High Injury Network vs High Risk Network

What is the difference and why do they matter?

Sydney Segal, AICP and Brian Almdale | 6/30/2026

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04 Project Prioritization

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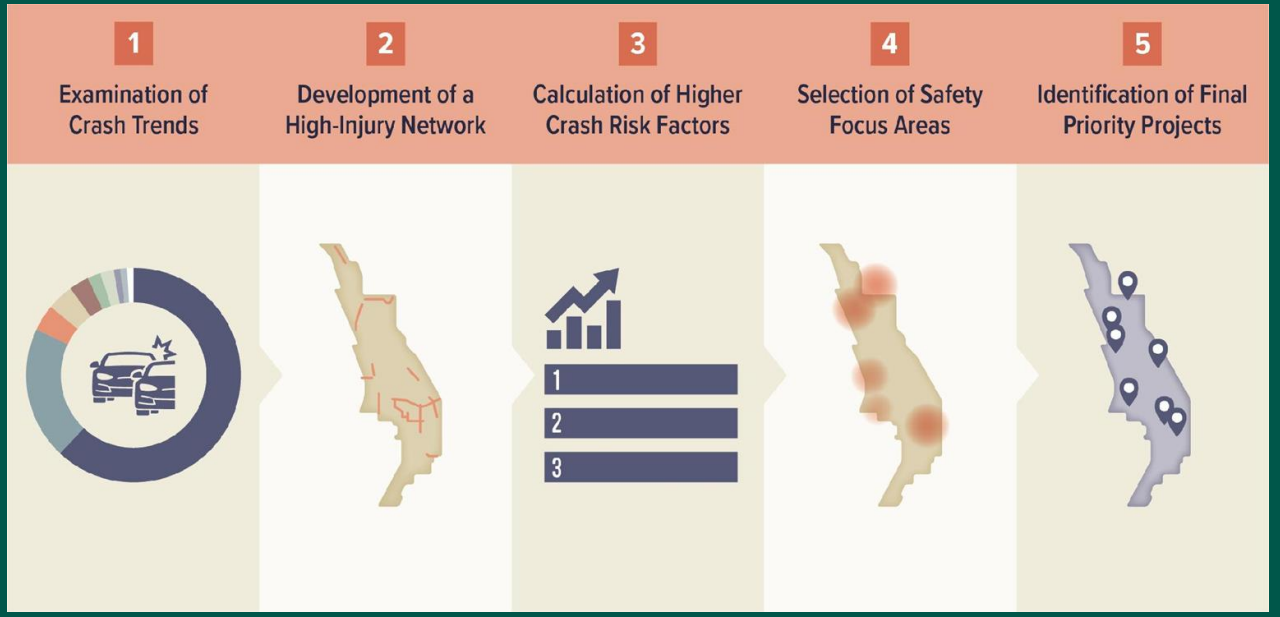
Introduction

Brian Almdale

Sydney Segal
AICP



SECTION 02

High Injury Network

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.

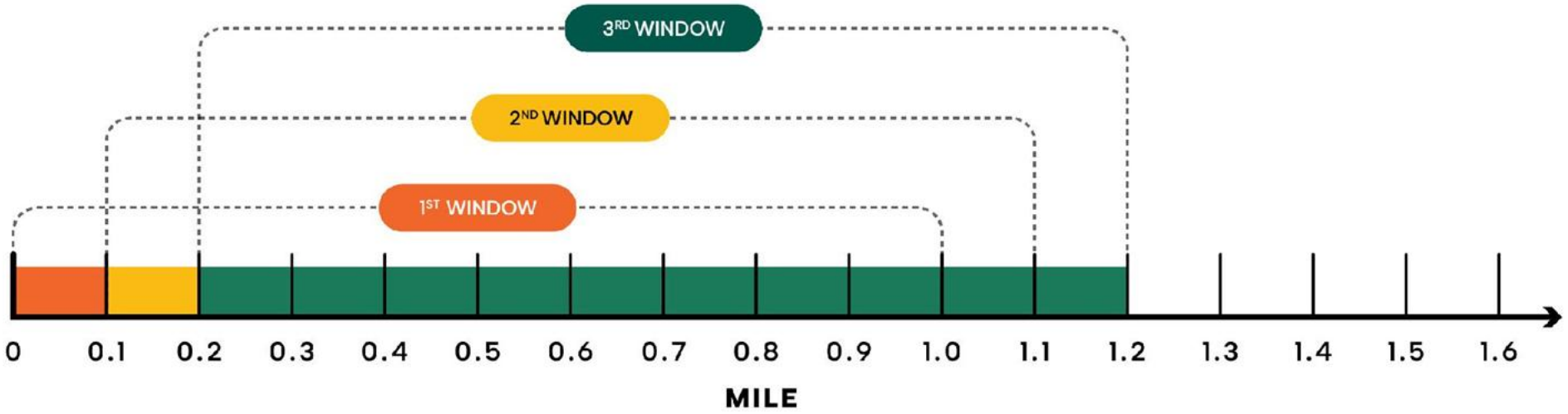
At a high level

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

High Injury Network

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 and mode.

