Fehr & Peers

High Injury Network vs High Risk Network

What is the difference and why do they matter?

Taylor Whitaker, RSP1 and Sydney Weisman, AICP | 7/15/2025

Agenda

ΓΘ LÁð″Ì ∑þ±ðÌ–Á

ΓΦ J →œŮÁ€þ″čŮª ðİ Ì ″› Ů

Γα J →œŮw–ł→ Ůª ðİ Ì ″›

Γδ t ″Ì €ª ±ðŮ″Ì″–ðą£ðÌ–ÁŮ

Γε í œ£ðĵŮª ČðΘ

Introduction

Taylor Whitaker
RSP1

Sydney Weisman
AICP

SECTION 02

High Injury Network

Looking Back: What is a HIN and why is it important?

The HIN is an analysis that identifies a network of streets with higher rates of injury and fatal crashes.

Inputs

Street Network

Crash History
(i.e. most recent 5 - years of crash data)

Uses

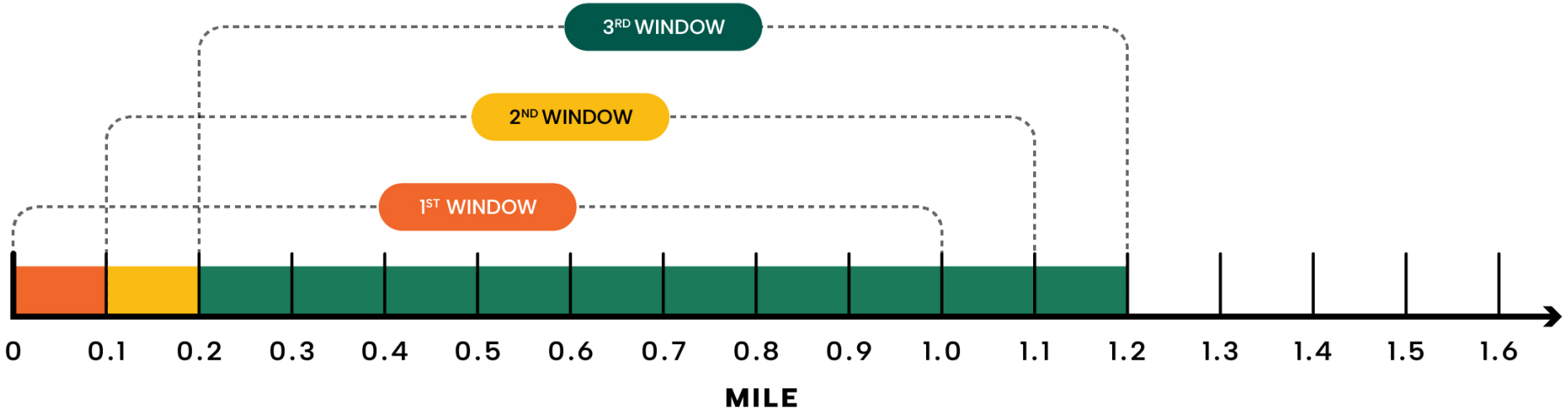
Tool to prioritize projects where there is crash history.

At a high level

The HIN is a **reactive** approach to planning.

Sliding Window Methodology

This algorithm can be the basis for a smoothed screen of crash data along continuous roadway segments.



The algorithm screens streets with a window (e.g. quarter mile or half mile).

Crashes that occur within each window are counted and categorized by crash severity.

The window is then shifted by a chosen length (e.g. 0.1 mi), and the crashes in the new window are counted.

