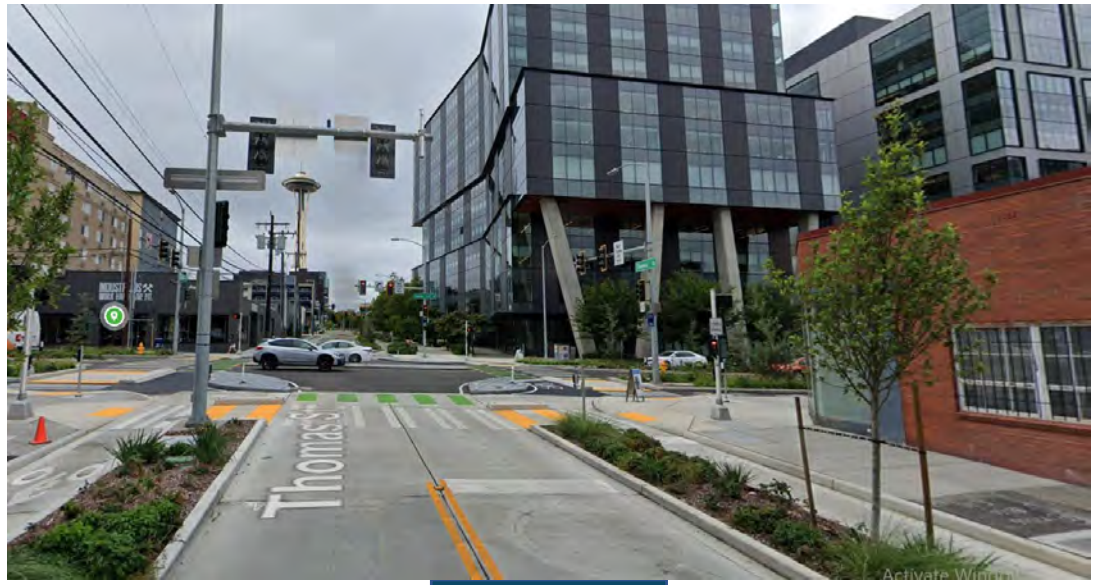


Seattle
Department of
Transportation

Thomas/Dexter Intersection



2021



2024

Seattle Department of Transportation

Protected Intersection (Dexter & Thomas)







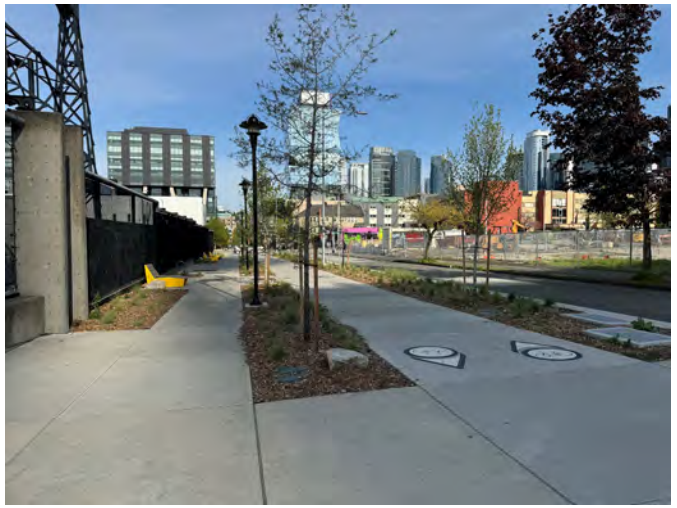


Seattle Department of Transportation

Additional Thomas St work







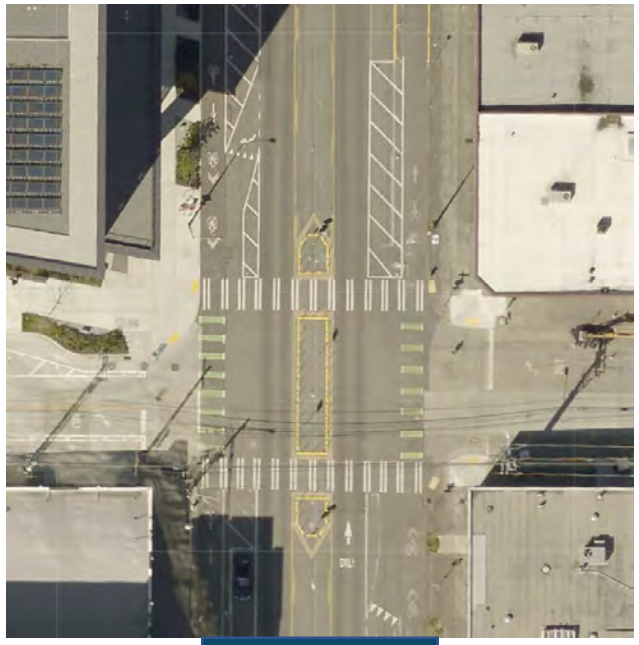




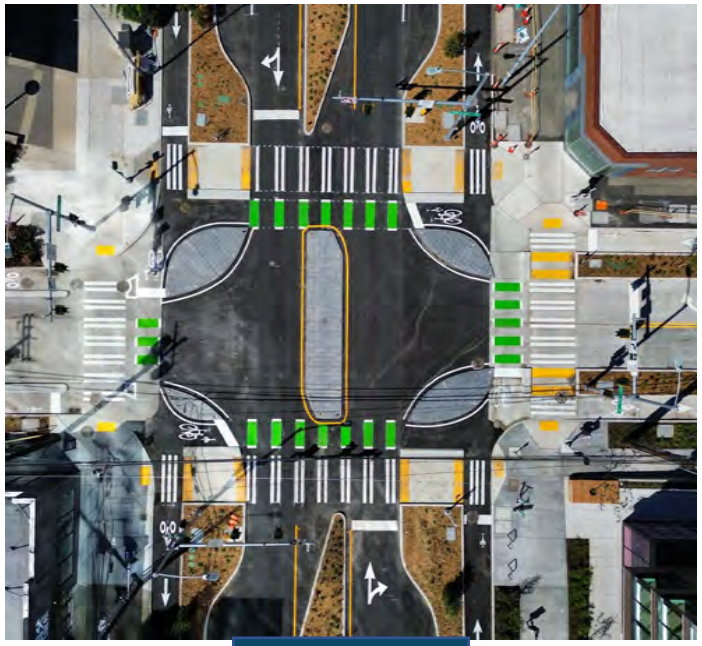
Seattle Department of Transportation

Summary

- No existing protected intersections in US at outset of planning process (2010)
- Intersection was developed as part of a larger bike and pedestrian corridor improvement project
- Extensive planning process
  - Alaskan Way Viaduct Replacement Project
  - 2013 concept plan
  - 2019 design charette
- Iterative improvements
  - Crossing improved over time



2019



2024

Replicability

Full Buildout

- Expensive and complex
  - Protected intersection elements
  - New signal
  - Landscaping, irrigation
  - Extensive utility coordination

Replicating

- Plenty of ways to minimize complexity
  - Intersection with recently built signals
  - Full concrete instead of landscaping
  - Paint/post improvements



Practical Uses of Artificial Intelligence in Transportation

Paul Snow
Transportation Engineer and Safety Analyst
Washington State Department of Transportation

Daniel Lai
Smart Mobility Manager
City of Bellevue

Kirk Neibert
Project Manager
City of Bellevue

An Introduction to Artificial Intelligence (AI) and Video Analytics in Transportation

Exploring AI's impact on traffic management solutions.

Paul Snow

(paul.snow@wsdot.wa.gov)

WSDOT Local Programs Engineering Services



What is Artificial Intelligence (AI)?

