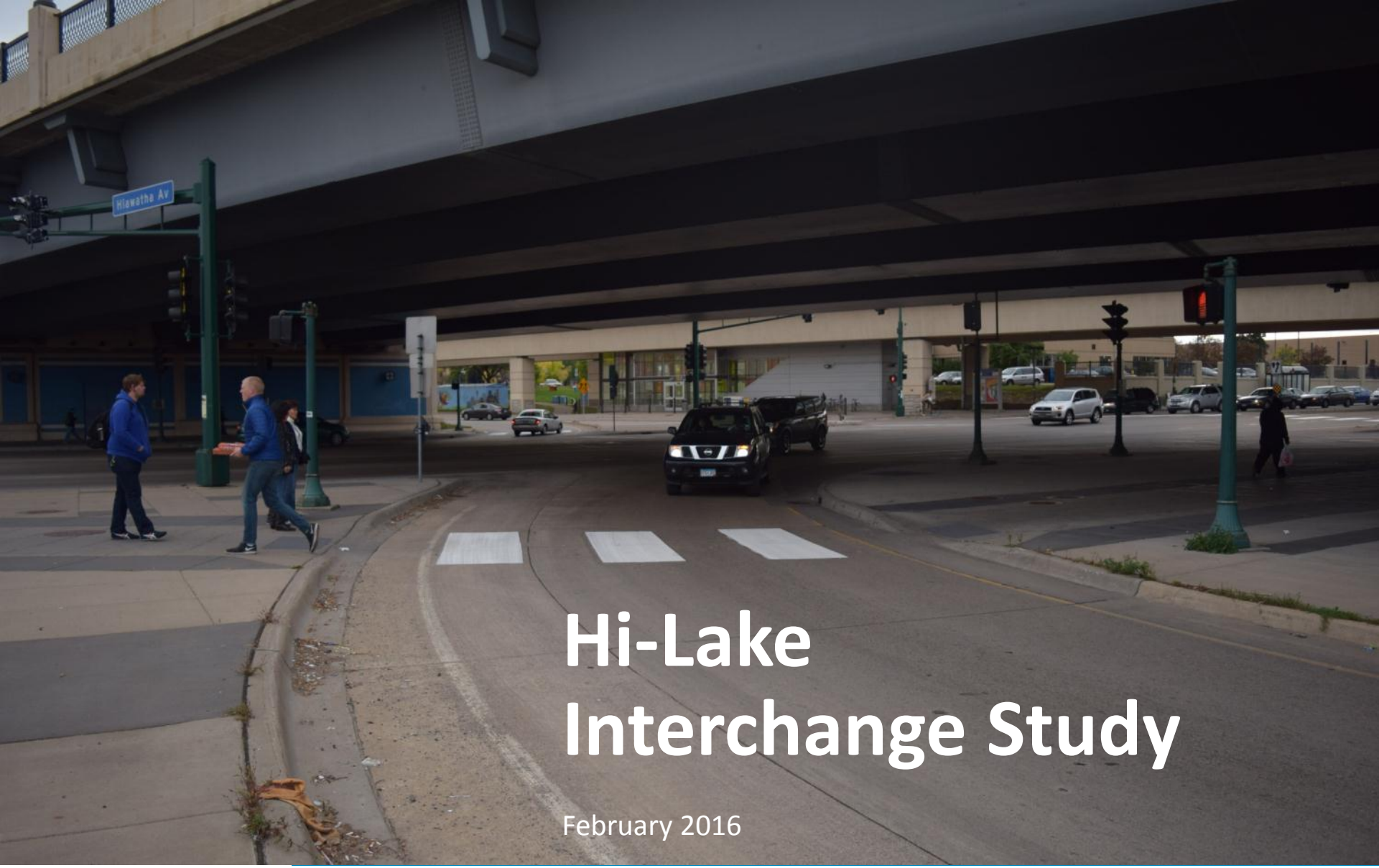


Hi-Lake Interchange Study

February 2016

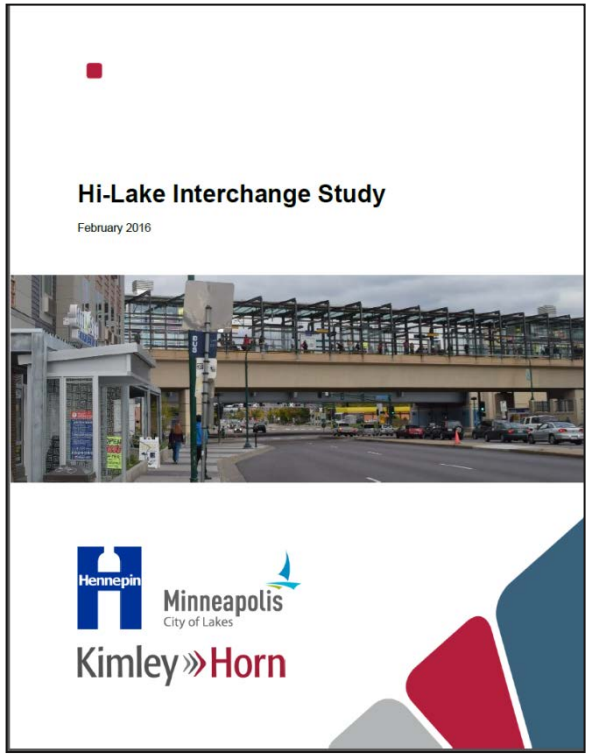
Minneapolis
City of Lakes

Study purpose

Technical study intended to inform decisions about potential improvements to the **pedestrian and bicycle** environment at the Hi-Lake interchange.

Tasks:

- Document existing conditions
- Identify key issues and opportunities
- Identify possible phased improvements (Tier I & II)
- Evaluate 5 concepts that would significantly reconfigure the interchange (Tier III)



Project Management Team (PMT)

- City of Minneapolis
- Hennepin County
- Metro Transit
- MnDOT

At the time of this study, no participating agencies have programmed projects or improvements in their capital improvement programs.

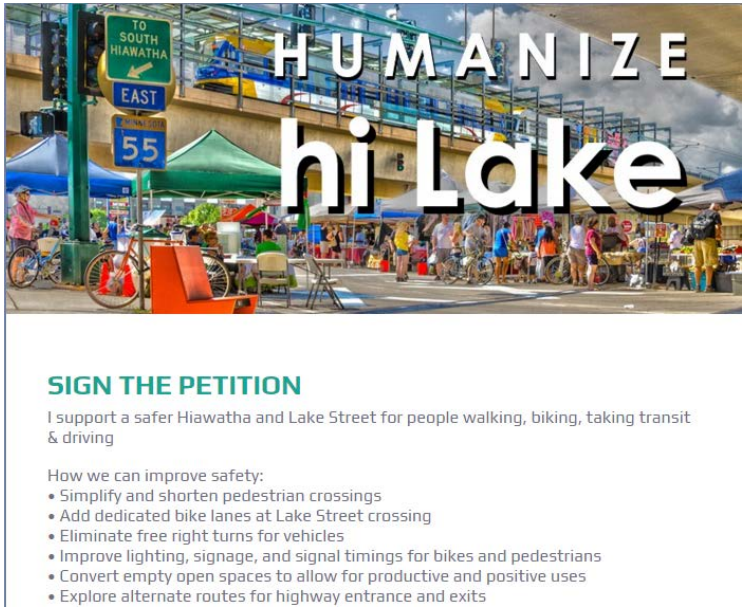
Historical Summary

Timing	Event/Study
1990's	Hi-Lake is grade separated; single point urban interchange (SPUI) constructed
2004	METRO Blue Line opens
2006-2007	Hi-Lake Pedestrian Connectivity Project
2011-2012	Arterial Transitway Corridor Study
2012	Hiawatha LRT Trail Extension Study
2012-2014	Midtown Corridor Alternatives Analysis
Present	Construction of L&H Station/2225 Lake St E Development