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

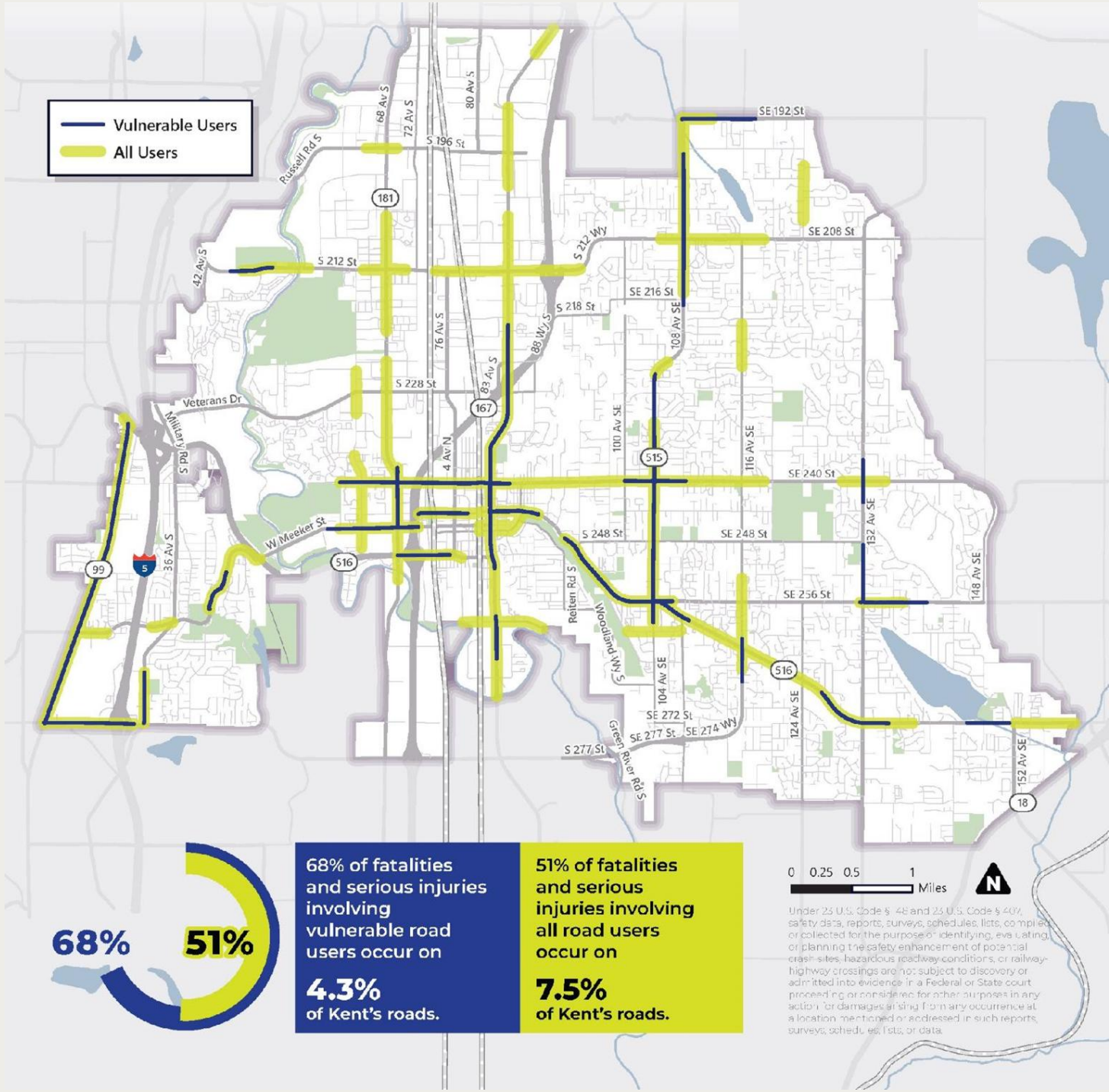
Case Study: City of Kent TZAP

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.



How do you choose an HIN threshold?