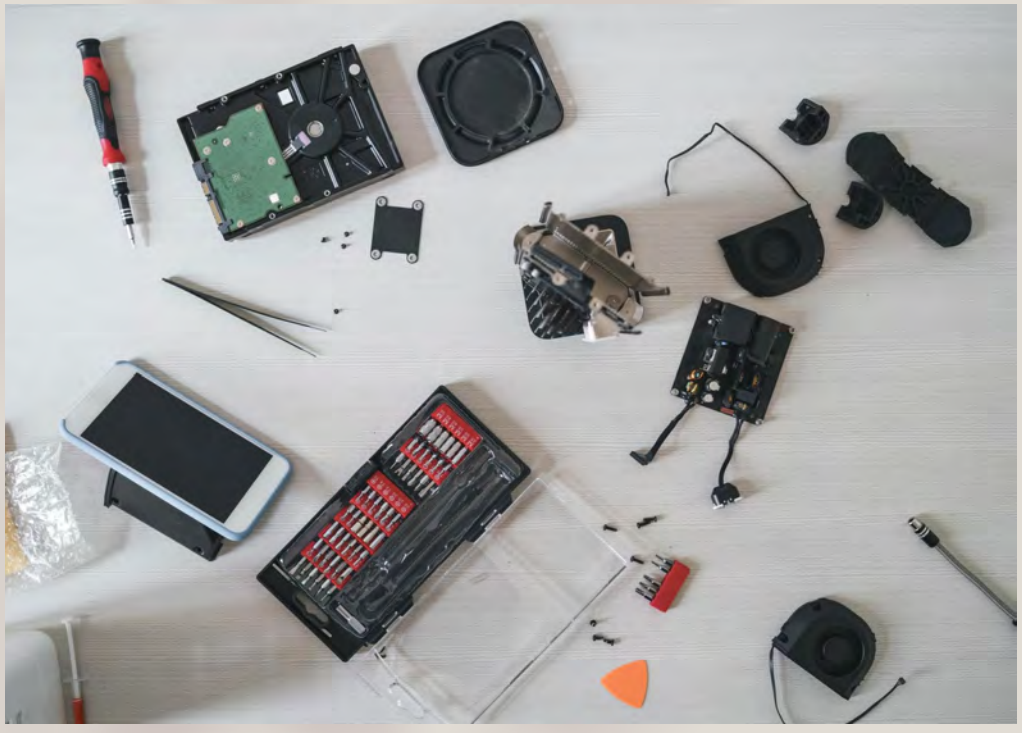
Computer Learning

Understanding

Recognizing

Making Decisions

AI in Data Collection Methods



Sensors

Sensors play a crucial role in capturing dynamic data. They provide real-time information beneficial for analysis.

Cameras

Cameras capture visual data that enhances understanding of traffic patterns. They can analyze vehicle behavior effectively.

GPS Data

GPS data from vehicles offers insights into location and movement. It's vital for improving traffic predictions.

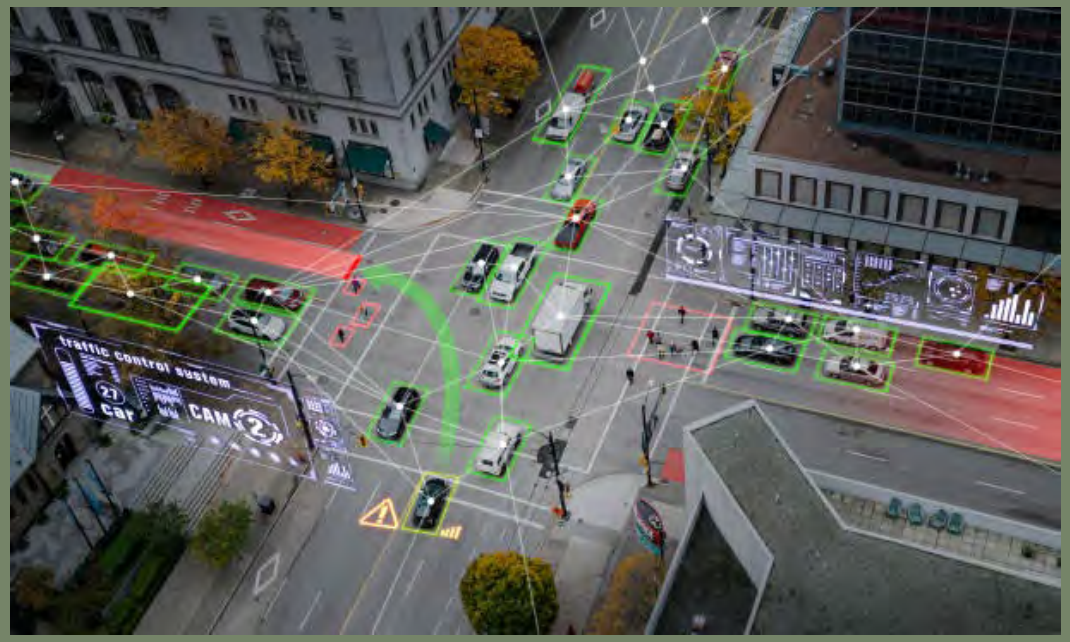


AI In Traffic Management

Traffic Monitoring

Predict Patterns

Detect Incidents





AI in Traffic Control

Smart Traffic Signals

AI adjusts traffic light timing in real time based on traffic flow.

Monitor congestion and update dynamic speed limit signs.

AI in Traffic Safety



- Forecast accident hotspots based on weather, traffic density, and road conditions
- Recommend proactive measures like speed limit adjustments or infrastructure changes
- Use machine learning models resulting in high accuracy (up to 82%) to predict crash likelihood

AI in Roadway Asset Management



Point Assets

Signals & Devices
Light Posts & Utility Poles
Fire Hydrants & Parking Meters
Markers & Delineators



Line Assets

Guardrails & Barriers
Medians & Sidewalks
Pavement Markings
Lanes & Shoulders

Challenges in AI

Data Collection

Collecting traffic data is essential for training AI models. Various methods can be used, including sensors and cameras.

Preprocessing Data

Data preprocessing involves cleaning and organizing data for effective model training. This step enhances data quality.

Model Training

Training models with the prepared data is crucial for performance. It involves selecting the right algorithms and parameters.

Validation Techniques

Validation techniques ensure the model's predictions are accurate and reliable. This step is vital for real-world applications.



Conclusion

As cities grow and transportation demands increase; AI offers a solution. (Top Picture Seattle 1970 bottom Picture Seattle 2024).





Reduce congestion

Enhance safety

Improve environmental outcomes

Support data-driven decision-making

Questions





Real-world Applications of AI in the City of Bellevue

September 2025

Application of AI Technologies in Bellevue



Kirk Neibert
Transportation Technology Partnerships Manager
City of Bellevue



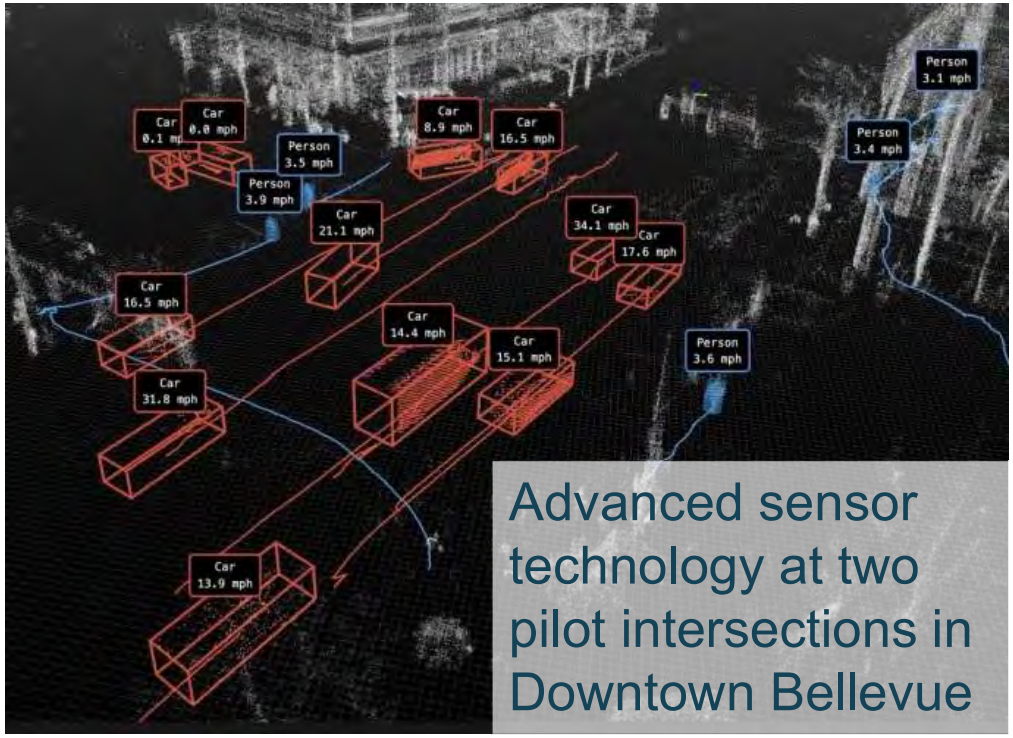
Daniel Lai
Smart Mobility Manager
City of Bellevue

- Moving beyond AI for data collection towards practical applications
- Pioneering initiatives to enhance intersection safety and efficiency for vulnerable road users
- Leverages cutting-edge sensors and analytics to improve intersection safety
- Best practices for public sector agencies