Humanize Hi-Lake Petition

How we can improve safety:

1. Simplify and shorten pedestrian crossings
2. Add dedicated bike lanes at Lake Street crossing
3. Eliminate free right turns for vehicles
4. Improve lighting, signage, and signal timings for bikes and pedestrians
5. Convert empty open spaces to allow for productive and positive uses
6. Explore alternate routes for highway entrance and exits

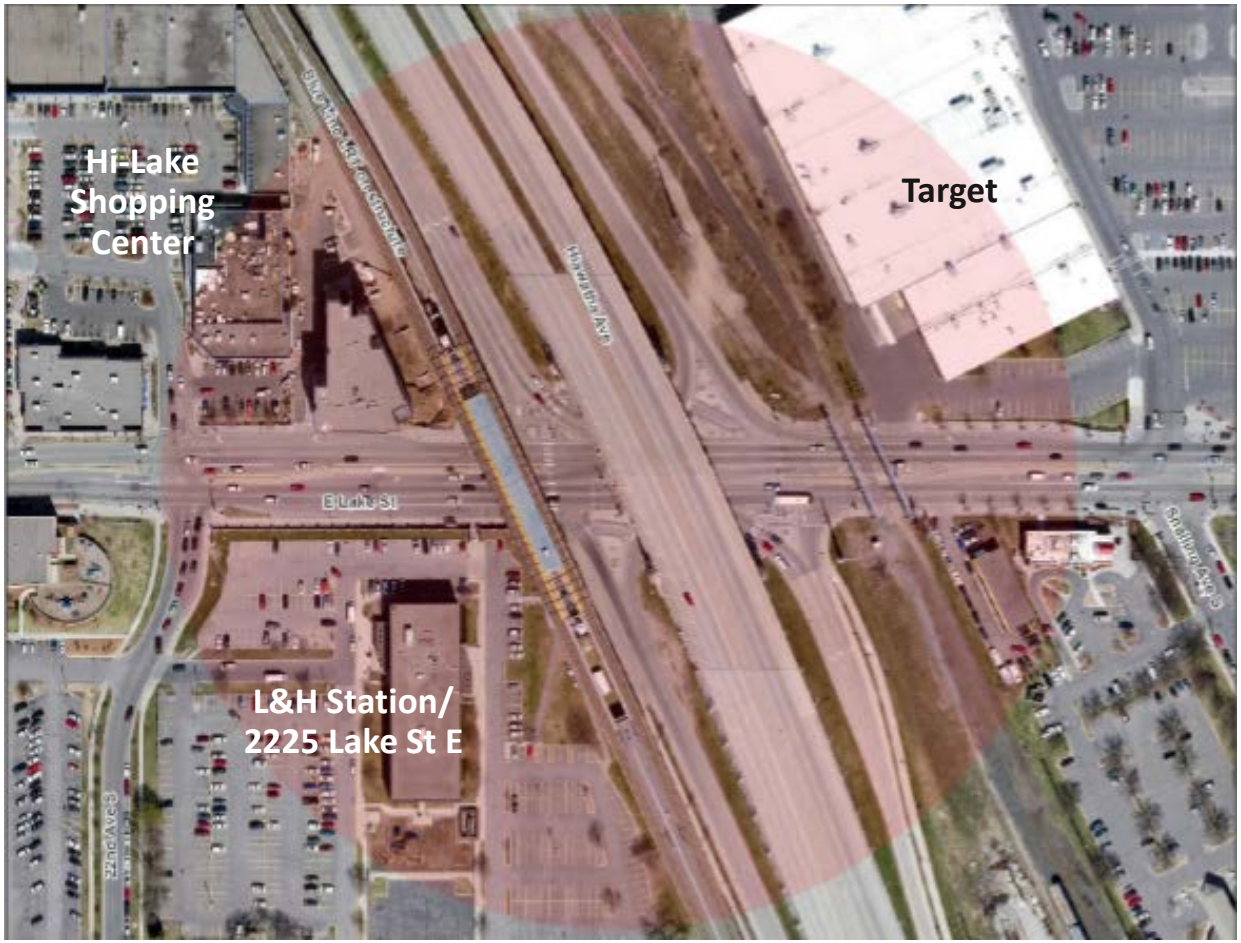


Hi-Lake Study explicitly looked at all recommendations except #5.