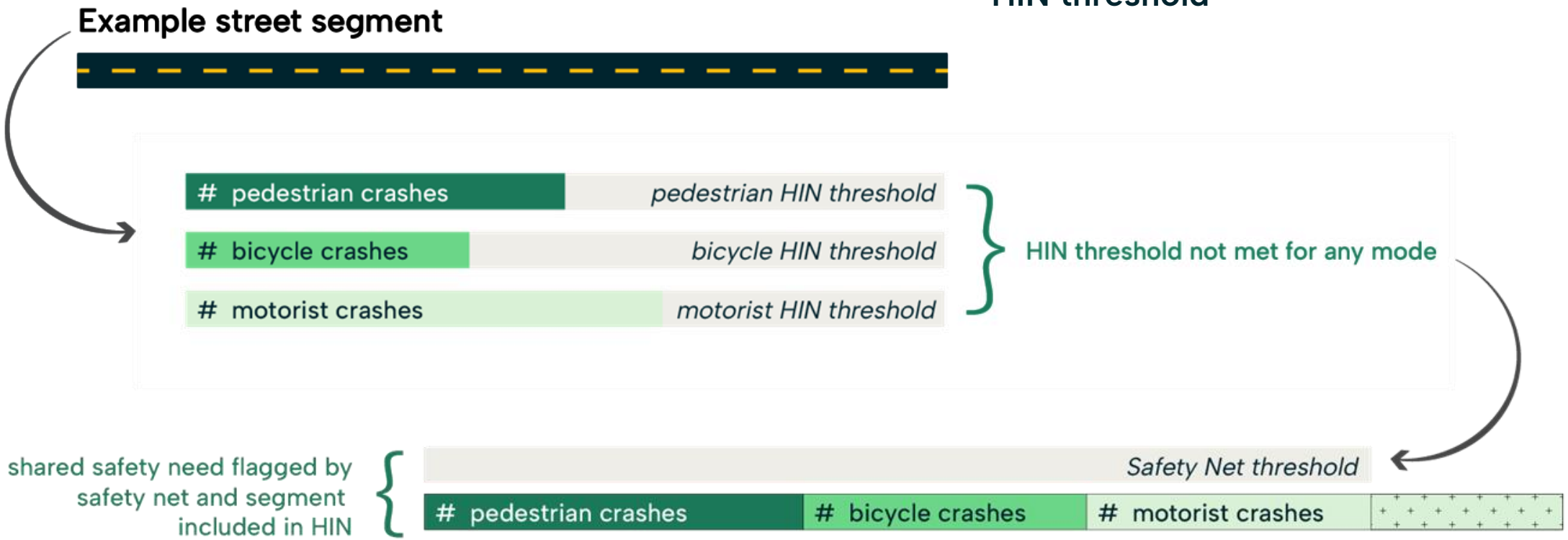
Choosing a threshold means weighing trade-offs between network coverage and crash coverage

Minimum Sliding Windows Score	Network Coverage		Crash Coverage				Density of KSI crashes per mile
	# Miles	% Miles	# KSI Crashes	% KSI Crashes	# Crashes	% Crashes	
0	1,000	100%	500	100%	500	100%	0.5
12	95	**10%**	350	**70%**	1,700	**57**	**3.5**
25+	25	1%	150	30%	750	25%	6.0
Total	1,000	100%	500	100%	3,000	100%	0.5

*KSI = Killed or Seriously Injured

How do you ensure you're not missing shared safety needs?

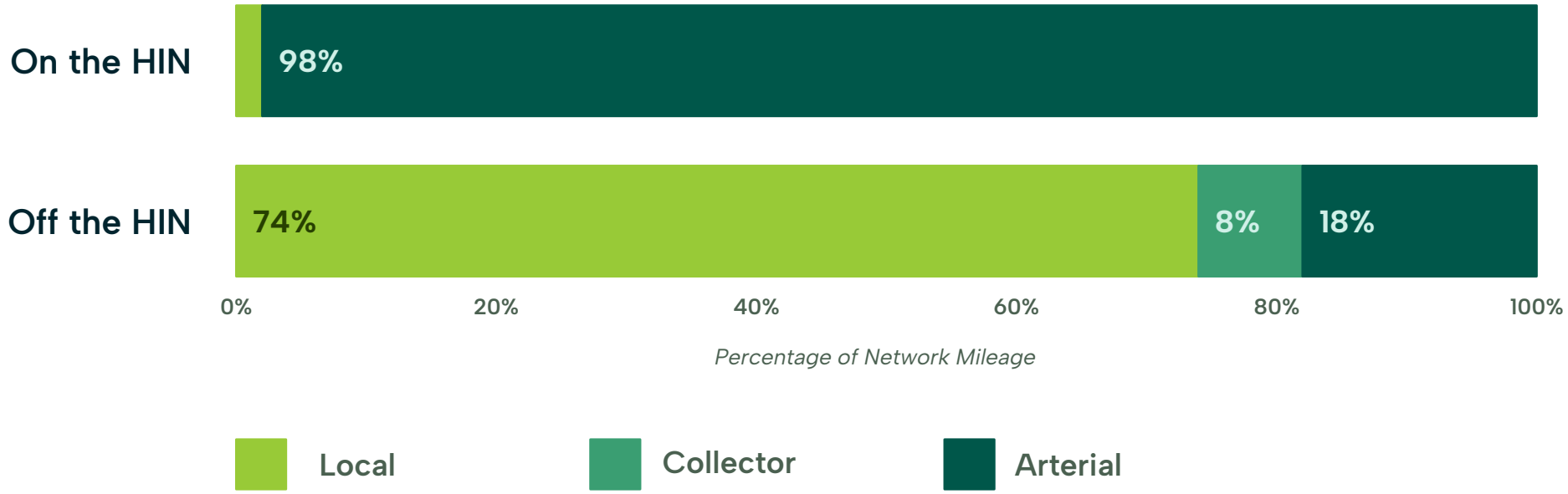
Modal HINs can sometimes miss shared safety needs – a "safety net" can capture segments with high concentrations of KSI crashes where no single mode reaches its HIN threshold



