



# Welcome to the Deerfoot Trail Study Open House

During this session, you can:

- View the long-term preliminary concepts for Deerfoot Trail and ask questions.
- Provide input on each preliminary concept.
- Learn how we developed the preliminary concepts.
- Learn about the next steps.

The input we receive, along with our continued technical review will help us identify a set of final recommendations to present to Calgarians in 2020.

In partnership with



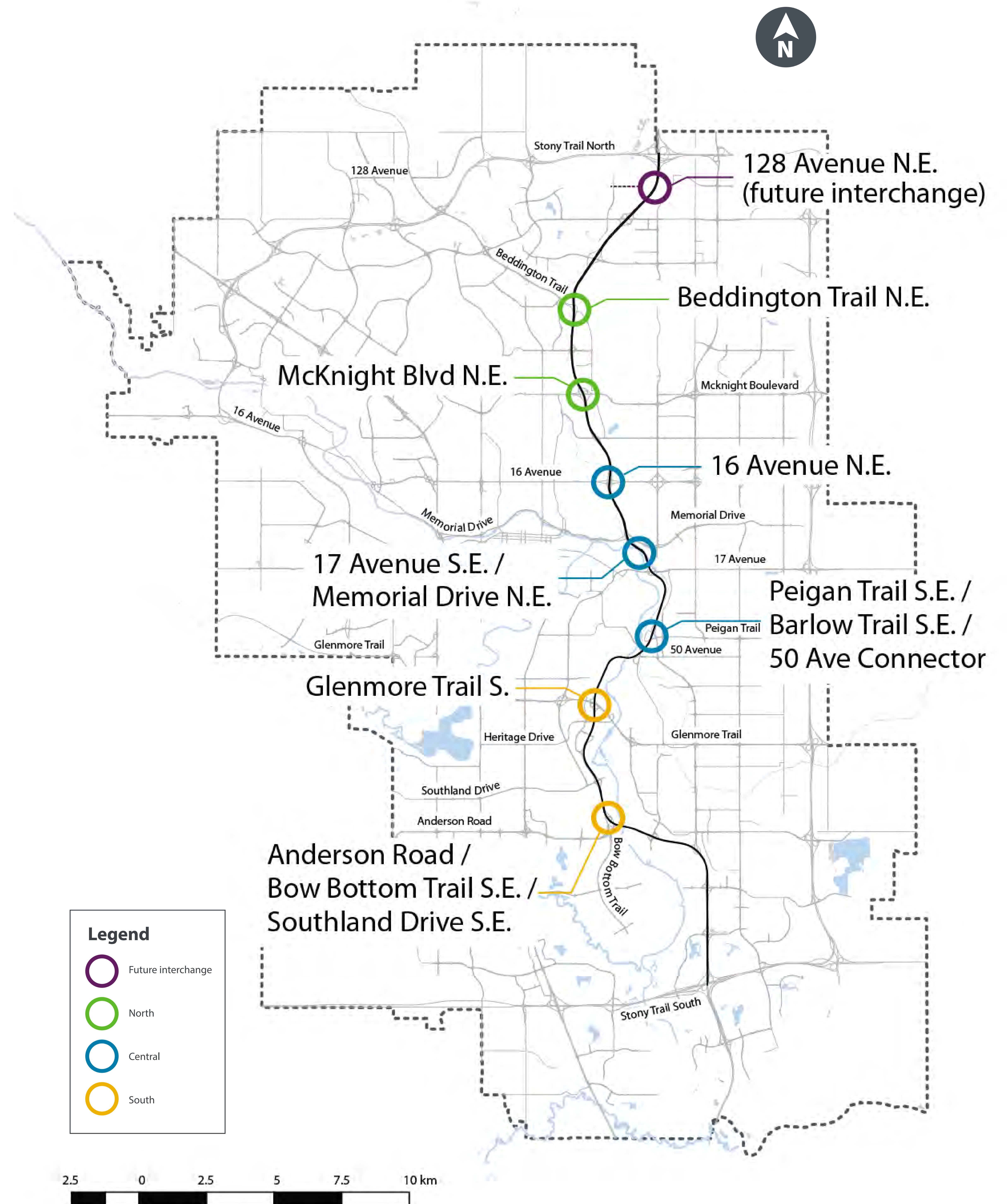
# This long-term corridor study:

- Is a joint initiative between The City of Calgary and Alberta Transportation.
- Reviews Deerfoot Trail between Stony Trail North and Stony Trail South.
- Covers approximately 35 kilometres of highway.
- Includes 18 existing interchanges and one future interchange at 128th Avenue N.E.
- Looks at increasing capacity, reducing travel times and improving safety on the corridor.
- Identifies potential short-term improvement options for the next five years.
- Plans for 30 years into the future to determine the amount of space (i.e. right-of-way) that will be needed to accommodate all transportation needs (width of road, median, active mode connections, etc.).