Source: www.facebook.com/HumanizeHiLake

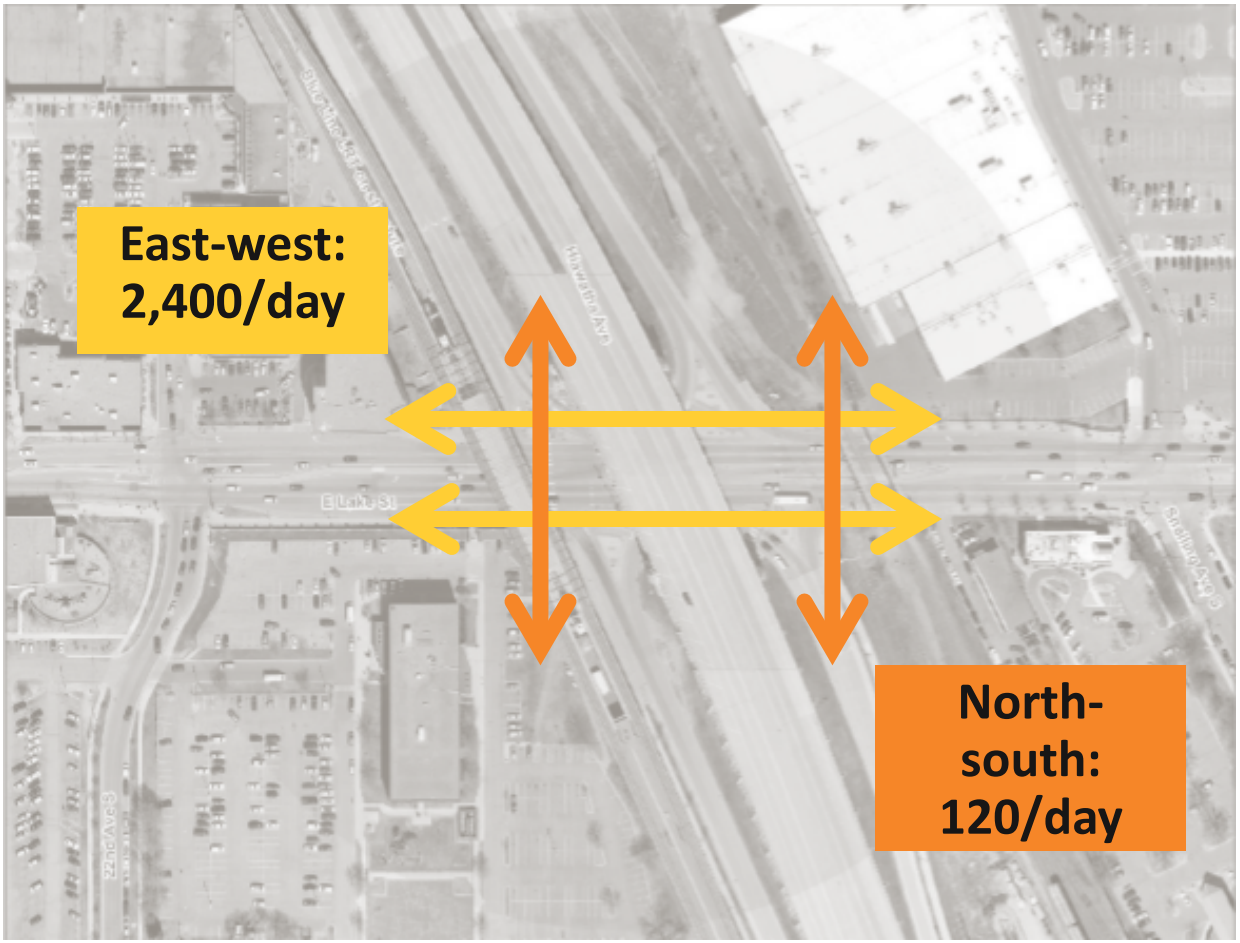
Existing Geometry

Hi-Lake is a **single point urban interchange (SPUI)**



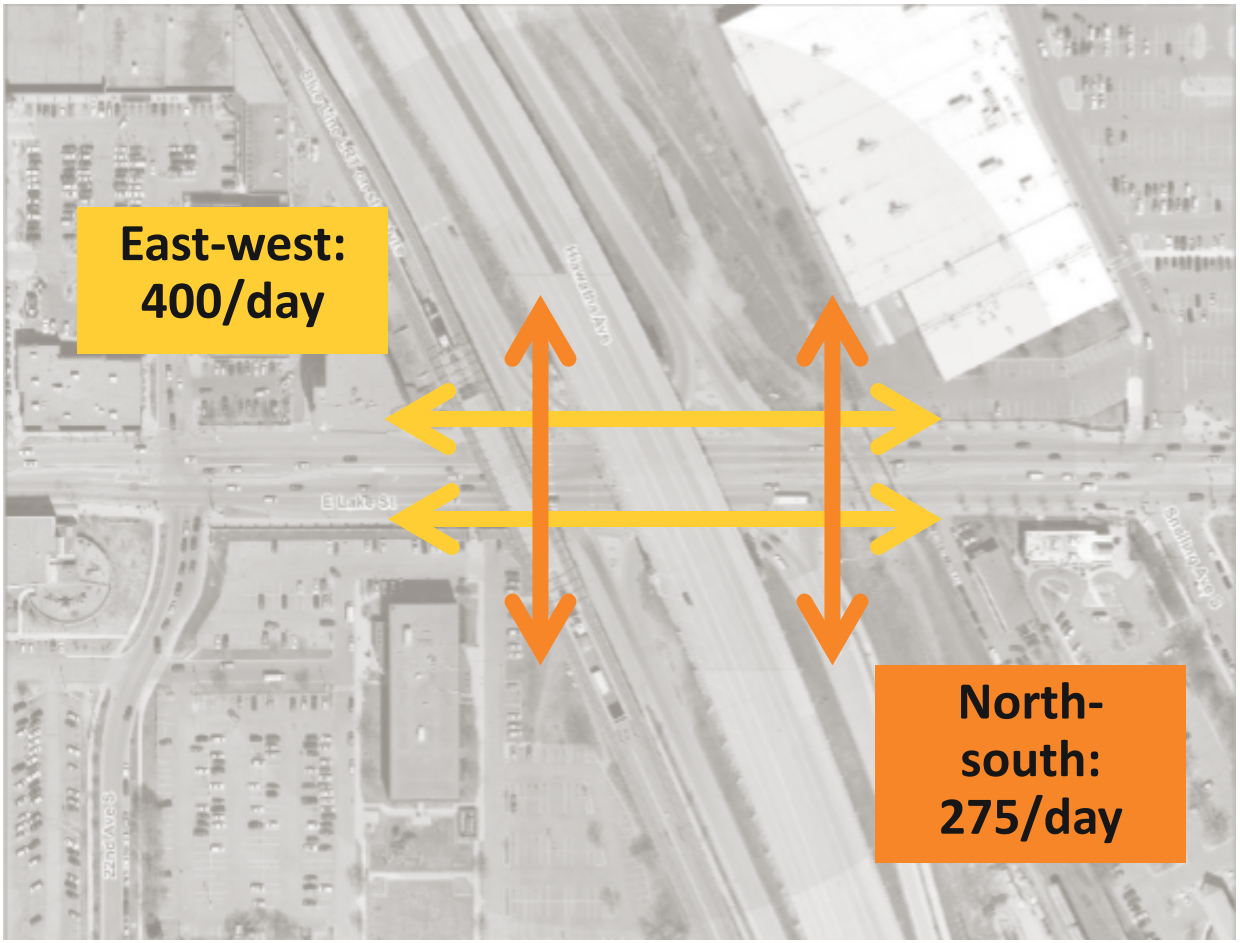
Ramp entrances/exits are controlled by a single traffic signal