Bringing systemic safety to HIN analysis

Understand what factors are overrepresented or underrepresented along the HIN

Network mileage on vs. off the HIN



SECTION 03

High Risk Network

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

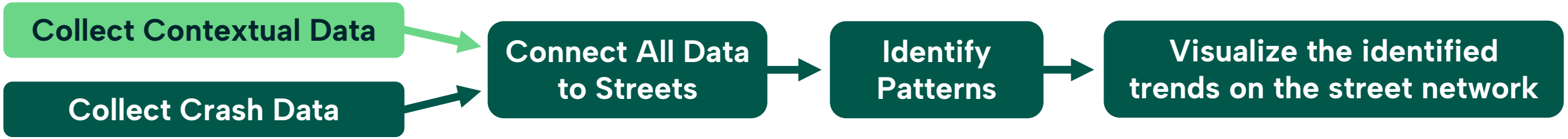
Identify safety concerns in locations where crashes may not have occurred but could be a factor in future crashes.

At a high level...

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

High Risk Network

Example Systemic Safety 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

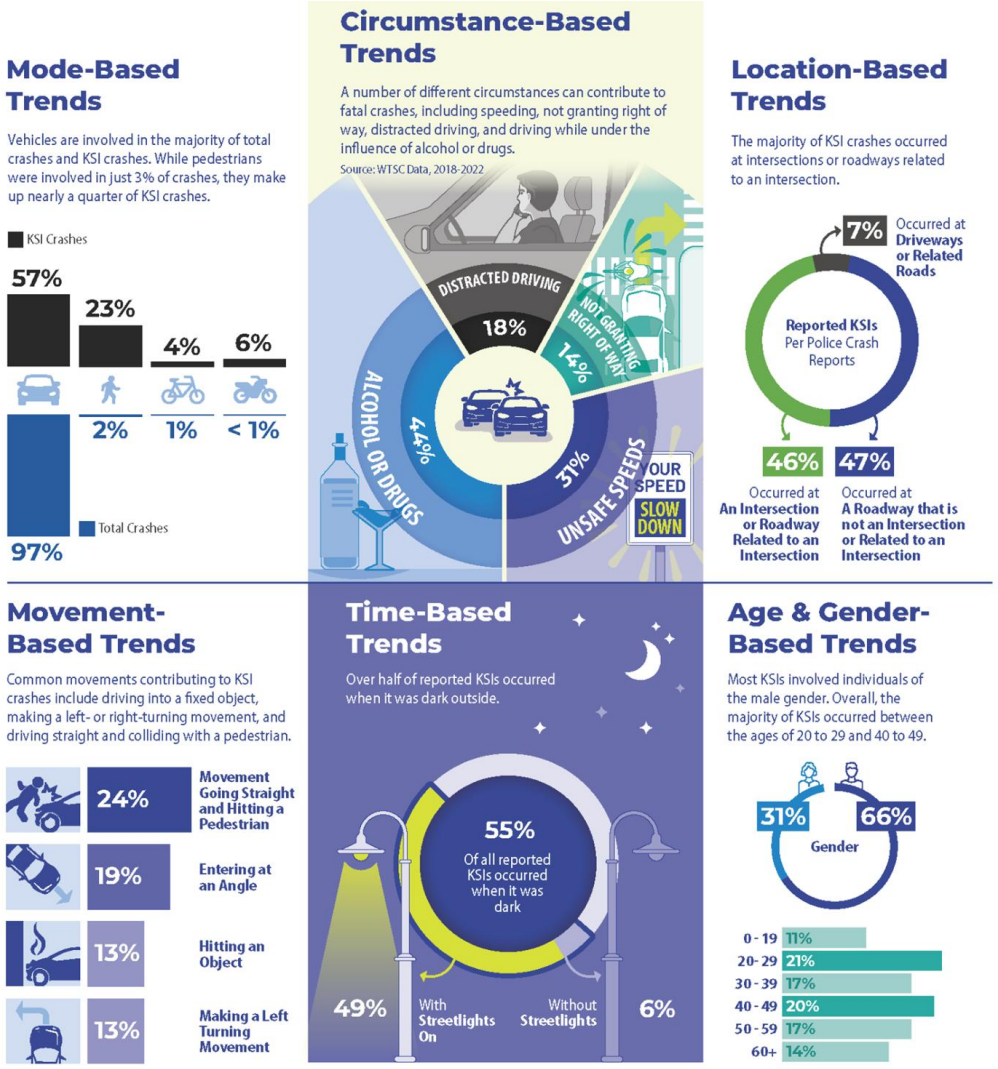
Busier and Faster Streets: 65% of fatal and serious injury crashes, but arterials account for only 15% of the network.