Traffic Signal Technologies

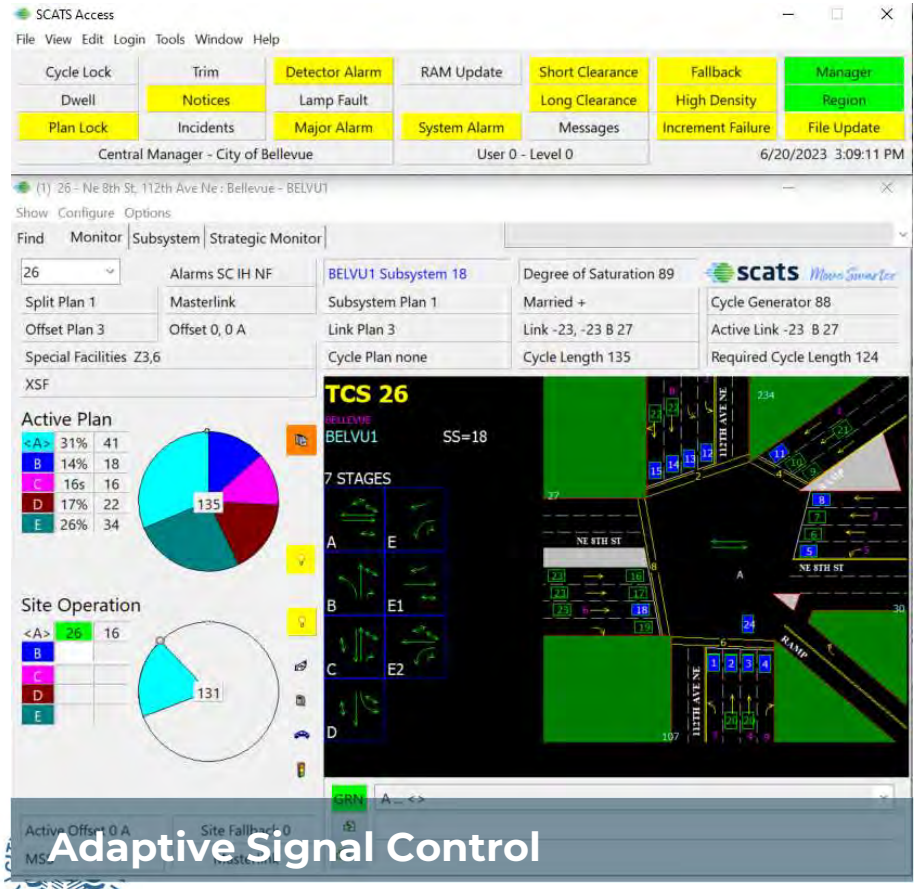


- Bellevue reached 100% adaptive signal control in 2016
- 100% high speed network connectivity between traffic signal and city hall