Case Study: City of Kent TZAP

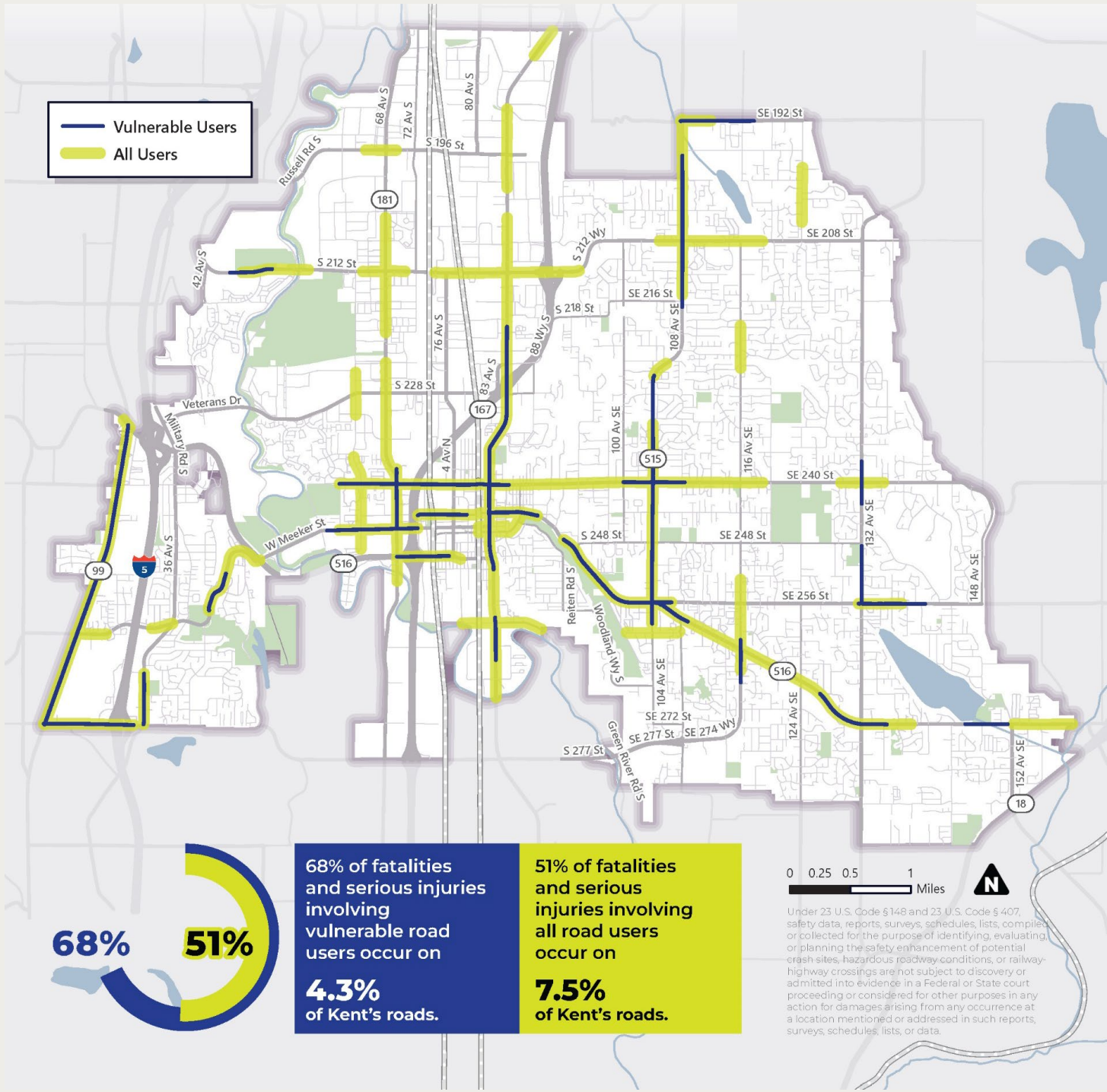
All Modes & Vulnerable Users HINs

Corridors highlighted in **yellow** see the highest levels of traffic related injuries and fatalities for **all users**.

Corridors highlighted in **blue** see the highest levels of traffic related injuries and fatalities for **vulnerable road users*** .

*A vulnerable road user is someone walking, rolling, biking, or using a motorcycle.

Fehr & Peers



SECTION 03

High Risk Network

Looking Forward: What is a HRN and why is it important?

The HRN is a custom process for identifying contextual transportation trends in crash data that we can apply system - wide.

Inputs

Crash History
(i.e. most recent 5 - years of crash data)

Systemic Data
(i.e. bicycle facilities, roadway network, pedestrian facilities, signals, etc.)

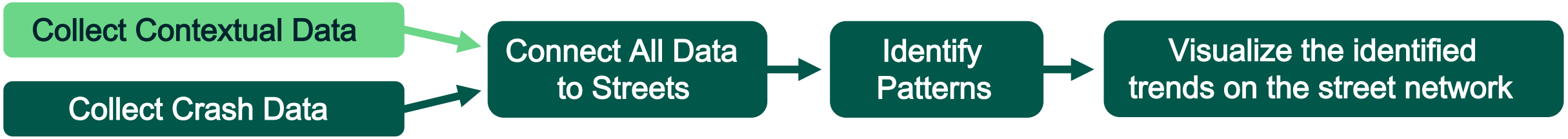
Uses

Identify safety concerns in locations where crashes may not have occurred but could be a factor in future crashes.

At a high level…

The HRN is a **proactive** approach to planning. Priority locations from the HRN may not have documented crash history.

Systemic Analysis Methodology



What contextual data can we review?

- Speed
- Functional Class
- Land Use
- Lighting
- Overburdened Communities of WA
- Transit stops/stations
- Schools
- Intersections(major vs. local)
- Bike Facilities
- Big Data (Near Miss, Hard Breaking, O-D Data)
- Crosswalks
- Signalization
- Sidewalk Presence
- Freight Routes
- Any other contextual data available!