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

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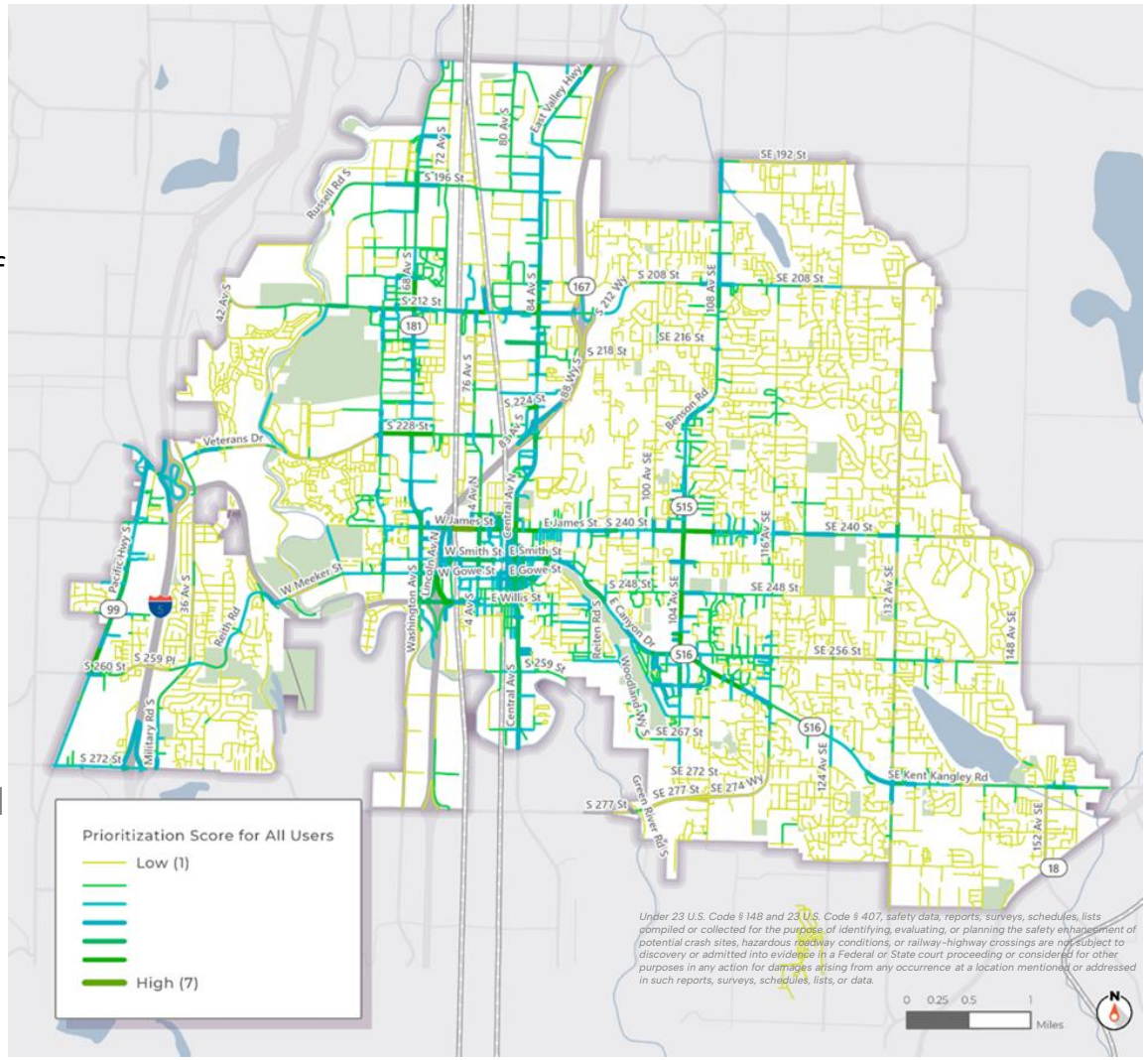


Example from City of Kent formatted for this presentation. This content is for demonstration purposes only and does not represent a finalized plan or commitment.