Advanced sensor technology at two pilot intersections in Downtown Bellevue

ITS Technologies in Bellevue



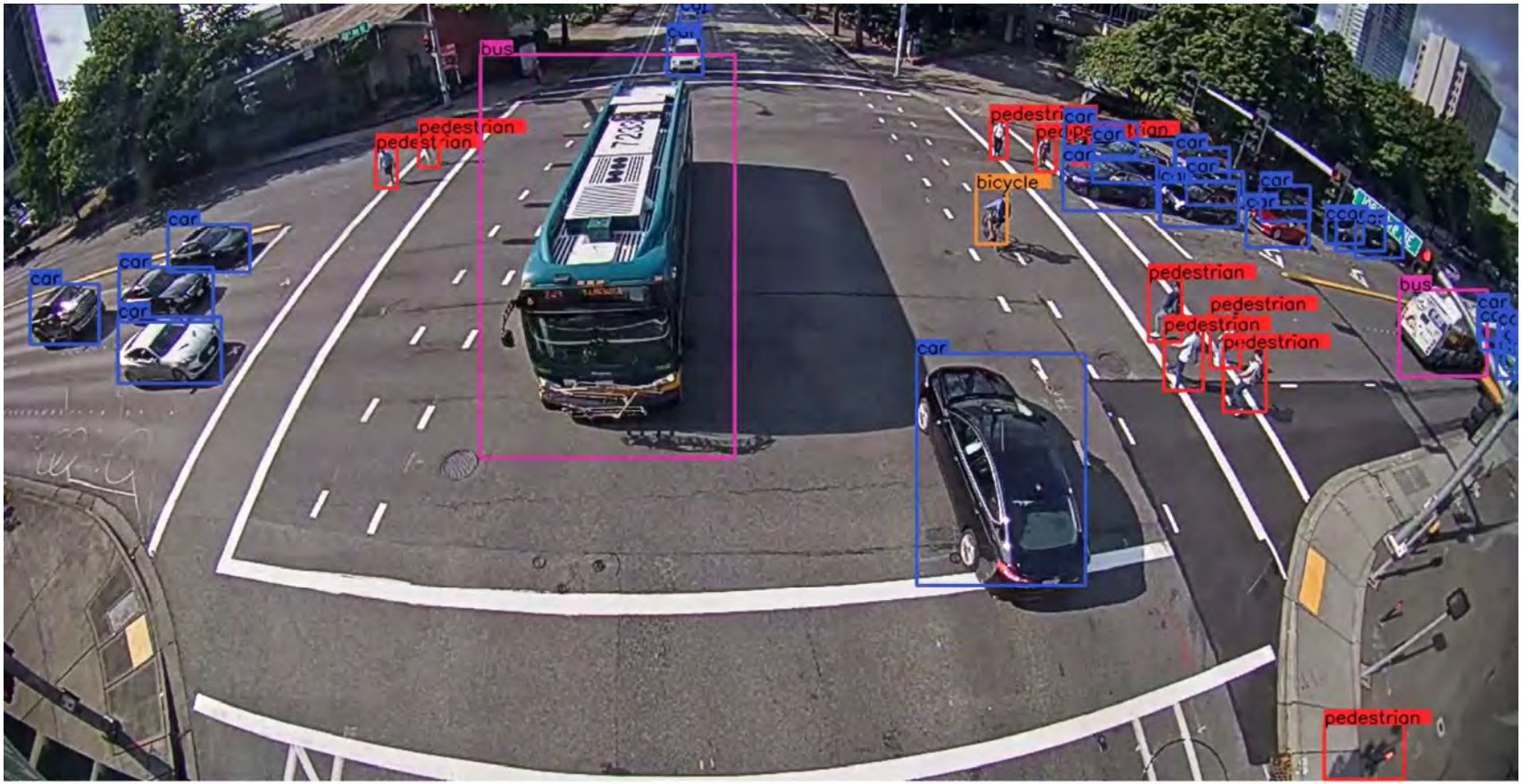
Adaptive Signal Control



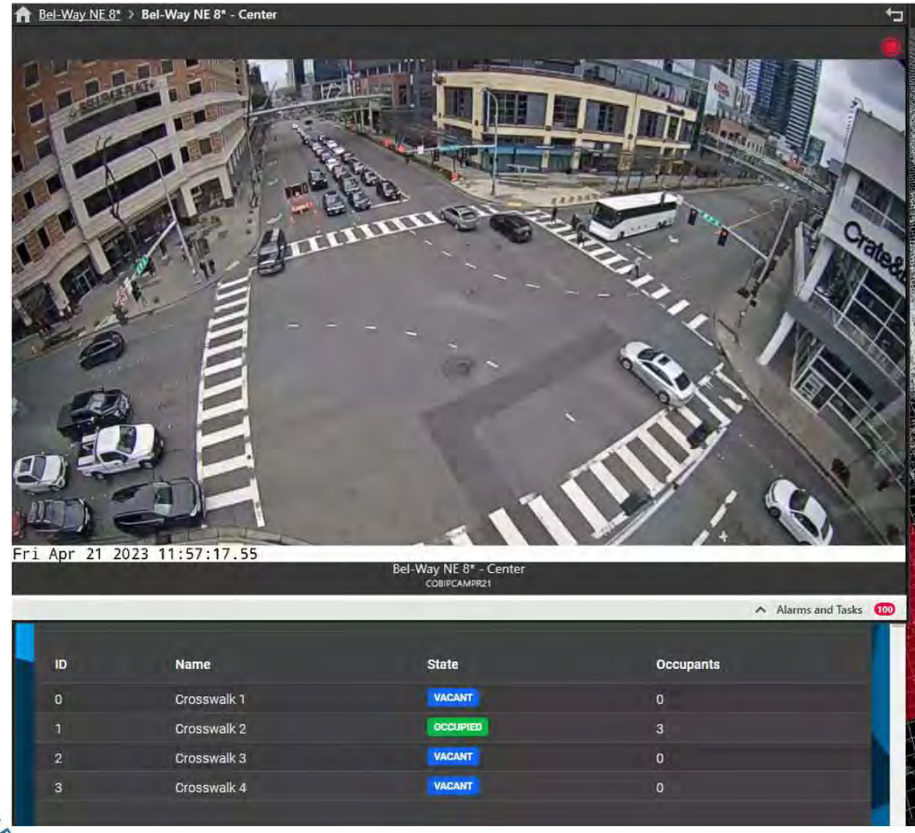
360 HD CAMERAS: 100% COVERAGE

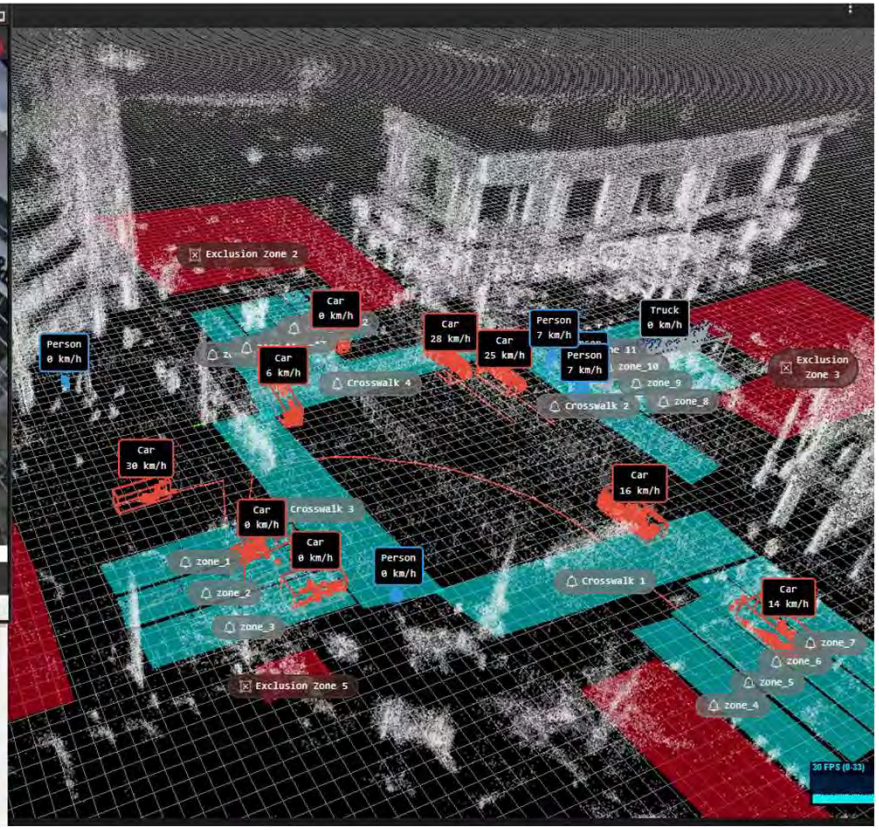

NETWORK: 10 GB SPEED

Cloud Computing + AI + Video Analytics



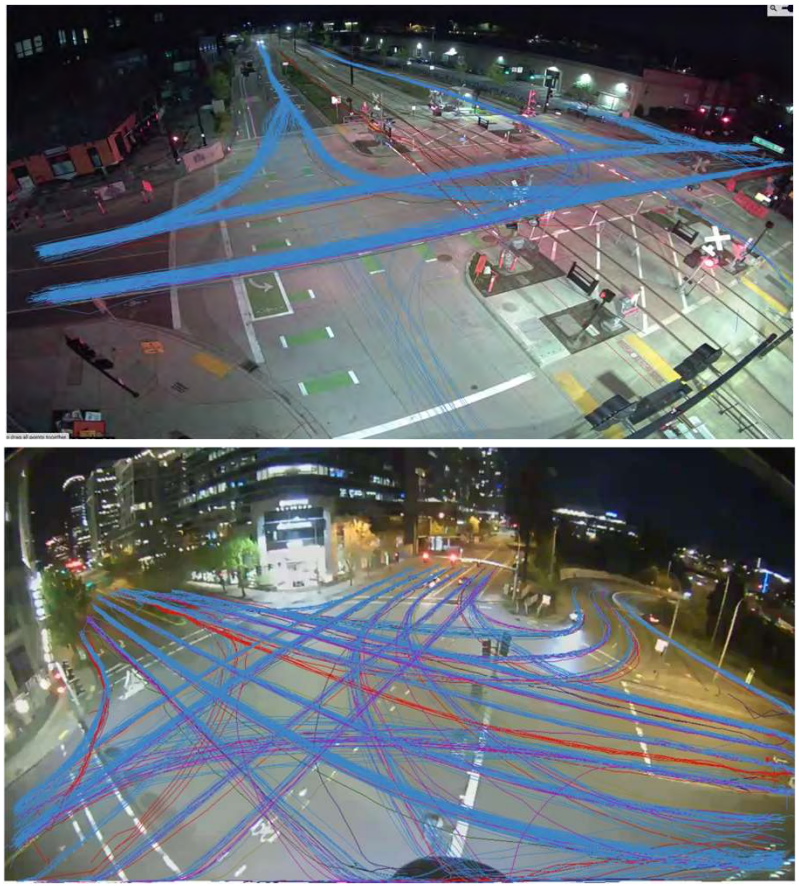
2023-2024 Edge Compute Partnership

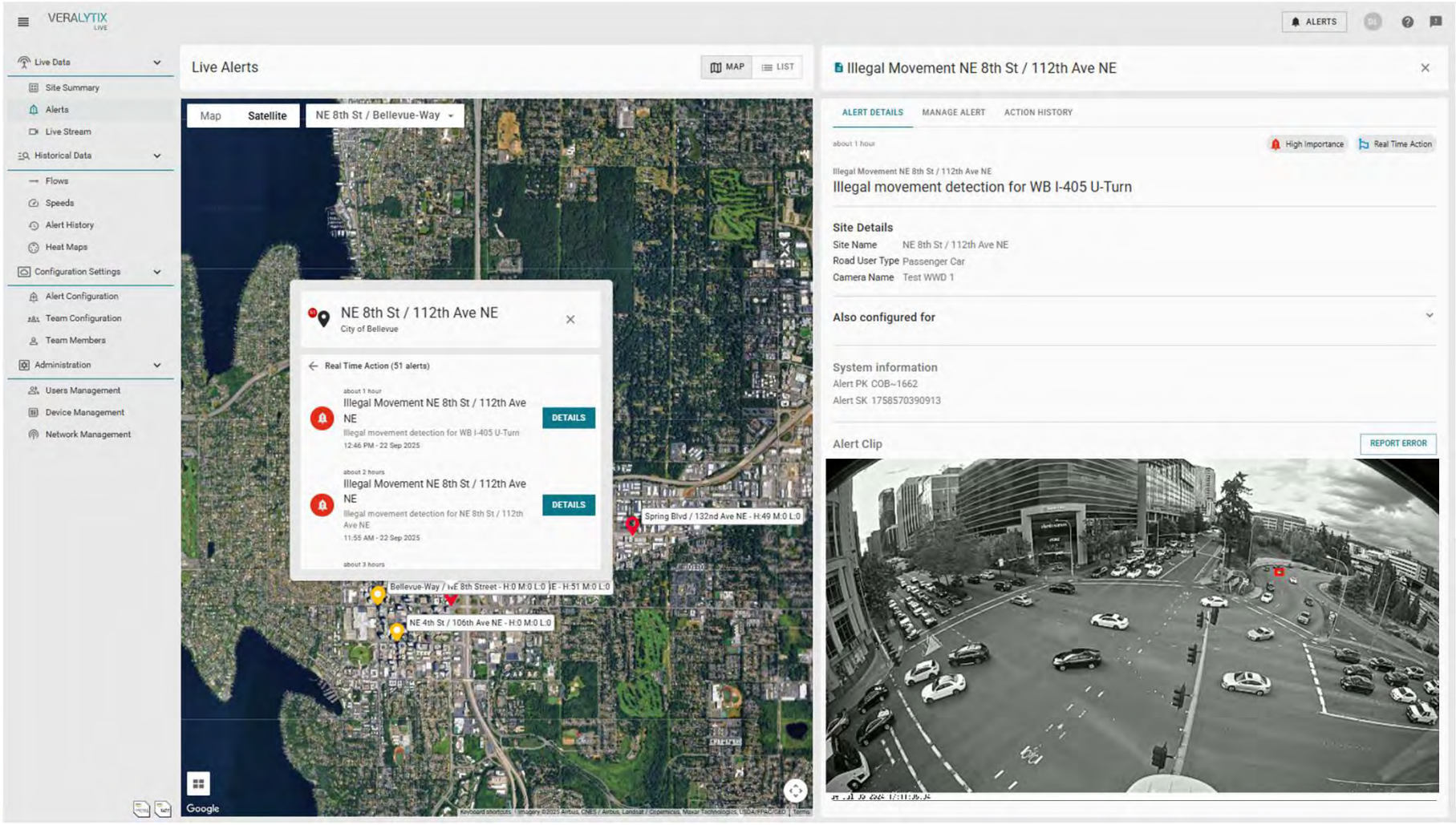




Safe System - Video Analytics

- Cloud-based video analytic solution
- Leverages Bellevue's traffic camera platform
- Automatically flags anomalous movements based on vehicle trajectory
- Provide video playback of events that constituted an anomalous movement
- Provides comprehensive insights on traffic operations and safety