Higher Risk Network: High Risk Factors

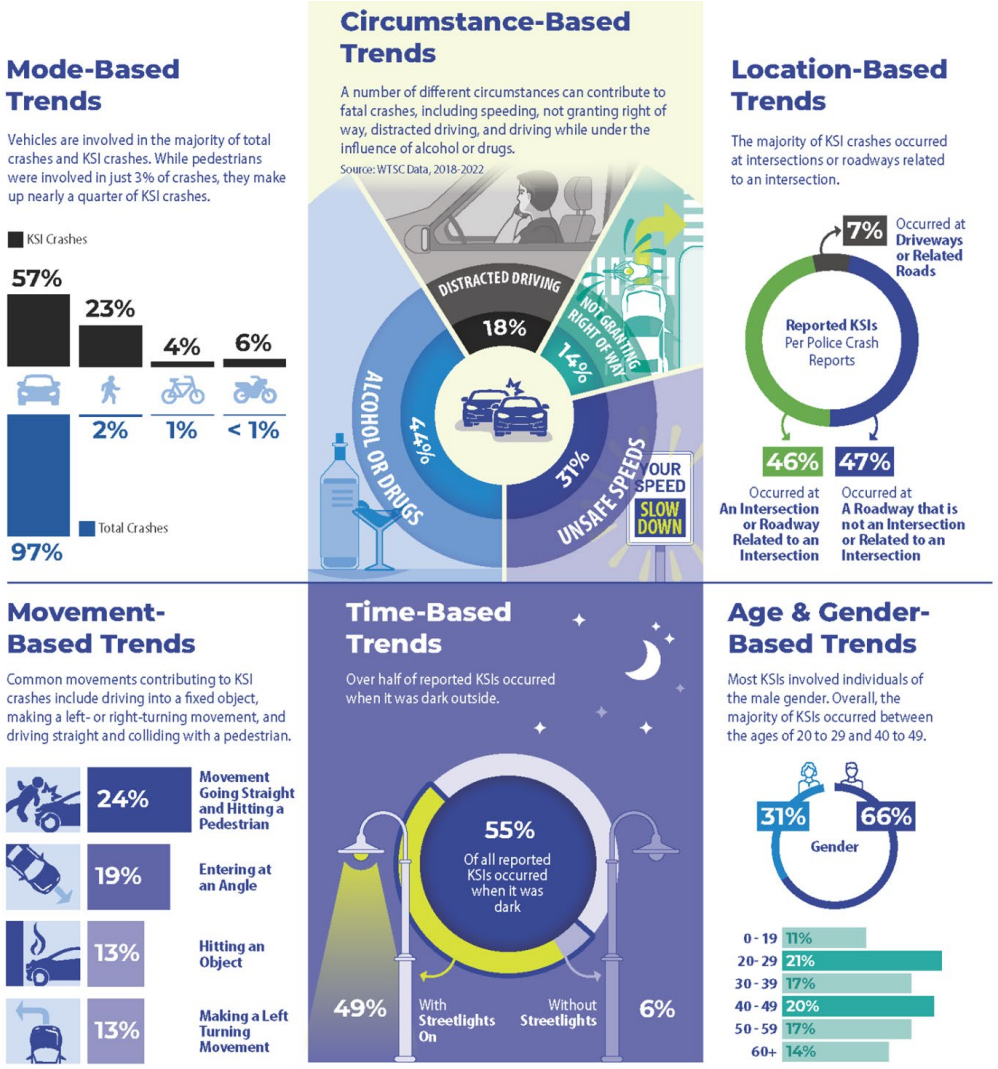
Busier Streets: **65% of fatal and serious injury crashes**, but arterials account for only 15% of the network.

Near Retail and Services: **45% of fatal and serious injury crashes**, but Commercial Land Use accounts for only 13% of the network.

Intersections with Signals: **30% of fatal and serious injury crashes**, but intersections with signals account for only 6% City intersections.

Near a Bus Stop: **57% of bicycle and pedestrian fatal and serious injury crashes**. 69% of pedestrian fatal and serious injury crashes.

Pedestrians and Bicyclists Crossing Streets: **57% of bicycle and pedestrian fatal and serious injury crashes**. 81% of pedestrian fatal and serious injury crashes.



Higher Risk Network: All User High Risk Factors

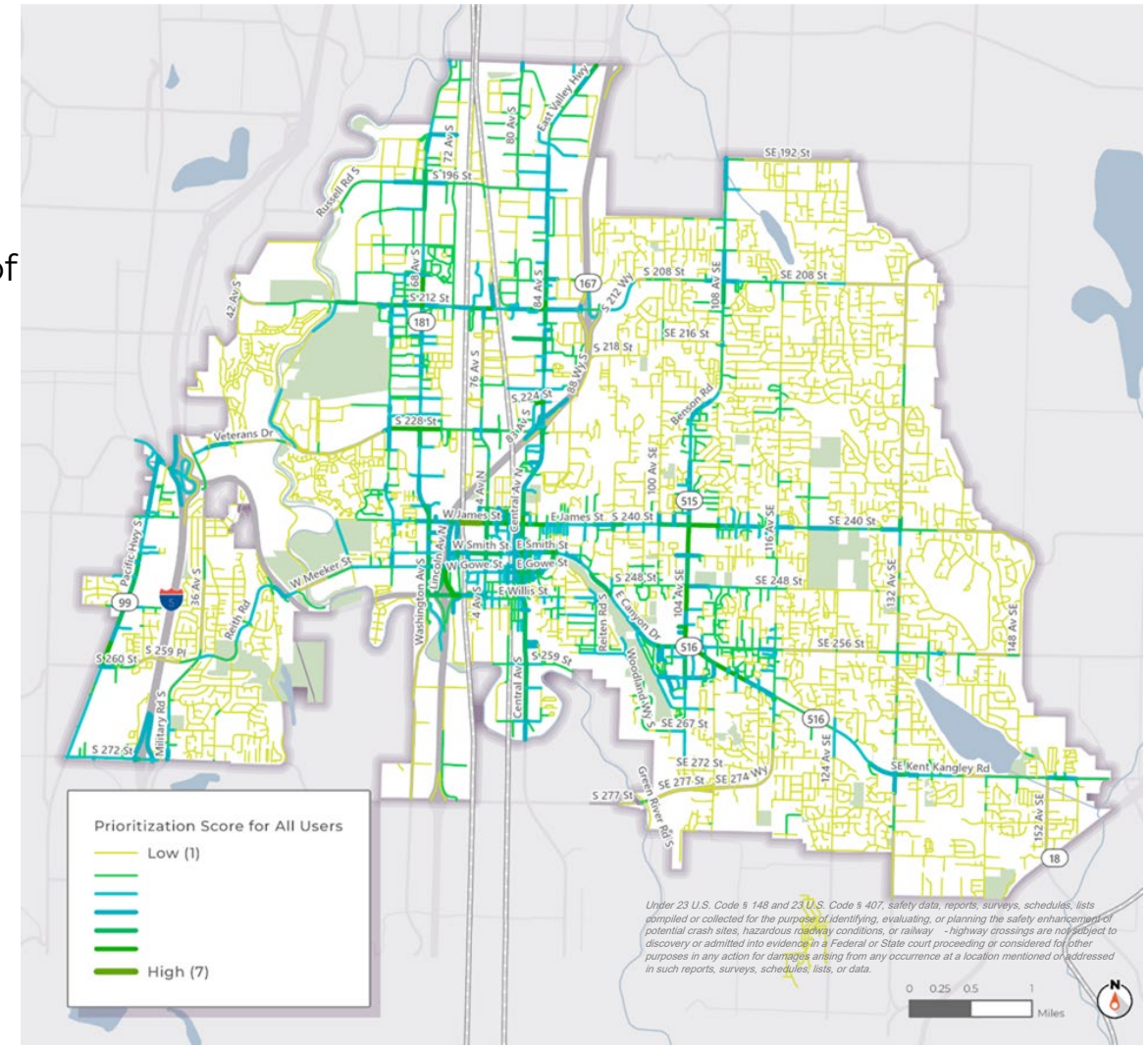
Busier Streets: **65% of fatal and serious injury crashes**, but arterials account for only 15% of the network.