Fehr & Peers

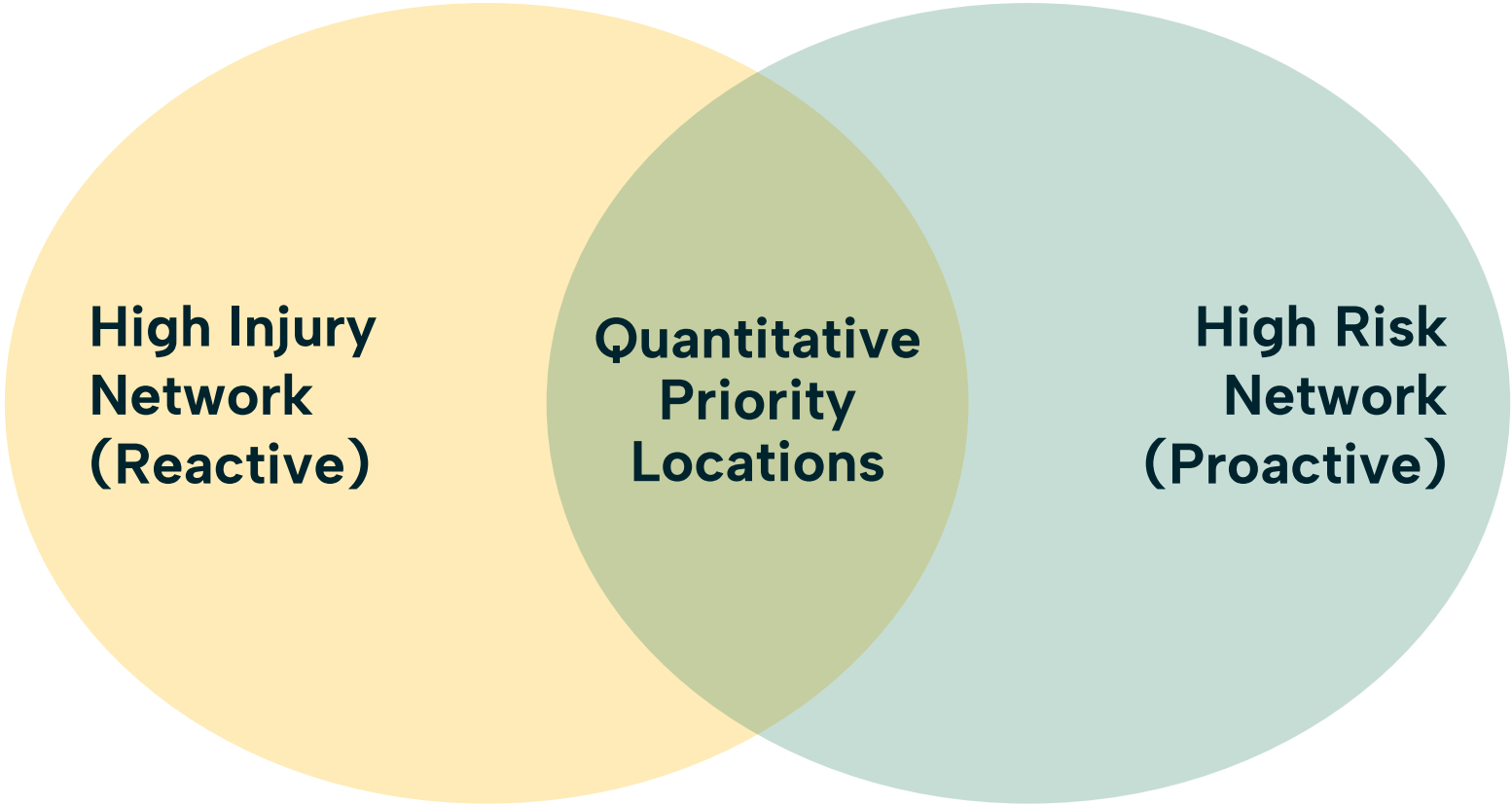
SECTION 04

Project Prioritization

Project Prioritization

Determining Key Projects

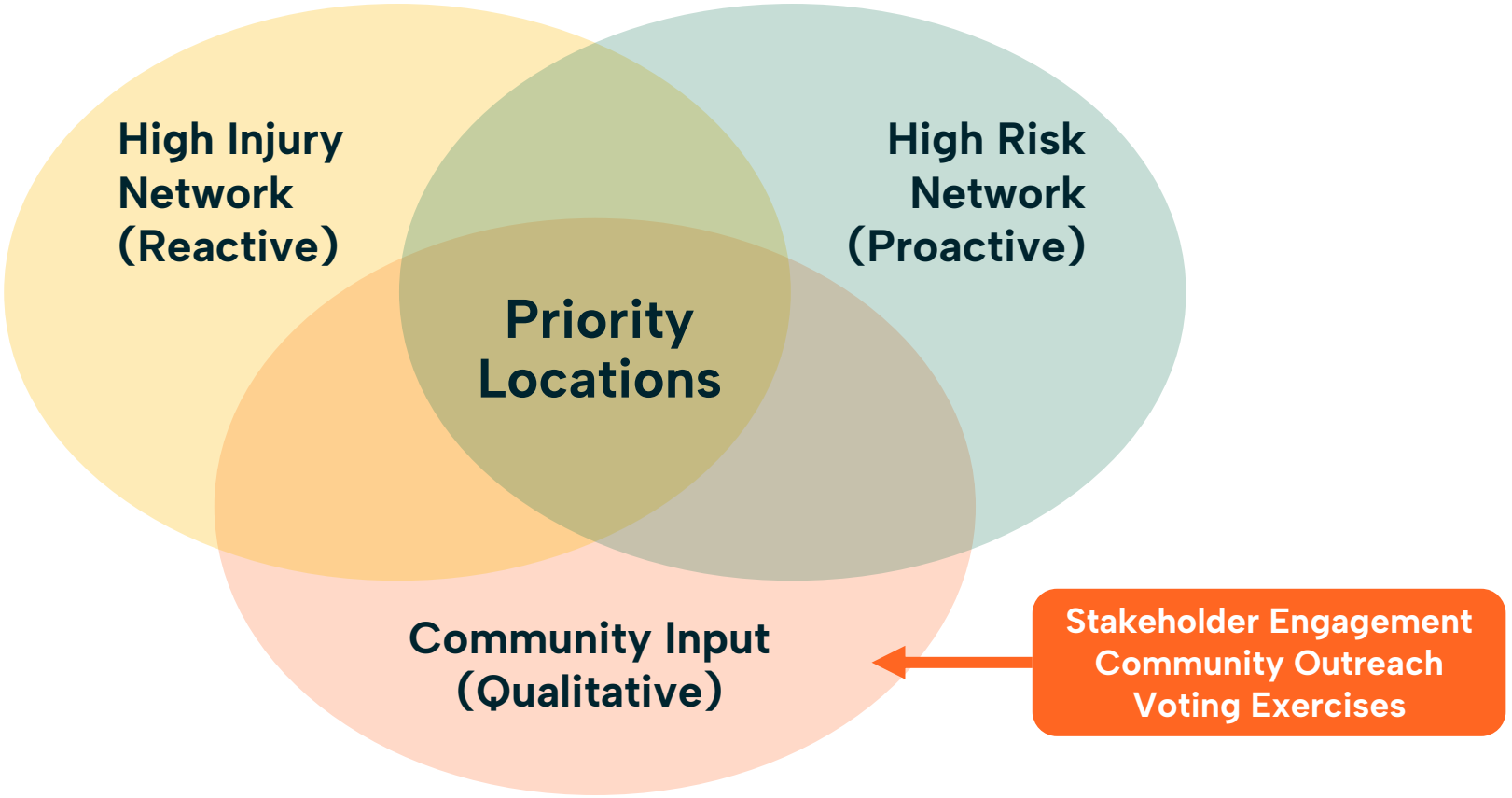
A prioritized project list should synthesize the HIN and HRN to capture