Existing Users
Pedestrians



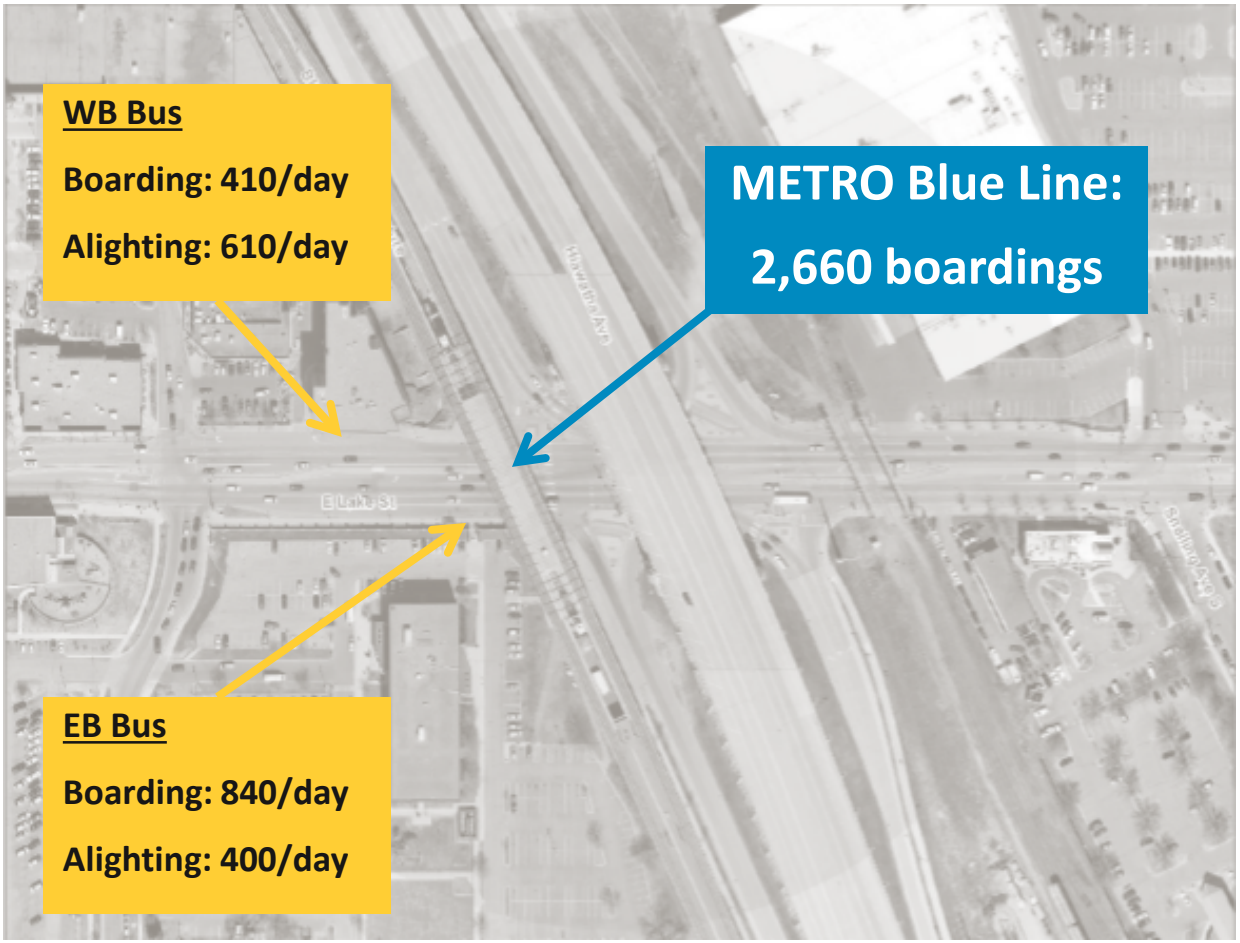
Based on fall 2015 counts

Existing Users
Bicycles

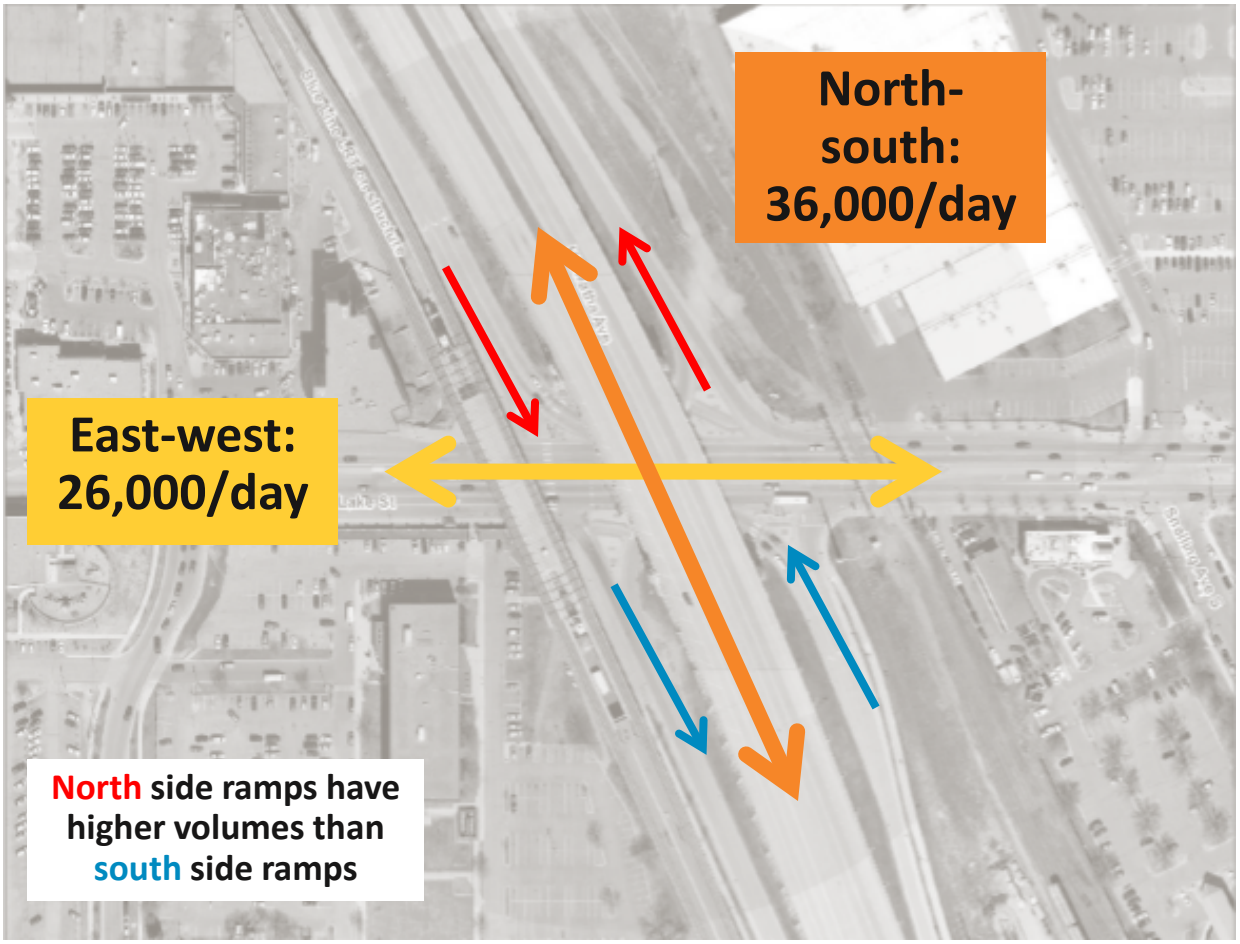


Based on fall 2015 counts

Existing Users
Transit



Existing Users
Motor Vehicles



Based on fall 2015 counts

Existing Issues

Some examples

Lighting

Lack of natural light under bridges limits visibility and diminishes perceived safety and personal security

Vehicle Routing, Pedestrian Crossings

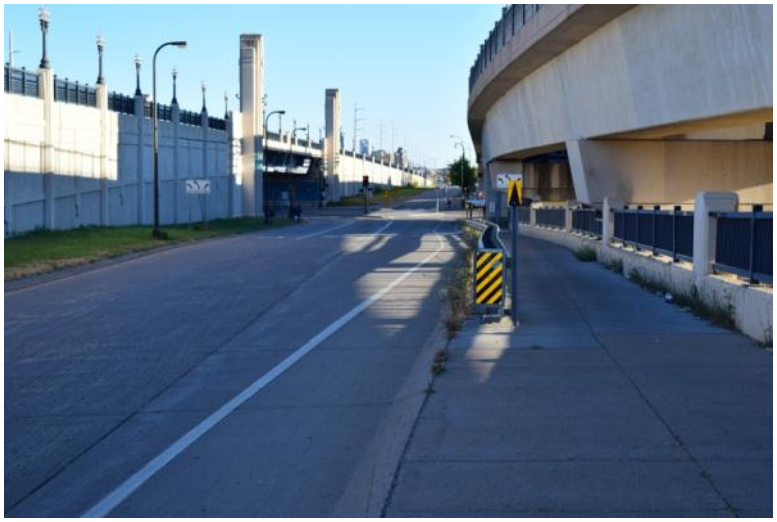
SPUI design results in indirect east-west pedestrian crossings and a mixture of signalized & free right movements