Near Retail and Services: **45% of fatal and serious injury crashes**, but Commercial Land Use accounts for only 13% of the network.

Intersections with Signals: **30% of fatal and serious injury crashes**, but intersections with signals account for only 6% City intersections.

Near a Bus Stop: **57% of bicycle and pedestrian fatal and serious injury crashes**. 69% of pedestrian fatal and serious injury crashes.

Pedestrians and Bicyclists Crossing Streets: **57% of bicycle and pedestrian fatal and serious injury crashes**. 81% of pedestrian fatal and serious injury crashes.



Example from City of Kent formatted for this presentation. *This content is for demonstration purposes only and does not represent a finalized plan or commitment.*

Fehr & Peers

Higher Risk Network: VRU High Risk Factors

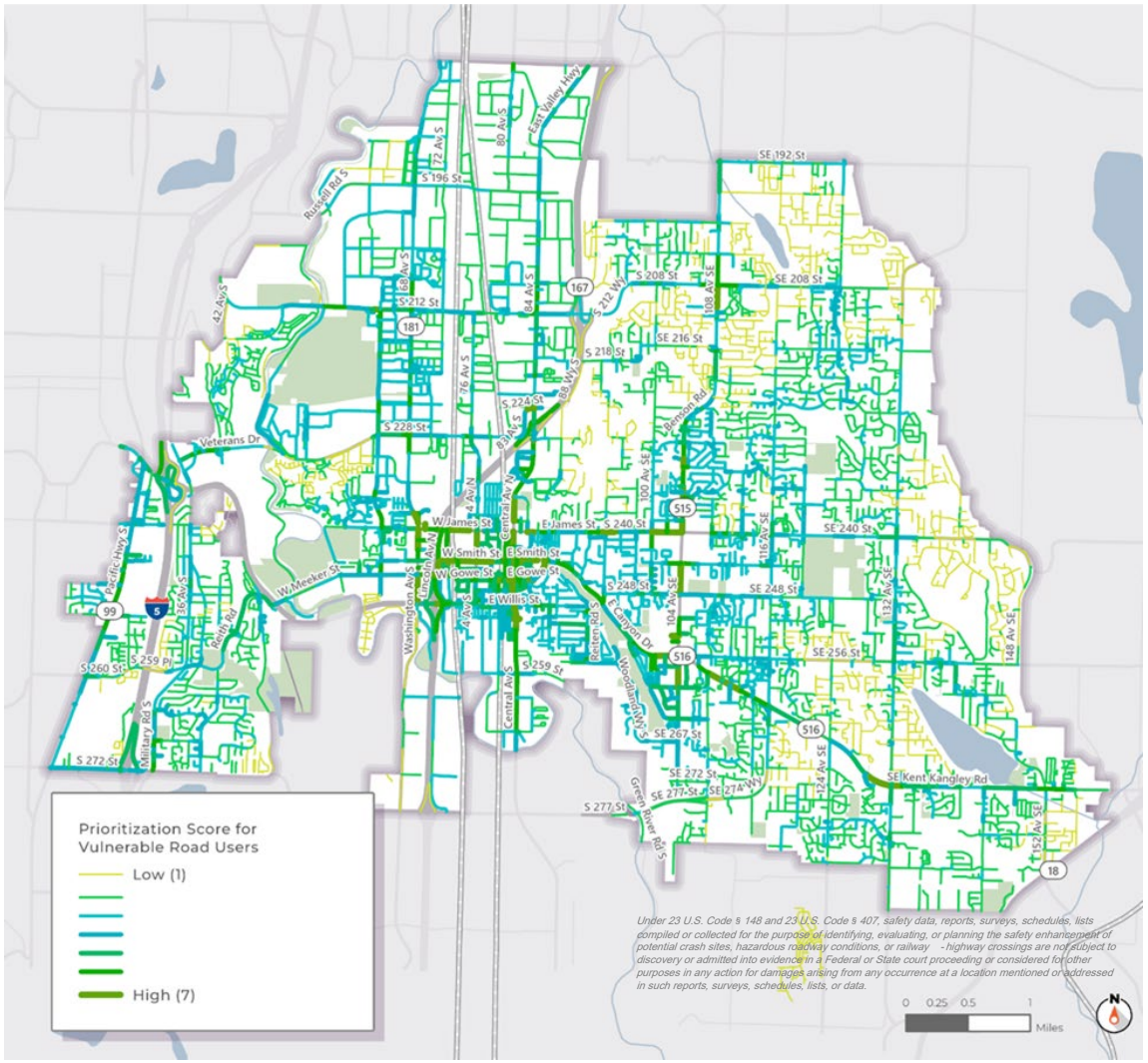
Busier Streets: **65% of fatal and serious injury crashes**, but arterials account for only 15% of the network.