crash history and potential future risk.



Project Prioritization

Determining Key Projects

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



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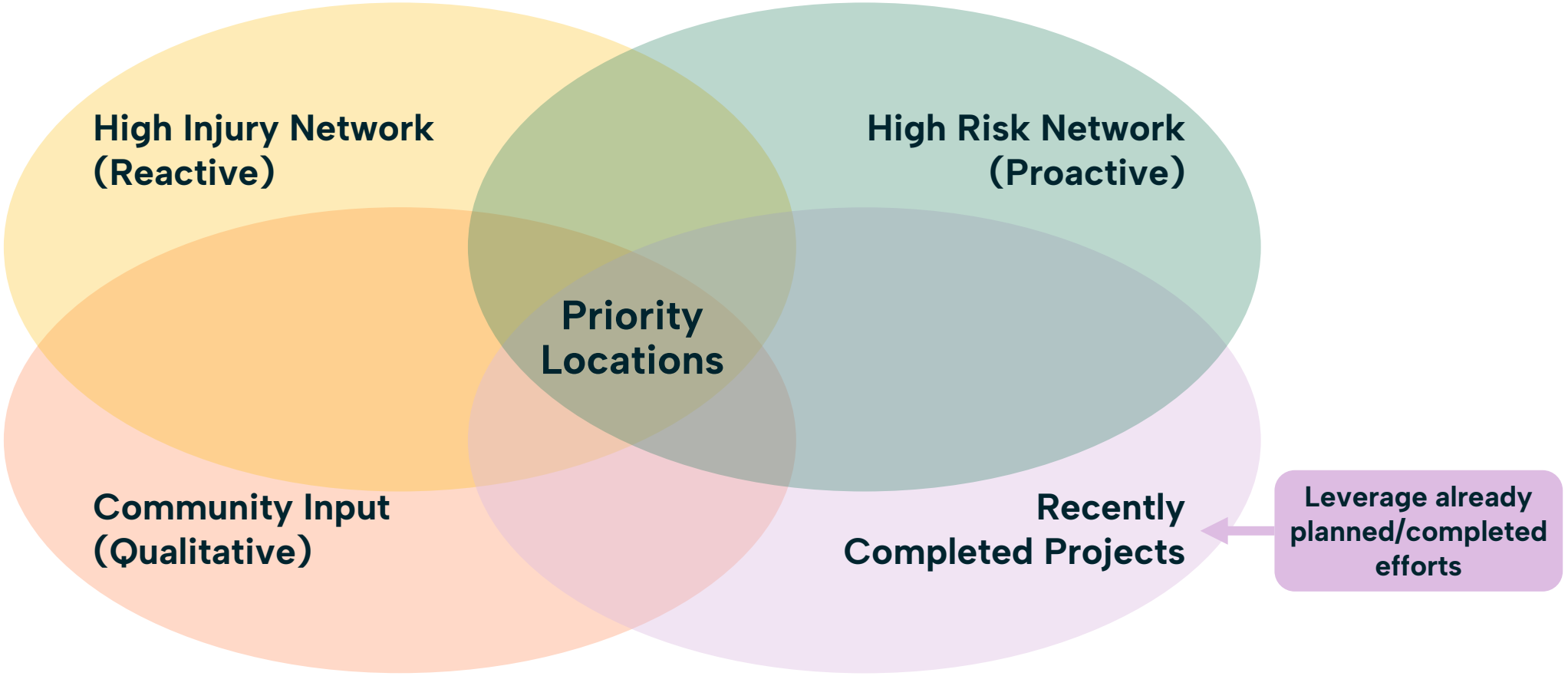