Existing Issues

Some examples

Long North-South Crossings

Six-lane crossing (140 ft) with no existing space for pedestrian refuge island



Bicycle Routing

Gap in Hiawatha LRT Trail (28th St to 32nd St) and lack of designated bicycle connection

Opportunities/Future Demand

Lake Street Station Apartments

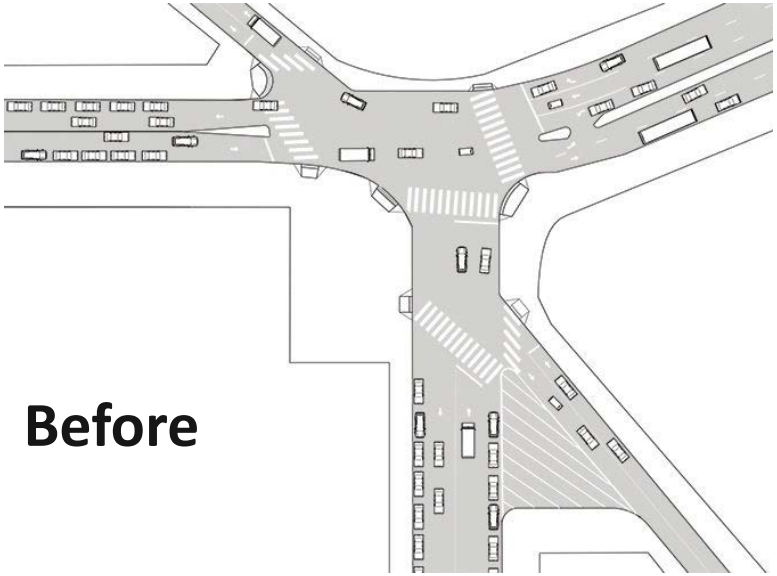
64-Unit affordable senior housing

L&H Station/2225 Lake St E

Hennepin County Service Center, Midtown Farmers Market, and future office, retail, and residential units

Intersection Design Principles

Illustrative Examples



Before

After

Aim to create a compact intersection that reduces conflicts and creates awareness between different users. Plan for future demand and consider the intersection within a network.

Source: National Association of City Transportation Officials (NACTO)

Possible Improvement Types

Type	Details	Potential Bike/Ped Benefit	Itemized Cost Range	Total Cost Estimate
Tier I	Surface level enhancements, no geometric changes	Low-Medium	$3,000-$150,000	$432,000
Tier II	Some geometric changes within the existing street right-of-way	Medium	$105,000-255,000	$660,000
Tier III	Reconfiguration of interchange, significant geometric changes	High	$2.4-5.6 million	n/a

Cost estimates based on 2015 dollars.

Tier I Options

Some examples:

- Speed tables at free rights
- Smart Channels
- Durable crosswalk/bike markings
- Leading pedestrian intervals/countdown timers
- Reconstruct pedestrian ramps
- Lighting improvements
- Street trees
- Interim pedestrian space widening

Itemized cost range: $3,000-$150,000

Total Tier I improvements: $432,000

Tier I Options – Some examples

Speed Tables at Free Rights

Level pedestrian crossing, increase visibility of crosswalk, and effective at reducing vehicle speeds

Interim pedestrian space widening

Use of temporary materials to expand pedestrian space with modifying curb lines

Tier II Options

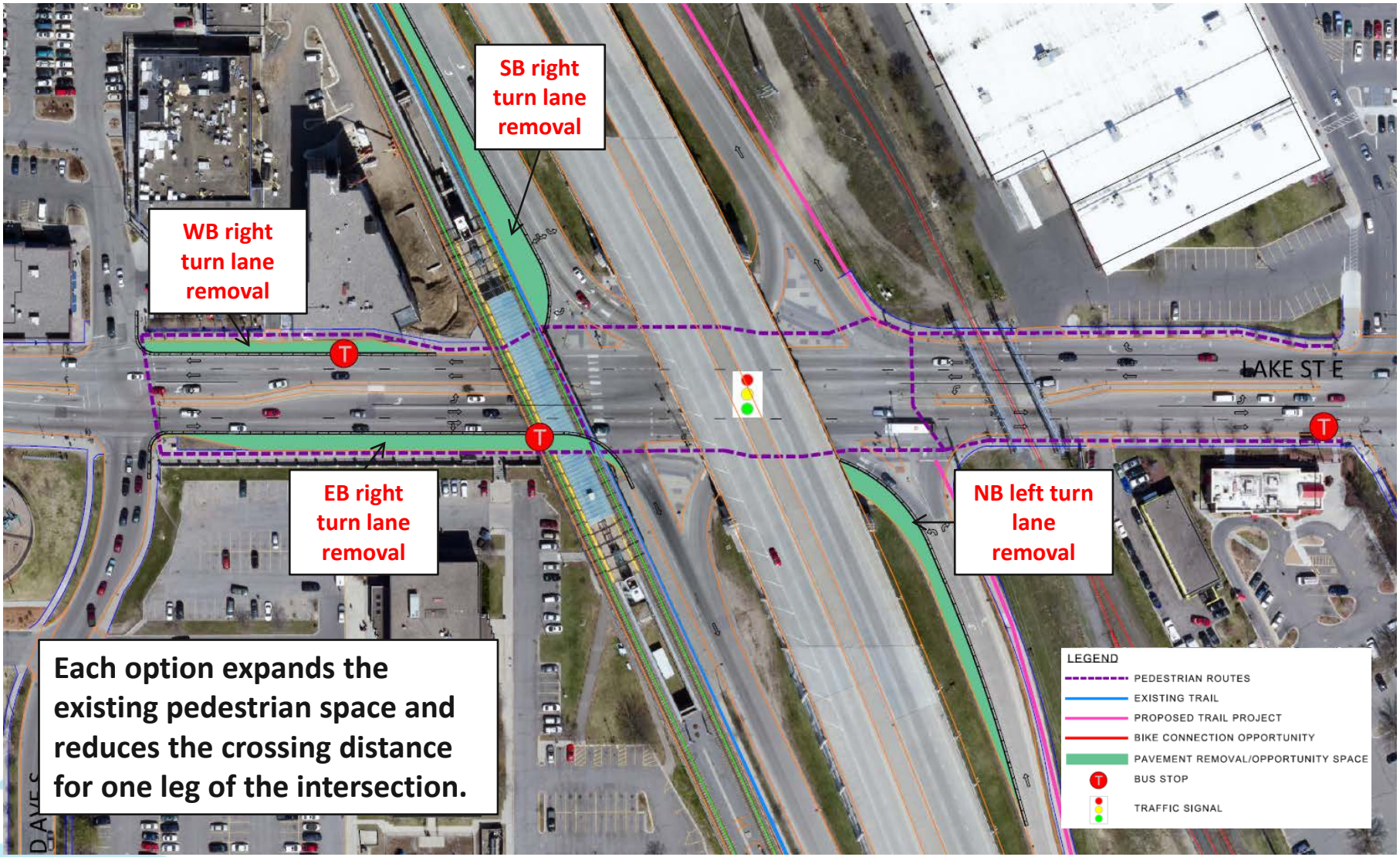
Removal of:

- WB right turn lane at 22nd Ave S
- EB right turn lane at SB Hiawatha Ave entrance ramp
- NB left turn lane at NB Hiawatha Ave exit ramp
- SB right turn lane at SB Hiawatha exit ramp