VERALYTIX
LIVE
ALERTS
Live Data
Site Summary
Alerts
Live Stream
Historical Data
Flows
Speeds
Alert History
Heat Maps
Configuration Settings
Alert Configuration
Team Configuration
Team Members
Administration
Users Management
Device Management
Network Management
Live Alerts
MAP
LIST
Map
Satellite
NE 8th St / Bellevue-Way
NE 8th St / 112th Ave NE
City of Bellevue
Real Time Action (51 alerts)
about 1 hour
Illegal Movement NE 8th St / 112th Ave NE
Illegal movement detection for WB I-405 U-Turn
12:46 PM - 22 Sep 2025
DETAILS
about 2 hours
Illegal Movement NE 8th St / 112th Ave NE
Illegal movement detection for NE 8th St / 112th Ave NE
11:55 AM - 22 Sep 2025
DETAILS
about 3 hours
Spring Blvd / 132nd Ave NE - H:49 M:0 L:0
Bellevue-Way / NE 8th Street - H:0 M:0 L:0
NE 4th St / 106th Ave NE - H:0 M:0 L:0
Google
Illegal Movement NE 8th St / 112th Ave NE
ALERT DETAILS
MANAGE ALERT
ACTION HISTORY
about 1 hour
High Importance
Real Time Action
Illegal Movement NE 8th St / 112th Ave NE
Illegal movement detection for WB I-405 U-Turn
Site Details
Site Name NE 8th St / 112th Ave NE
Road User Type Passenger Car
Camera Name Test WWD 1
Also configured for
System information
Alert PK COB~1662
Alert SK 1758570390913
Alert Clip
REPORT ERROR

SMART Grant

- **What is SMART?**
  - Strengthening Mobility and Revolutionizing Transportation
  - Funding for innovative, technology-focused projects

- **Bellevue's Award**
  - Stage 1 grant: $1.43 million for planning and prototyping
  - Grant period: October 2024 – March 2026

- **RTSSI – From Grant to Project**
  - Development and live testing of critical use cases
  - Launchpad for partnerships, technology integration, and future expansion



Motivations for RTSSI

- **Crashes disproportionately impact vulnerable road users**
  - Over half of all fatal and serious injury crashes in Bellevue involve a VRU
  - Traditional traffic signals are vehicle centric

- **Higher-risk intersections**
  - Near schools, shops and transit hubs in historically disadvantaged communities
  - Minority populations, older adults, disabilities

- **Rethink signal operations**
  - Smarter and more responsive intersections for everyone
  - Dynamic real-time solutions

RTSSI Team

Public Sector

Technology

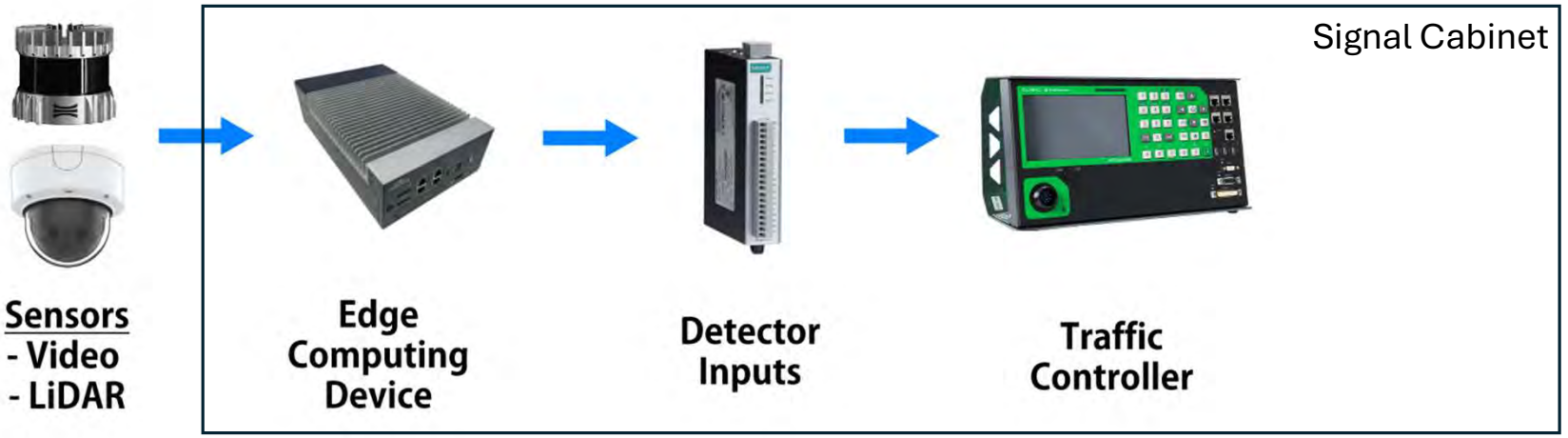
Evaluation

Consulting

Real-Time Safety Technical Platform

- **Ouster LiDAR sensor platform**
  - Delivers high-resolution 3D detection and real-time classification of pedestrians, cyclists, and vehicles at intersections.
  - Enables precise, privacy-preserving monitoring of all road users—day or night, all weather—feeding actionable data to signal controllers.
- **Derq AI Video Analytics Platform**
  - Provides advanced video analytics for real-time road user detection, tracking, and intent prediction—including pedestrians, cyclists, and vehicles.
  - Uses state-of-the-art AI to classify and monitor intersection activity from video camera data, and integrates directly with signal controllers for safety interventions, even in challenging visibility.
- **Edge computing**
  - Local GPU-powered edge devices process sensor data instantly at the intersection, achieving sub-second latency from detection to traffic signal response.
- **SCATS Signal System Integration**
  - Both platforms link seamlessly to Bellevue's SCATS adaptive signal controllers, so real-time sensor data drives traffic phase extensions, protected turn activations, and dynamic turn restrictions

Solution Components



Identifies road user type, speed, trajectory, count

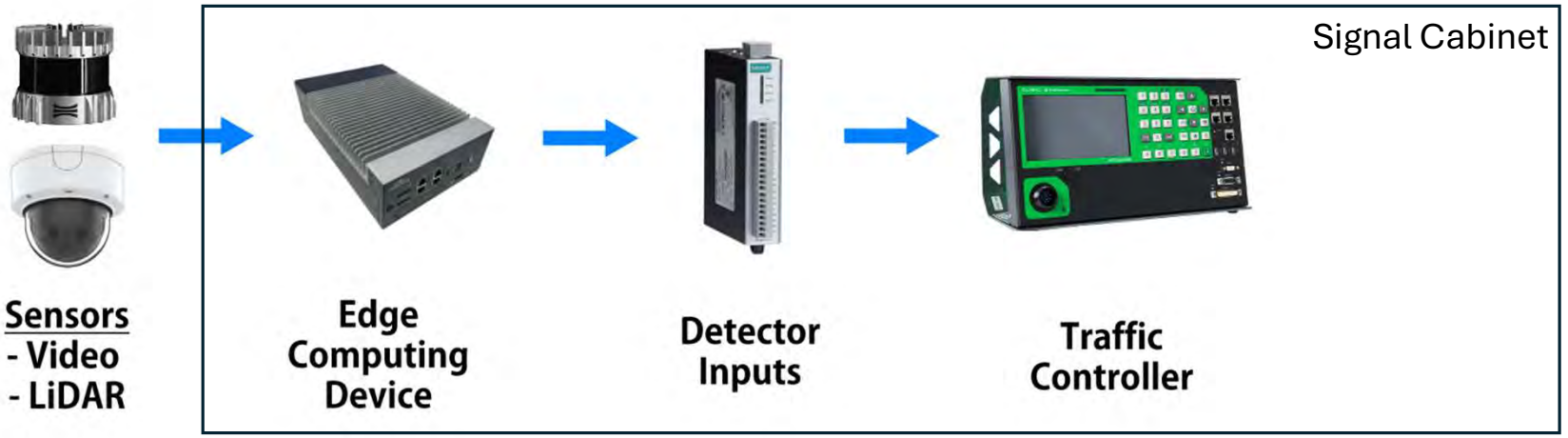
Determines if a "qualifying event" occurs and sends input to controller

Receives input (on/off)

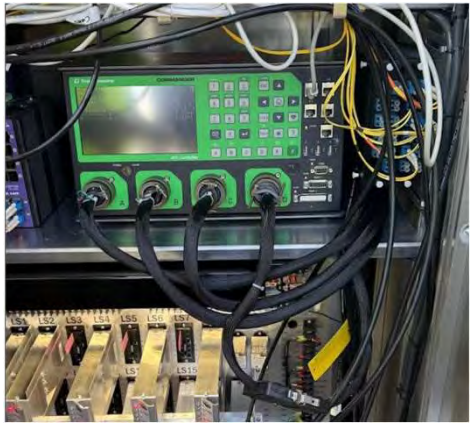
The logic for what to do resides in the controller