Near Retail and Services: **45% of fatal and serious injury crashes**, but Commercial Land Use accounts for only 13% of the network.

Intersections with Signals: **30% of fatal and serious injury crashes**, but intersections with signals account for only 6% City intersections.

Near a Bus Stop: **57% of bicycle and pedestrian fatal and serious injury crashes**. 69% of pedestrian fatal and serious injury crashes.

Pedestrians and Bicyclists Crossing Streets: **57% of bicycle and pedestrian fatal and serious injury crashes**. 81% of pedestrian fatal and serious injury crashes.



Example from City of Kent formatted for this presentation. *This content is for demonstration purposes only and does not represent a finalized plan or commitment.*

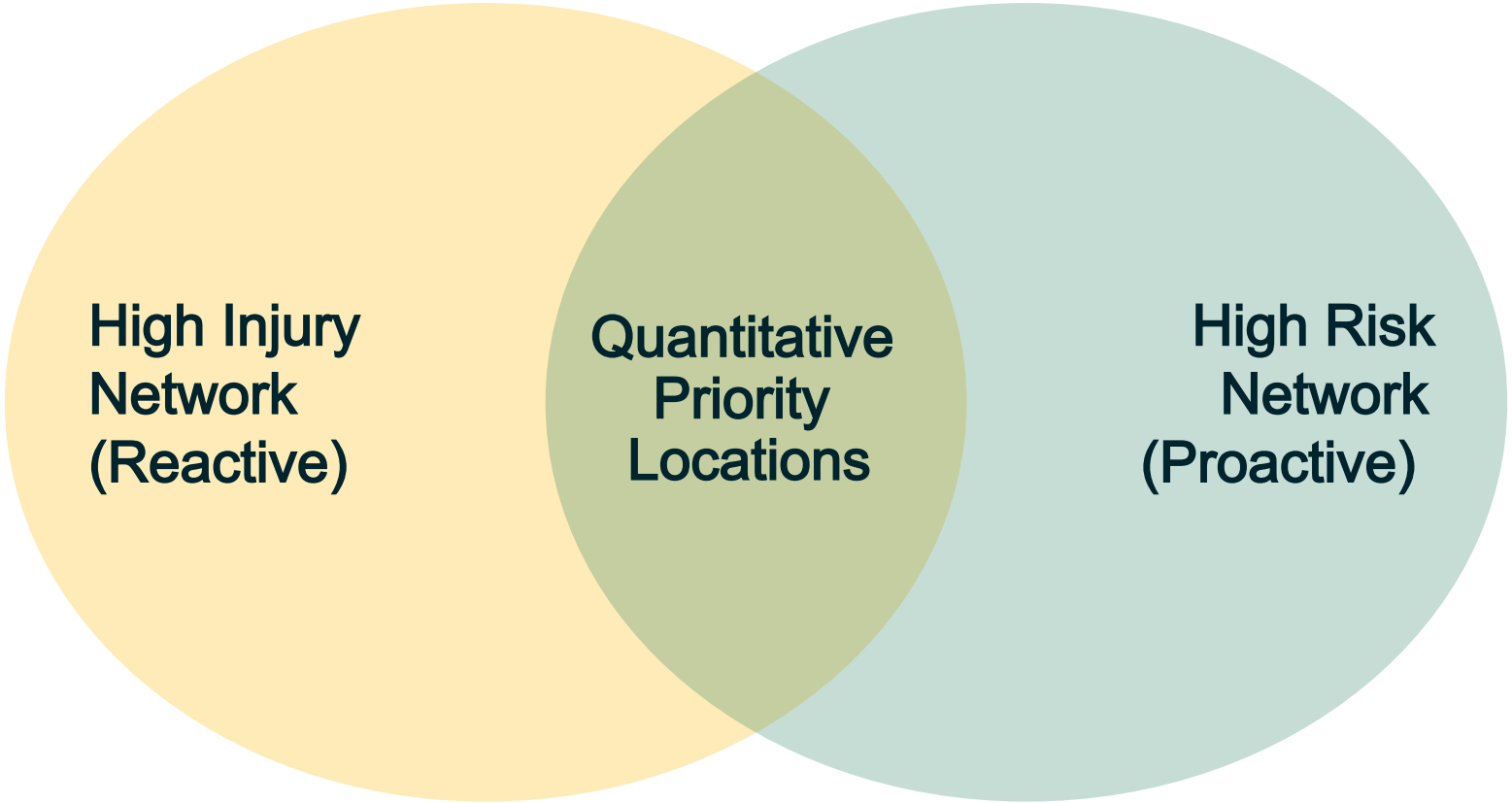
Fehr & Peers

SECTION 04

Project Prioritization

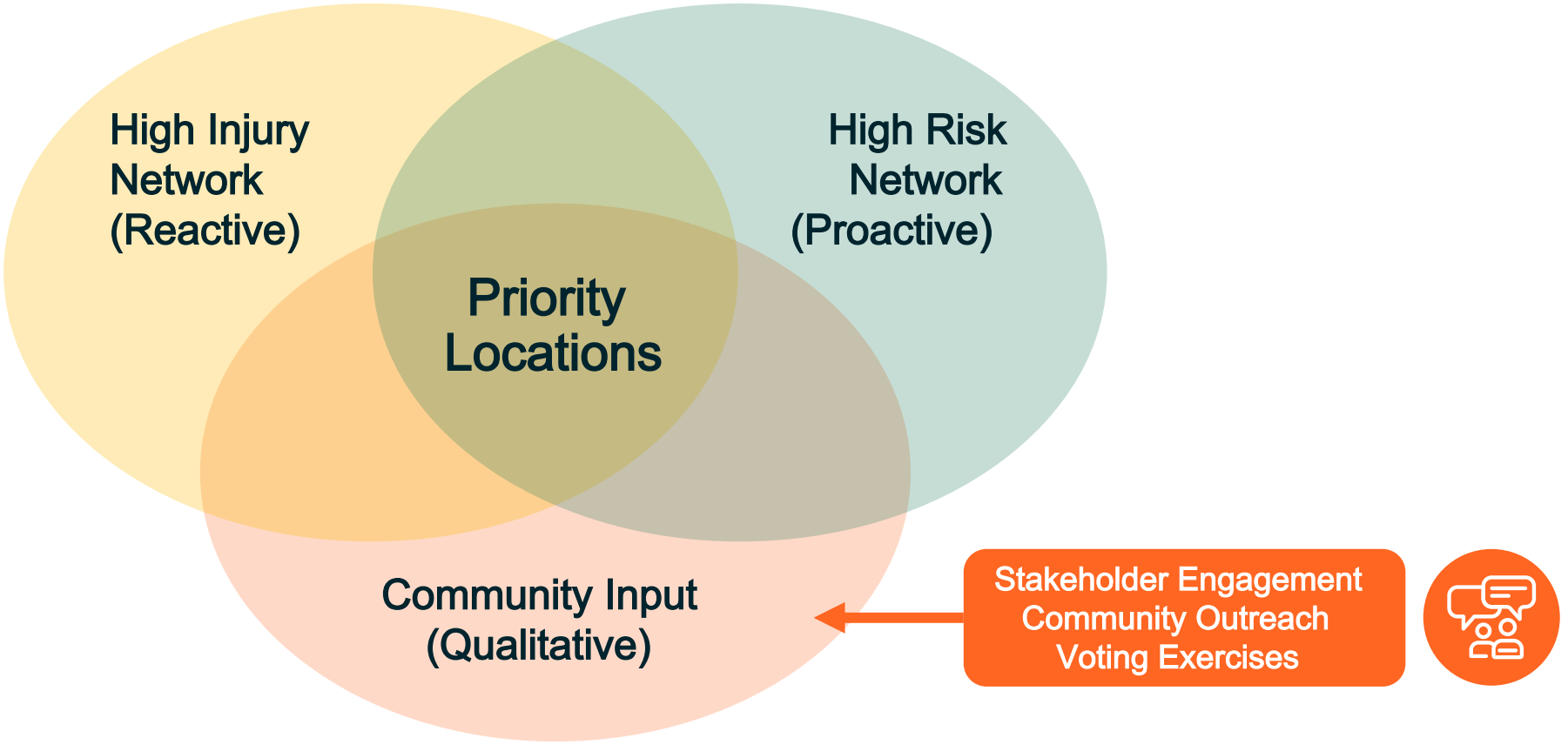
Determining Key Projects

A prioritized project list should synthesize the HIN and HRN to capture crash history and potential future risk.