Itemized cost range: $105,000-$255,000

Total Tier II improvements: $660,000

Tier II Options – Locations



Tier III Concepts – Evaluation Criteria

Pedestrian

East-west crossing distance/delay; number of free rights

Bicycle

North-south crossing distance; east-west connections to LRT station

Motor Vehicles

Peak hour delay; impacts at 28th St and 32nd St

Transit

LRT “bus bridge operations”; aBRT compatibility

Livability

Pavement removal opportunities; diverted traffic

Example Base Conditions

No.	Evaluation Measure	Notes	Base Condition
	**Pedestrians**		
P1	East-West Crossing Distance	The distance that a pedestrian on Lake Street is in a crosswalk	200 feet
P2	East-West Signal Delay	The average time a pedestrian waits for a walk signal	56 seconds
P3	East-West Crossing Time	The average time a pedestrian on Lake Street is in a crosswalk	57 seconds
P4	East-West Total Time	The total time needed to travel from eastbound bus stop to the railroad crossing on the north side of Lake Street	199 seconds
P5	East-West Lane Crossings	The number of vehicle lanes a pedestrian on Lake Street crosses	5
P6	Count of Vehicle Free Rights	The number of non-signalized turns allowed	2
P7[1]	*Number and severity of pedestrian crashes*	*2 pedestrian/vehicle crashes since 2010 (4% of total collisions), both at crash severity C (possible injury). Full report available.*	

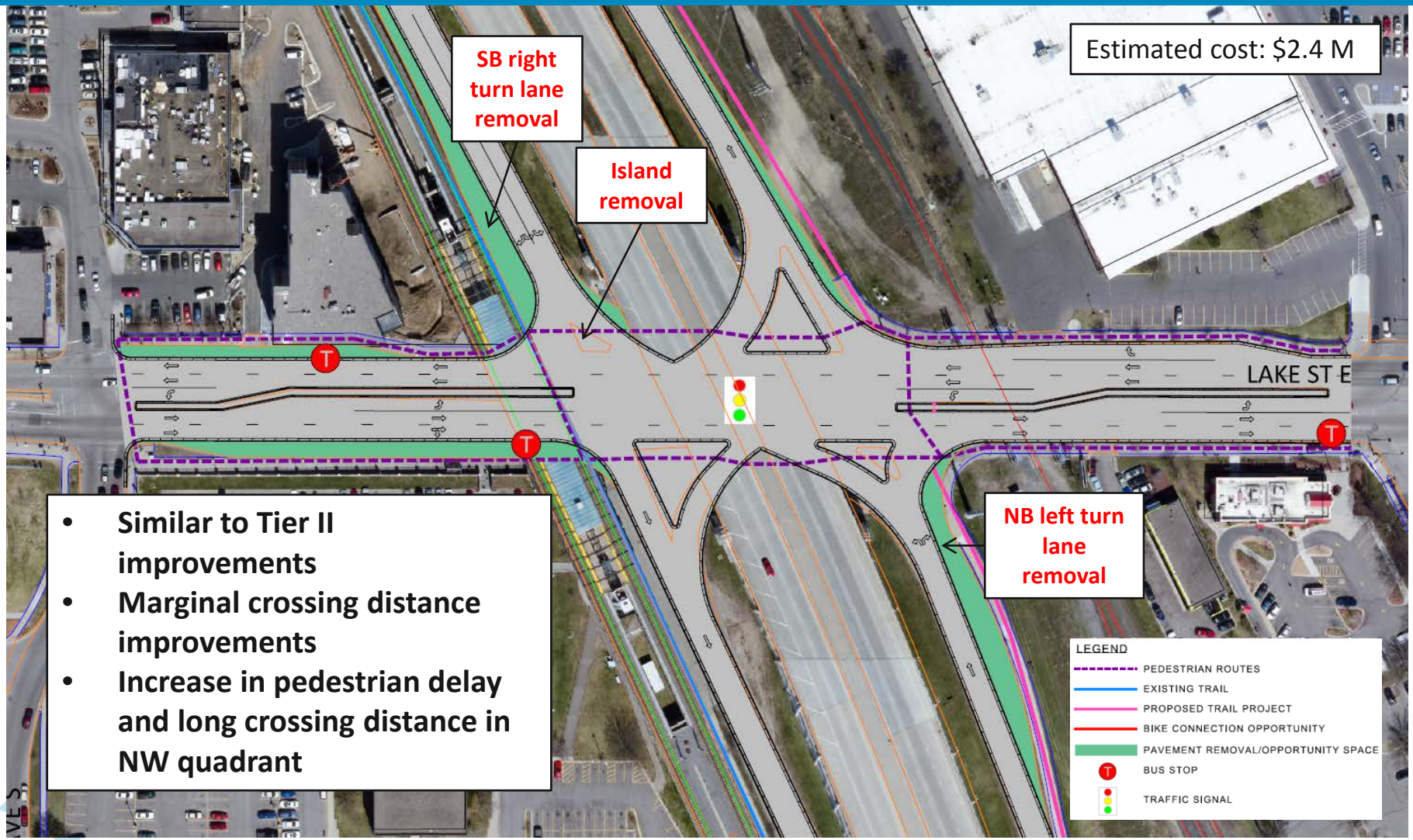
Tier III Concept Analysis

1. Modified SPUI (Low overall benefit)
2. Tight Diamond
3. Half Diamond with Promenade
4. Two-Way Ramps (Not favorable by PMT)
5. Diamond with Two-Way Ramps (Not favorable by PMT)