Triggers intervention if in correct signal phase

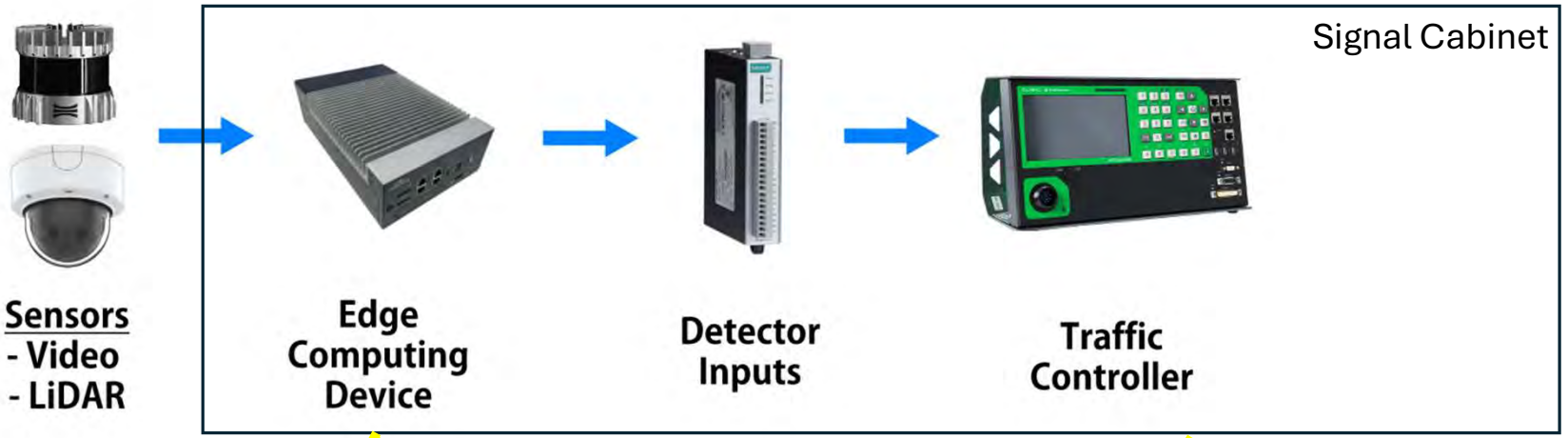
Solution Components

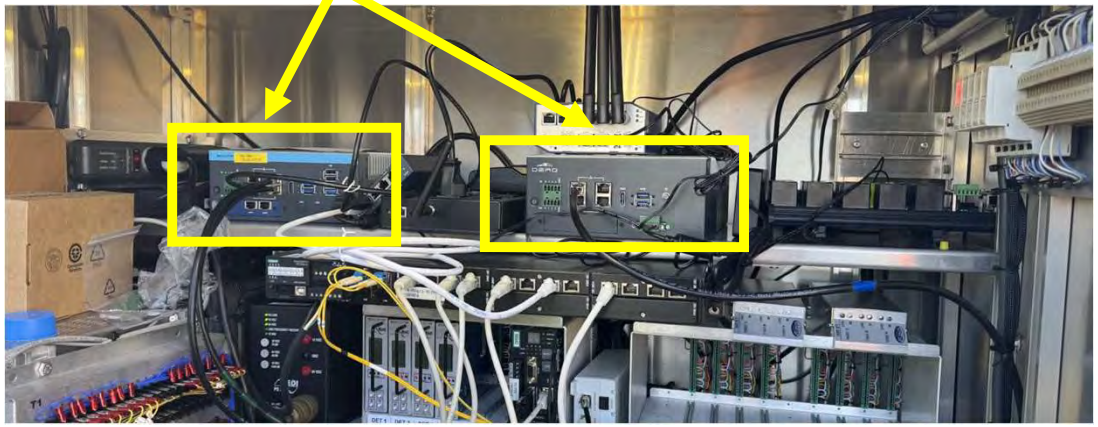


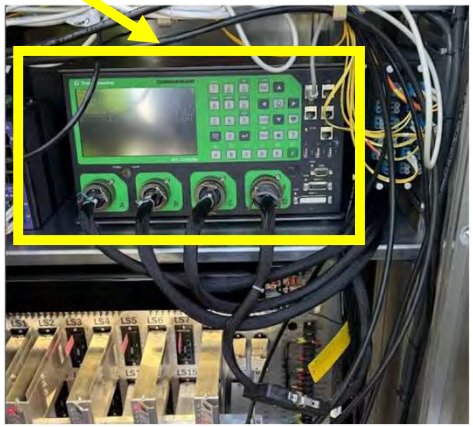




Solution Components

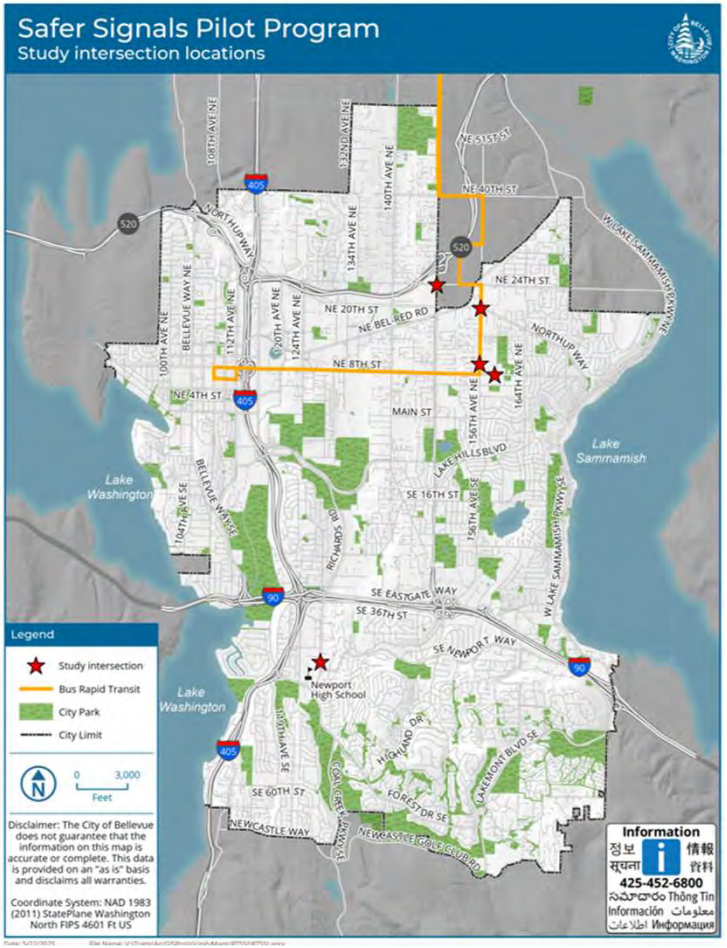






Smart Use Cases for Safer Intersections

- **Focused on real-world problem-solving**
- **Five pilot intersections**
- **Four pilot use cases**
  - Pedestrian Clearance Extension
  - Passive Pedestrian Walk Extension
  - Dynamic No Right Turn on Red (NRTOR)
  - Dynamic Left-Turn Phasing
- **Safety and equity prioritized**



Pedestrian Clearance

What It Is

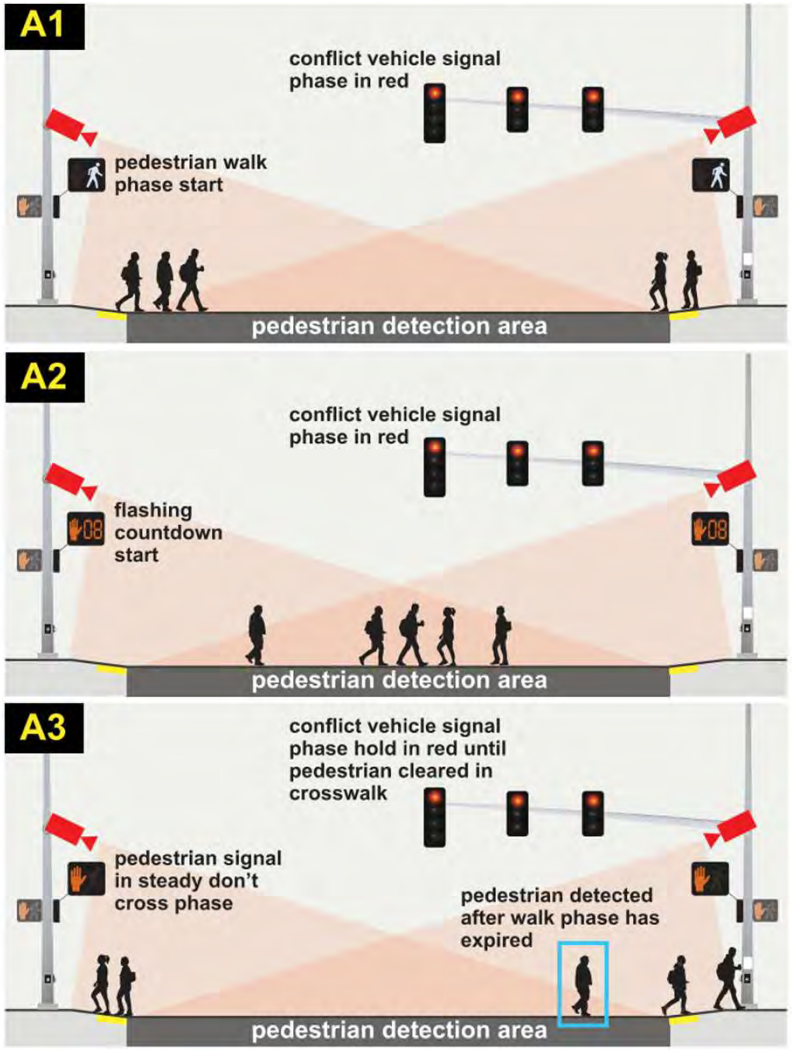
- Detects pedestrians still in the crosswalk when the orange “Hand” symbol begins to flash (clearance interval)
- Automatically holds vehicle movements and *extends the green phase after clearance* until the pedestrian fully exits the crosswalk.