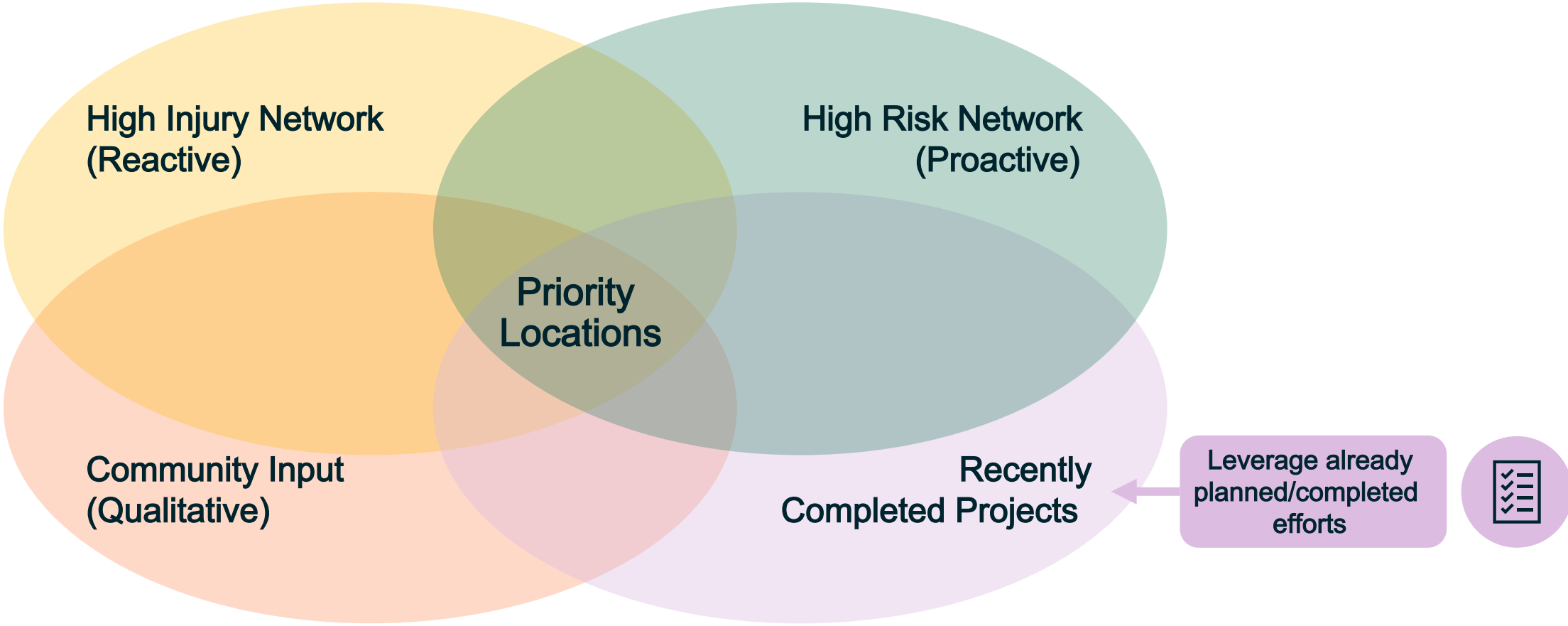
Determining Key Projects

Quantitative + Qualitative considerations are incorporated: data cannot capture all safety concerns



Determining Key Projects

Quantitative + Qualitative considerations are incorporated: data cannot capture all safety concerns



Case Study: City of Tukwila

Project prioritization can have many inputs

Table 3. Quantitative Prioritization Criteria and Weights

Criteria	Data (points)	Weight	Notes
Inclusion on Vulnerable Road User HIN	3 points - complete overlap on HIN 2 points - more than half overlap on HIN 1 points - less than half overlap on HIN 0 points - not on HIN	30%	HIN factor is a 0, 1, 2, or 3-pt factor (depending on how much a segment overlaps)
KSI Crashes (Crash Density)	3 points - Highest 2 points - Middle 1 points - Lowest 0 points - No KSI Crashes	25%	City of Tukwila project lengths are typically </= 2,500 linear feet and 2,500 feet is the length of the longest blocks in Southcenter
Inclusion on overall HIN	3 points – On 0 points - Off	25%	"Yes or no" based on overlap with HIN
Equity Index Score	3 points - Highest Score 2 points - Middle 1 points - Lowest Score 0 points - No value	10%	By score percentile
Proximity to Vulnerable Road User Destinations such as transit stops, schools, and parks	Based on the counts of the nearby destinations, located within 1/2 -mile of high-capacity transit stations and within 1/4 mile of schools and parks.[8] 3 points - more than three destinations 2 points - two 1 points -one 0 points -none	10%	¼-mile radius used to focus project location priorities on areas closest to these destinations.

Source: Toole Design, 2025

How are Projects Prioritized?