Tier III cost range: $2.4 - $5.6 million

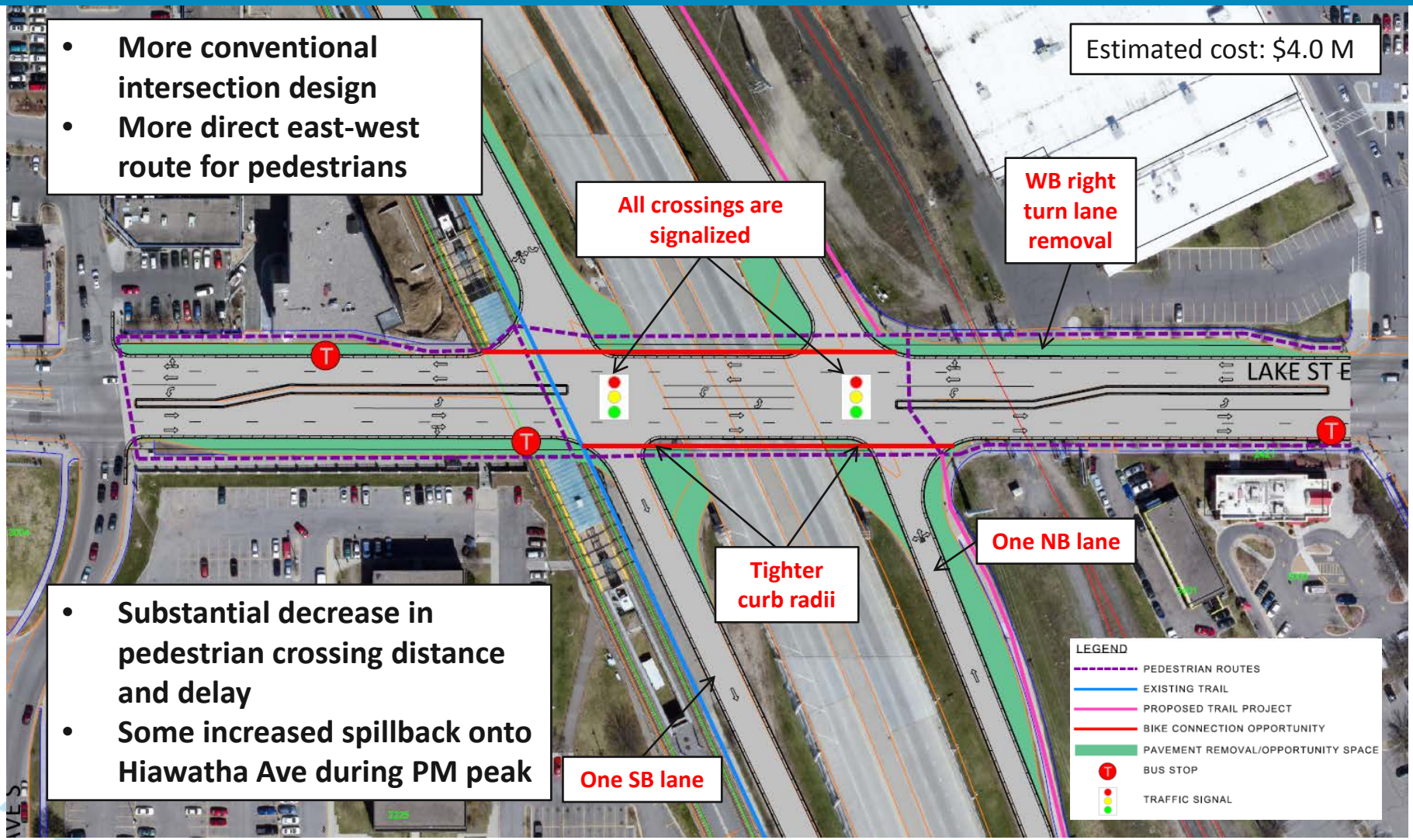
For the screening level of analysis conducted in this study, traffic operations on the surrounding roadway network and the traffic/LRT interactions at Hiawatha Avenue/28th and 32nd streets were not analyzed in detail. Further evaluation and coordination with participating agencies will be needed to advance any alternatives.

1. Modified SPUI



- Similar to Tier II improvements
- Marginal crossing distance improvements
- Increase in pedestrian delay and long crossing distance in NW quadrant

2. Tight Diamond

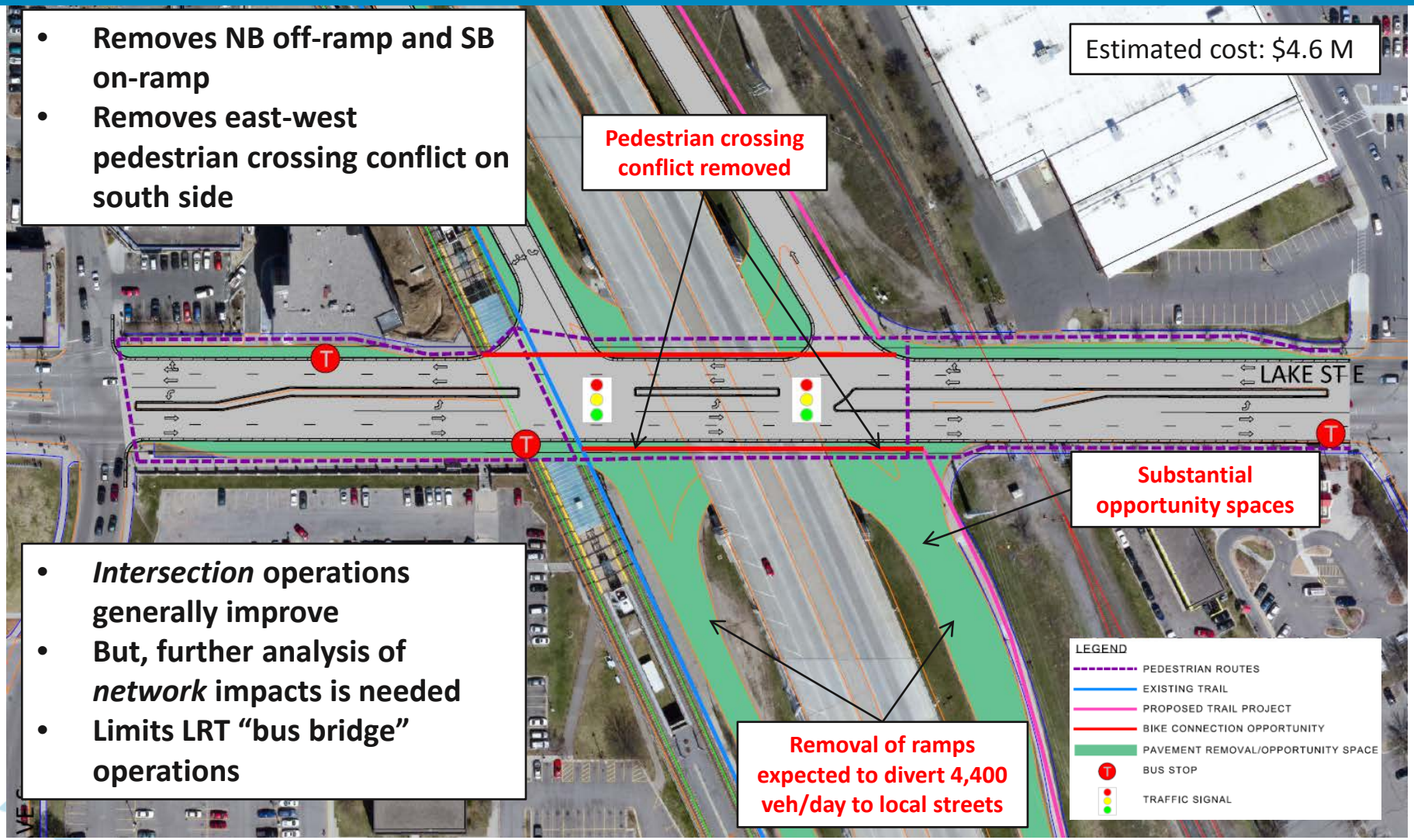


3. Half-Diamond with Promenade

- Removes NB off-ramp and SB on-ramp
- Removes east-west pedestrian crossing conflict on south side