How It Works

- Video and LiDAR sensors continuously monitor the crosswalk during the clearance phase.
- If a person is detected within the crosswalk after the clearance countdown finishes, the system extends the concurrent vehicle movement, delaying conflicting vehicle movements. AD2
- Once the crosswalk is clear, the signal resumes normal timing and next phase.

Why It Matters

- Directly addresses the top cause of pedestrian exposure in crosswalks: people being caught in the road as traffic moves
- Helps protect the most vulnerable users—seniors, people with disabilities, children, families, or anyone needing extra time.
- Proven safety practice that reduces risk of pedestrian-vehicle conflicts, especially at large or complex intersections.



Walk Extension

What It Is

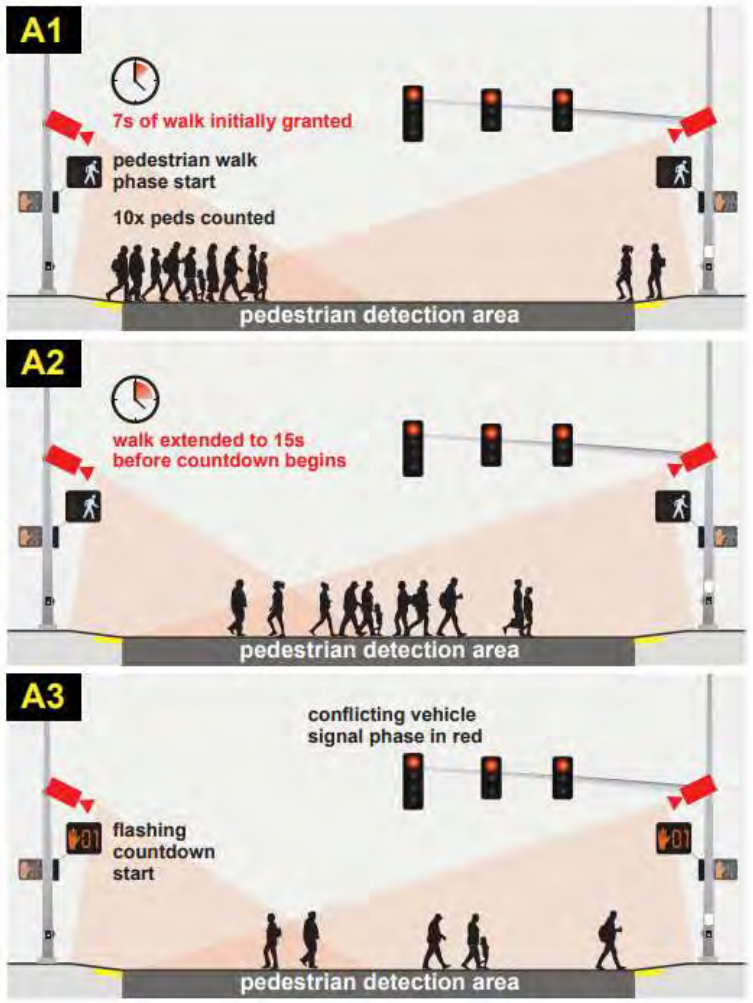
- The system detects slow walkers, people with mobility devices, or large groups waiting to cross—*as soon as the "Walk" signal starts*
- If needed, it automatically extends the "Walk" display (e.g., from 7 seconds up to 15–20 seconds), ensuring everyone has enough time to step into the crosswalk before the countdown or "Don't Walk" hand appears.

How It Works

- Video and/or LiDAR sense waiting pedestrians' number, walking speed, and mobility needs at the crossing.
- If qualifying criteria are met—such as presence of mobility aids, slow-moving individuals, or higher-than-usual volume—the system holds the "Walk" phase longer before switching to the pedestrian clearance.
- No button-pushing or extra steps required for pedestrians—*the process is fully automated and equitable*.

Why It Matters

- Ensures older adults, people with disabilities, children, and families aren't rushed or left behind at the start of their crossing.
- Particularly critical at busy intersections, near schools, transit, and in areas with diverse mobility needs.
- Reduces start-up lost time risks and improving safety for all crosswalk users.



Dynamic NRTOR Restriction

What It Is

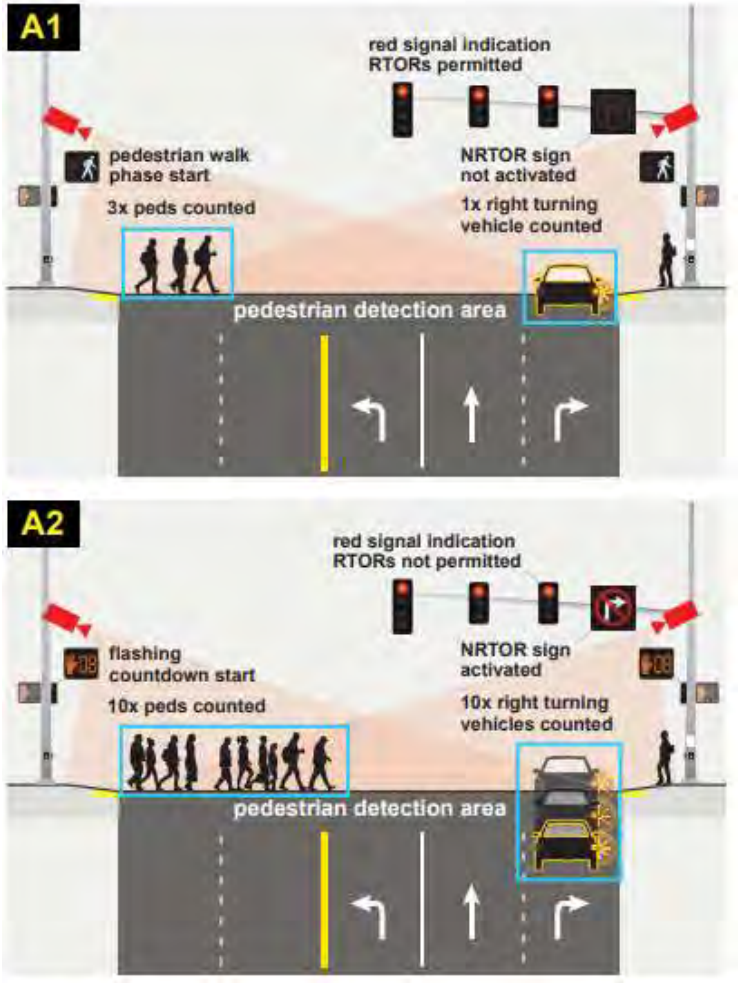
- Smart, real-time activation of “No Right Turn on Red” signals when pedestrians are detected crossing or waiting to cross, to eliminate vehicle-pedestrian conflicts during the red phase.
- The NRTOR sign is activated only when it matters—minimizing unnecessary driver delay and maximizing safety

How It Works

- Video and/or LiDAR sensors continuously monitor right-turn lanes (channelized right turns) and crosswalks
- When a pedestrian is present or projected to be in conflict with a turning vehicle, the system causes the “No Turn on Red” symbol to light up
- Once the crosswalk is clear, the restriction ends and right turns on red are permitted again, restoring normal traffic flow

Why It Matters

- Reduces “look-backs”—dangerous last-second right turns while drivers are focused left for gaps, not checking the crosswalk to the right
- Protects all road users, especially those most at risk: children, elderly, and people with disabilities
- Allows enforcement and public understanding of NRTOR as a dynamic, data-driven safety intervention—building legitimacy for flexible, non-permanent restrictions that match live conditions