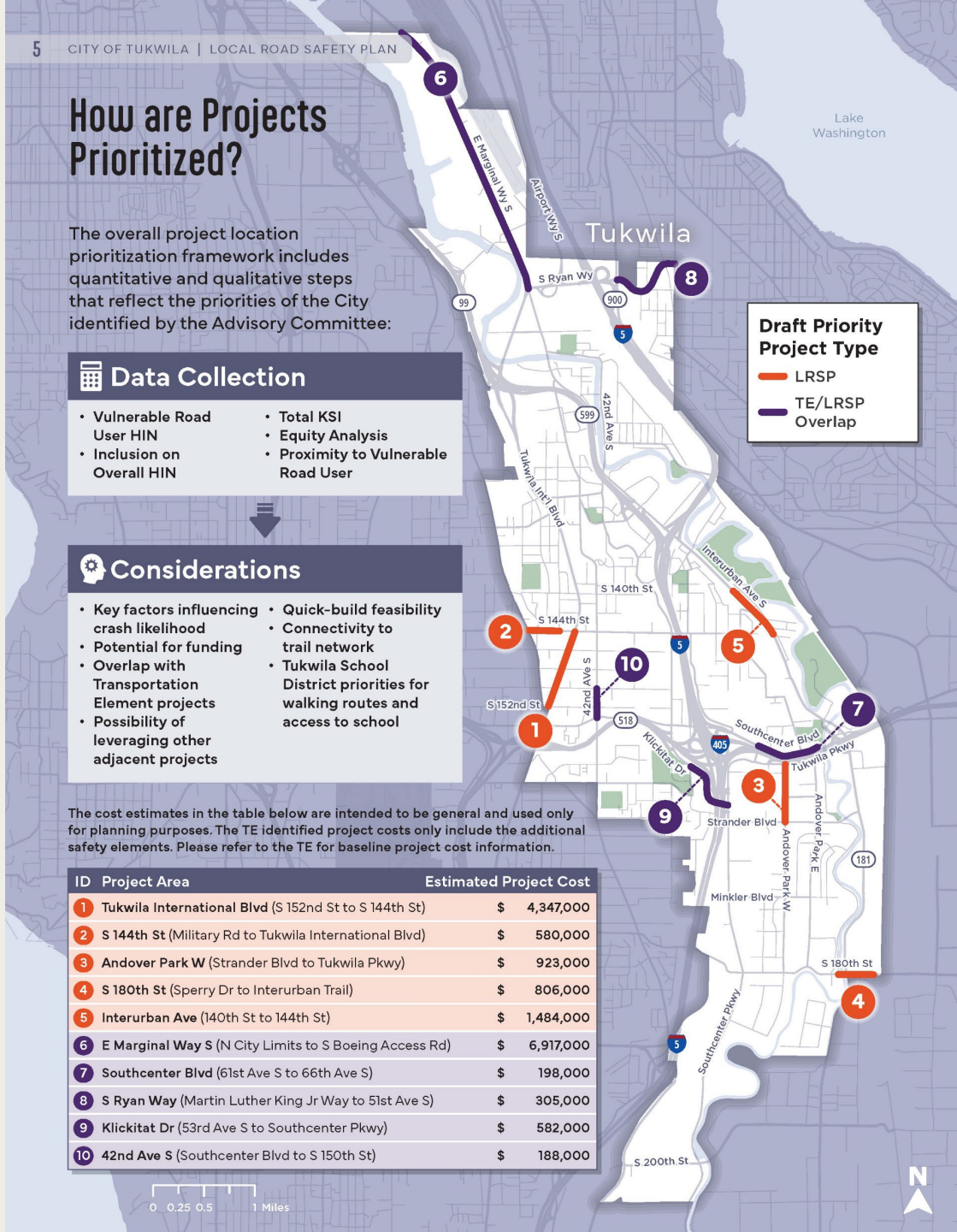
The overall project location prioritization framework includes quantitative and qualitative steps that reflect the priorities of the City identified by the Advisory Committee:

Data Collection

- Vulnerable Road User HIN
- Inclusion on Overall HIN
- Total KSI
- Equity Analysis
- Proximity to Vulnerable Road User

Considerations

- Key factors influencing crash likelihood
- Potential for funding
- Overlap with Transportation Element projects
- Possibility of leveraging other adjacent projects
- Quick-build feasibility
- Connectivity to trail network
- Tukwila School District priorities for walking routes and access to school



The cost estimates in the table below are intended to be general and used only for planning purposes. The TE identified project costs only include the additional safety elements. Please refer to the TE for baseline project cost information.

ID	Project Area	Estimated Project Cost
1	**Tukwila International Blvd** (S 152nd St to S 144th St)	$ 4,347,000
2	**S 144th St** (Military Rd to Tukwila International Blvd)	$ 580,000
3	**Andover Park W** (Strander Blvd to Tukwila Pkwy)	$ 923,000
4	**S 180th St** (Sperry Dr to Interurban Trail)	$ 806,000
5	**Interurban Ave** (140th St to 144th St)	$ 1,484,000
6	**E Marginal Way S** (N City Limits to S Boeing Access Rd)	$ 6,917,000
7	**Southcenter Blvd** (61st Ave S to 66th Ave S)	$ 198,000
8	**S Ryan Way** (Martin Luther King Jr Way to 51st Ave S)	$ 305,000
9	**Klickitat Dr** (53rd Ave S to Southcenter Pkwy)	$ 582,000
10	**42nd Ave S** (Southcenter Blvd to S 150th St)	$ 188,000

SECTION 05

What's Next?

What's Next?

Funding

SS4A funding prioritizes projects along **HIN** and **systemic** projects **.**

HSIP funding prioritizes projects in places with historic **KSI crashes.**

Phasing and Sequencing

Projects can be split into multiple parts (near - term to long - term) to **align implementation with funding** .

Target Metrics and Tracking

Consistent methodology for the HIN/HRN has an opportunity to **compare results** over time as projects are implemented.

Proven Safety Solutions

Synthesizing HIN/HRN can provide a **data- driven approach** to **proactive safety planning.**

Questions