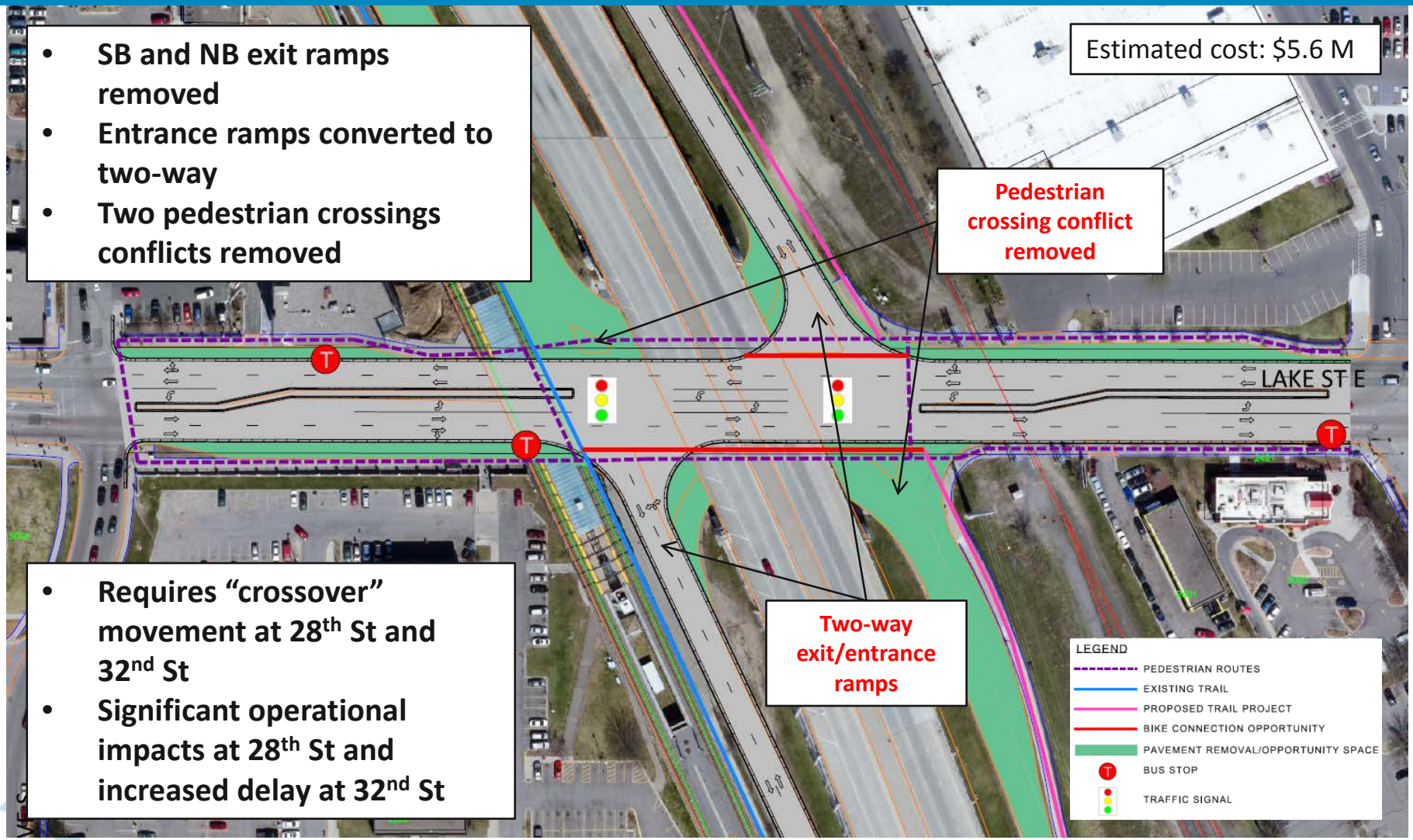
Estimated cost: $4.6 M

Pedestrian crossing conflict removed



- *Intersection* operations generally improve
- But, further analysis of *network* impacts is needed
- Limits LRT "bus bridge" operations

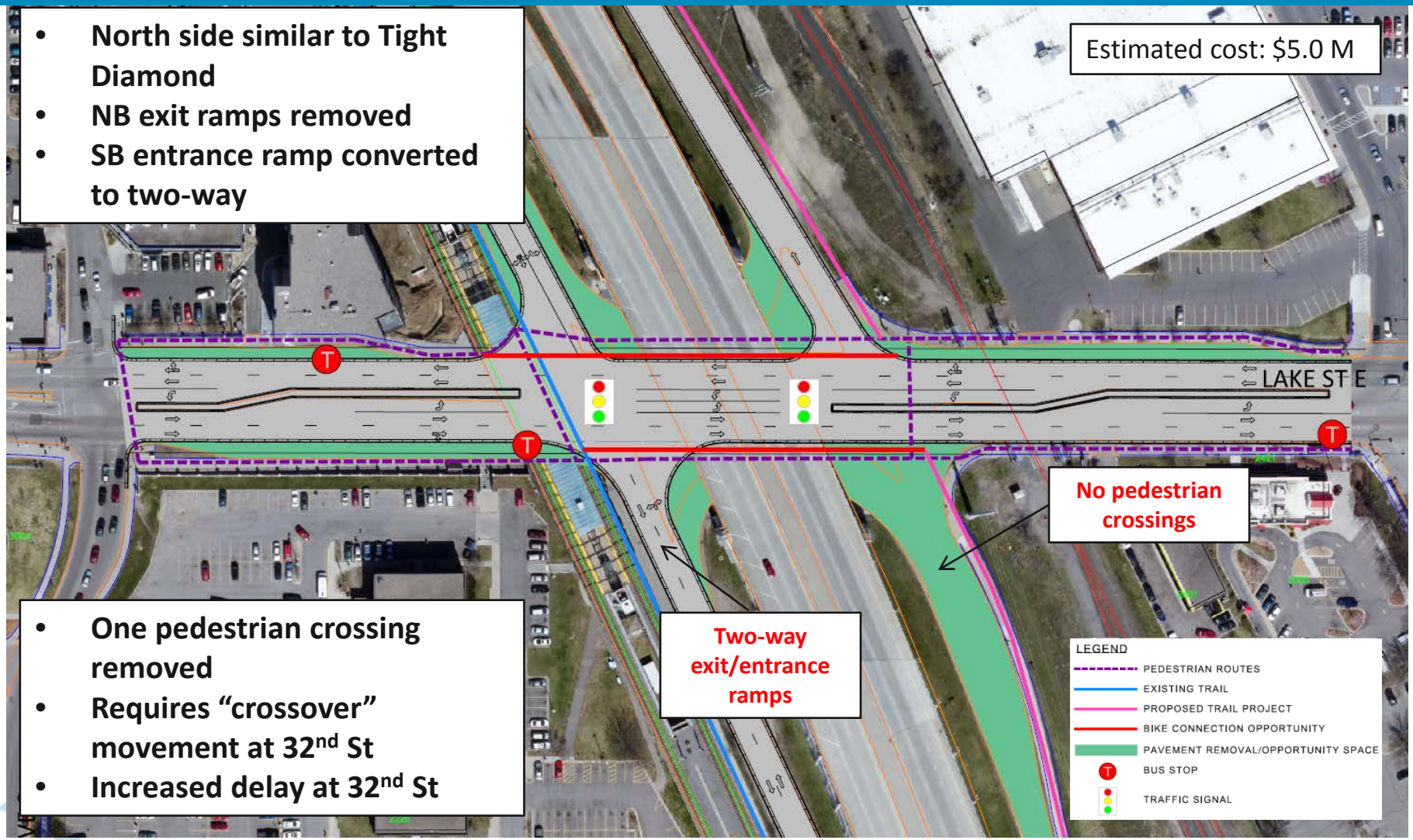
4. Two-Way Ramps



5. Diamond with Two-Way Ramps

- North side similar to Tight Diamond
- NB exit ramps removed
- SB entrance ramp converted to two-way

Estimated cost: $5.0 M



- One pedestrian crossing removed
- Requires "crossover" movement at 32nd St
- Increased delay at 32nd St

Much more detail in report:

Including:

- Existing conditions
- Key issues and opportunities
- Improvements
  - Tier I: Surface level
  - Tier II: Some geometric changes
  - Tier III: Interchange reconfiguration alternatives
- Evaluation criteria/methodology
- Traffic analysis
- Cost estimates