Dynamic Left Turn Phasing

What It Is

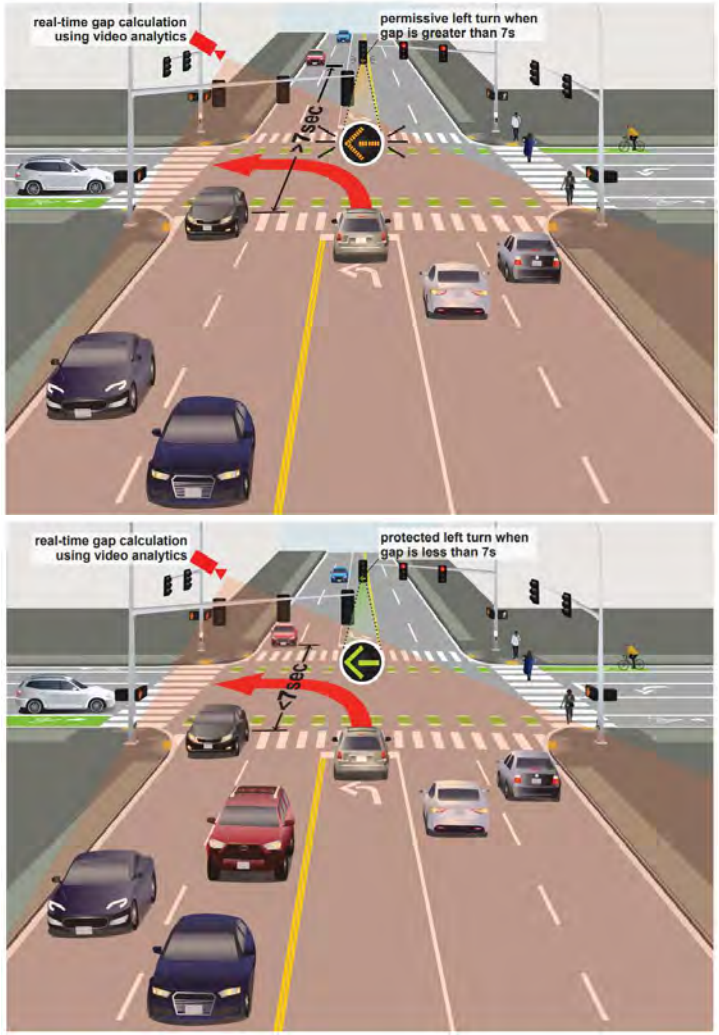
- The system dynamically selects between protected (solid green arrow = left turn only, solid red arrow = left turn prohibited) and permissive (flashing yellow arrow = yield to oncoming traffic) phasing for left turns, based on real-time vehicle gaps

How It Works

- Video and LiDAR sensors continuously watch oncoming flows
- When there are not enough gaps in oncoming traffic, the phase stays protected:
  - *Solid green arrow* means left turns are exclusive and safe from oncoming conflict
  - *Solid red arrow* means left turns are not permitted at all
- When safe gaps are detected, the signal transitions to a *flashing yellow arrow*, allowing permissive (yielding) left turns

Why It Matters

- Prevents risky left turns during periods of heavy or unpredictable oncoming traffic
- Increases safety and operational flexibility, using protected phases only when gaps are insufficient
- Maximizes throughput and driver satisfaction without compromising intersection safety



Best Practices for Agencies

- **Engage cross-disciplinary partners early**
  - Involve all stakeholders from the outset: IT, traffic engineering, community members
  - Cross-functional teams anticipate challenges, accelerate solutions, and boost both technical and public trust
- **Prioritize privacy and transparency**
  - Design data flows and system specs to ensure *no collection of PII* and proactively publish privacy policies
  - Keep the public and city leadership informed with clear communications on what is (and isn't) collected
- **Test innovations with live demos and feedback loops**
  - Pilot new use cases in the real world—host live demonstrations for agency staff, policymakers, and community members
  - Gather feedback before—and during—deployment to pivot quickly if problems or concerns arise
- **Document integration issues and share guidelines**
  - Rigorously track integration challenges: sensor placement, network connectivity, timing mismatches, data anomalies
  - Create and publicly share "how-to" guides so peer agencies can benefit from lessons learned—accelerating regional and national progress in signal safety.
- **Takeaway**
  - Future-ready traffic technology is as much about collaboration and transparency as it is about code and hardware. Agencies that share early, test openly, and document thoroughly set the standard for smart mobility innovation.

Questions?

- For project details, partnership opportunities, or technical info

  - **Daniel Lai – Transportation Smart Mobility Manager**
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  - **Kirk Neibert – Transportation Technology Partnerships Manager**
    - kneibert@bellevuewa.gov

Practical Uses of Artificial Intelligence and Video Analytics in Transportation

Q&A Follow-up

Question 1: You mention how important validation is AI, but also have made some broad claims about safety enhancement and congestion reduction. Do we have any example sources for these claims that have been independently verified, or aren't coming from a private sector source with a financial interest in promoting its own AI technology?

The claims regarding safety enhancement and potential congestion reduction are supported by a rigorous evaluation framework involving independent academic and research partners.

- Insurance Institute for Highway Safety (IIHS): IIHS is partnered with the project to evaluate the overall effectiveness of the safety interventions by measuring reductions in near-miss conflicts involving Vulnerable Road Users (VRUs) over time. IIHS provides data on the real safety impacts of the program.
- University of Washington (UW): UW's STARLab is focused on independently assessing the accuracy of the signal interventions, analyzing metrics such as detection accuracy, true positives, false positives, false negatives, and identifying anomalies in the data provided by the commercial vendors (Derq and Ouster).
- Preliminary analysis conducted by IIHS, comparing two months prior to activation against the first two weeks of live intervention, showed statistically significant reductions in near-misses for several use cases.
    - The Dynamic "No Turn on Red" (DNTOR) use case showed a 42.9% reduction in near-misses.
    - The Dynamic Extension of Pedestrian Walk Times (WE) use case showed 51.5% reduction in near-misses.
- Congestion Reduction Claims
    - The evaluation includes quantitative measures of vehicle mobility metrics, specifically assessing control delay using data from the Iteris ClearGuide platform, comparing data from before and after periods.
    - While real-time VRU safety interventions could potentially result in minor delays, the City uses a citywide SCATS adaptive signal control system which helps accommodate these interventions while minimizing overall vehicular delay. The system aims to minimize signal changes and delays for drivers when interventions are not needed.

Question 2: Does the dynamic NRTOR help improve driver compliance, since drivers are less delayed if not needed? The dynamic left turn phasing seems to be of high value, but counterintuitive when one thinks of driver expectations or understanding. Acceptance of gaps is a driver decision. How will that be overcome?

The design of the Dynamic No Turn on Red (DNTOR) intervention inherently encourages better driver compliance and minimizes unnecessary delays compared to static restrictions:

- Unlike static "No Turn on Red" restrictions, DNTOR is deployed dynamically, activating the restriction only when VRUs are detected crossing or waiting to cross. This approach aims to minimize vehicular delay when the intervention is not necessary.
- The intervention is designed to address a key safety risk: drivers making right turns on red are often focused primarily on finding gaps in traffic and may not notice VRUs in the adjacent crosswalk. By proactively restricting the turn when pedestrians are present, the system removes the conflict opportunity entirely.

The Dynamic Left Turn (DLT) intervention addresses the conflict between driver expectation (seeking gaps) and safety when conditions deteriorate:

- DLT is triggered when the gap between approaching vehicles falls below a safe threshold (e.g., typically under seven seconds), signaling that a permissive left turn may no longer be safe. When activated, the phase changes to protected-only. This action directly overcomes the issue of risky driver acceptance of gaps by dynamically removing the permissive turning opportunity, thus eliminating the risk of left-turning vehicle conflicts with opposing through traffic.
- When DLT is activated, the reduction in conflicts between left-turning vehicles and opposing vehicles should be 100%, assuming drivers comply with the signal indications.
- The City is gathering public feedback through engagement events on the appropriateness and perceived benefits of the safety interventions, aiming to determine how well the technology meets the expectations or needs of the traveling public. The approach emphasizes transparency, explaining exactly how the countermeasures work via animations and outreach materials to ensure the community understands and embraces the changes.

Question 3: Did you compare the two technologies in the use cases or did you use the output of both lidar and AI Video to inform the traffic controller?

The fundamental premise of the Stage 1 RTSSI project was to prototype the capabilities of advanced sensors by deploying two dual technologies (Derq and Ouster) side-by-side to allow for cross-referencing and comparison. The dual-technology approach allowed the City to better understand each technology's capabilities and limitations. We're not fusing the outputs of the two systems, but instead utilizing the output of each vendor's system independently to inform the traffic controller:

- The two systems run as separate, parallel platforms. Each of the five intersections is equipped with two Ouster LiDAR sensors and one Derq camera, along with a dedicated edge processor for each vendor.
- Each vendor's edge computer identifies road user types, speeds, and trajectory, and determines if a "qualifying event" (meeting pre-defined thresholds) has occurred.
- If a qualifying event is met, the respective edge processor sends a low-latency input through a Moxa or WebRelay I/O module to the traffic signal controller.

Thank you!

Next Forum and Peer Exchange:

- April 2026
- Do you have a topic of interest?
- Contacts:

  Ed Spilker– Ed.Spilker@wsdot.wa.gov

  Charlotte Claybrooke– ClaybrC@wsdot.wa.gov