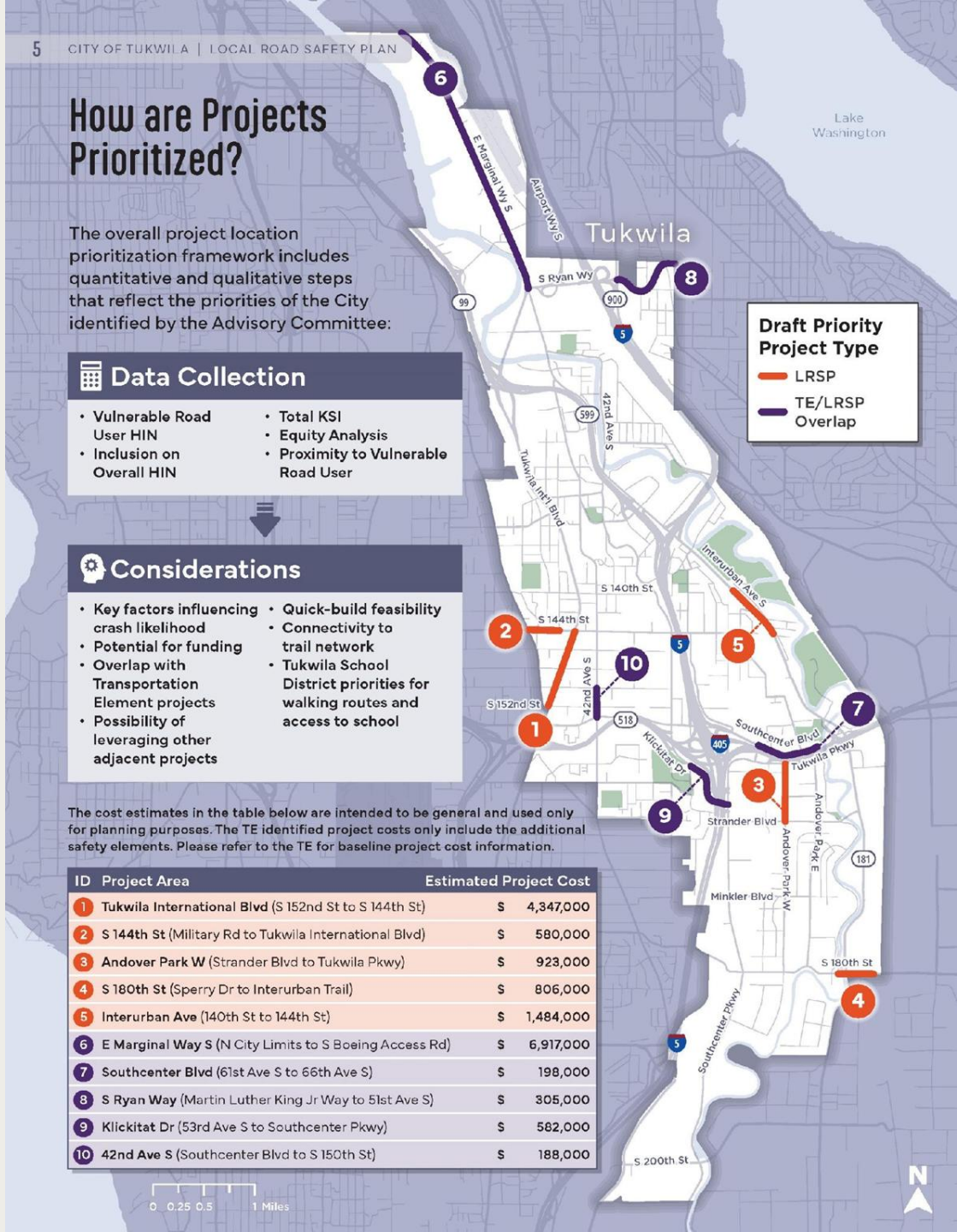
Case Study: City of Tukwila

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



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