# Fast facts about Deerfoot Trail

- In Calgary, Deerfoot Trail is part of the Primary Goods Movement Network and is classified as a skeletal road in the Calgary Transportation Plan. Skeletal roads are generally designed to move large volumes of traffic over long distances.
- The average daily traffic ranges from 83,000 vehicles per day at the south end to 170,000 vehicles per day north of Memorial Drive.
- Deerfoot Trail is the only road, other than Stony Trail, providing a continuous north-south connection across the city, and the only north-south skeletal road serving central and east Calgary.

## Key improvement areas



**Did you know? Deerfoot Trail is part of the National Highway Network and managed by Alberta Transportation.**

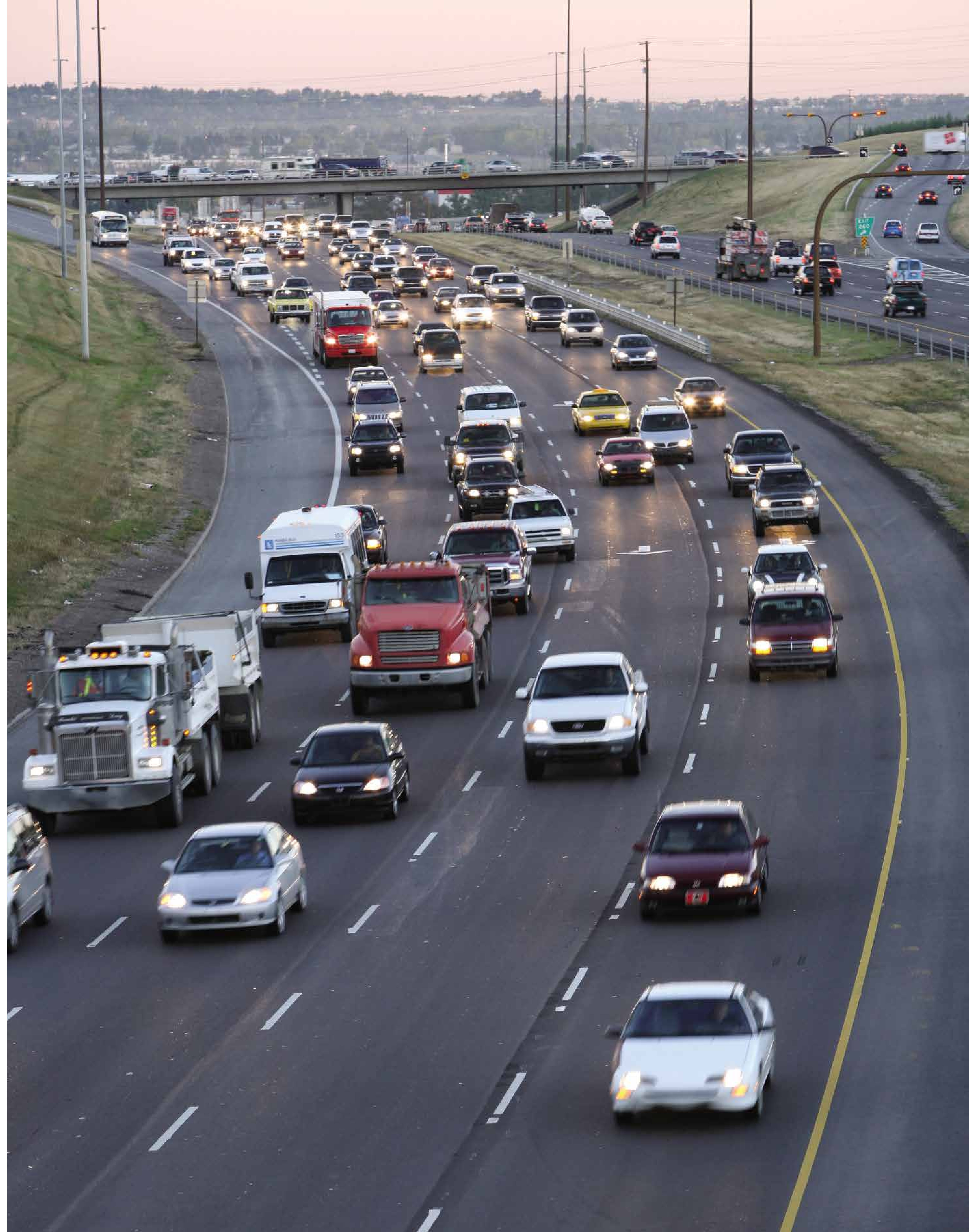
# Study goals and objectives

## Goals

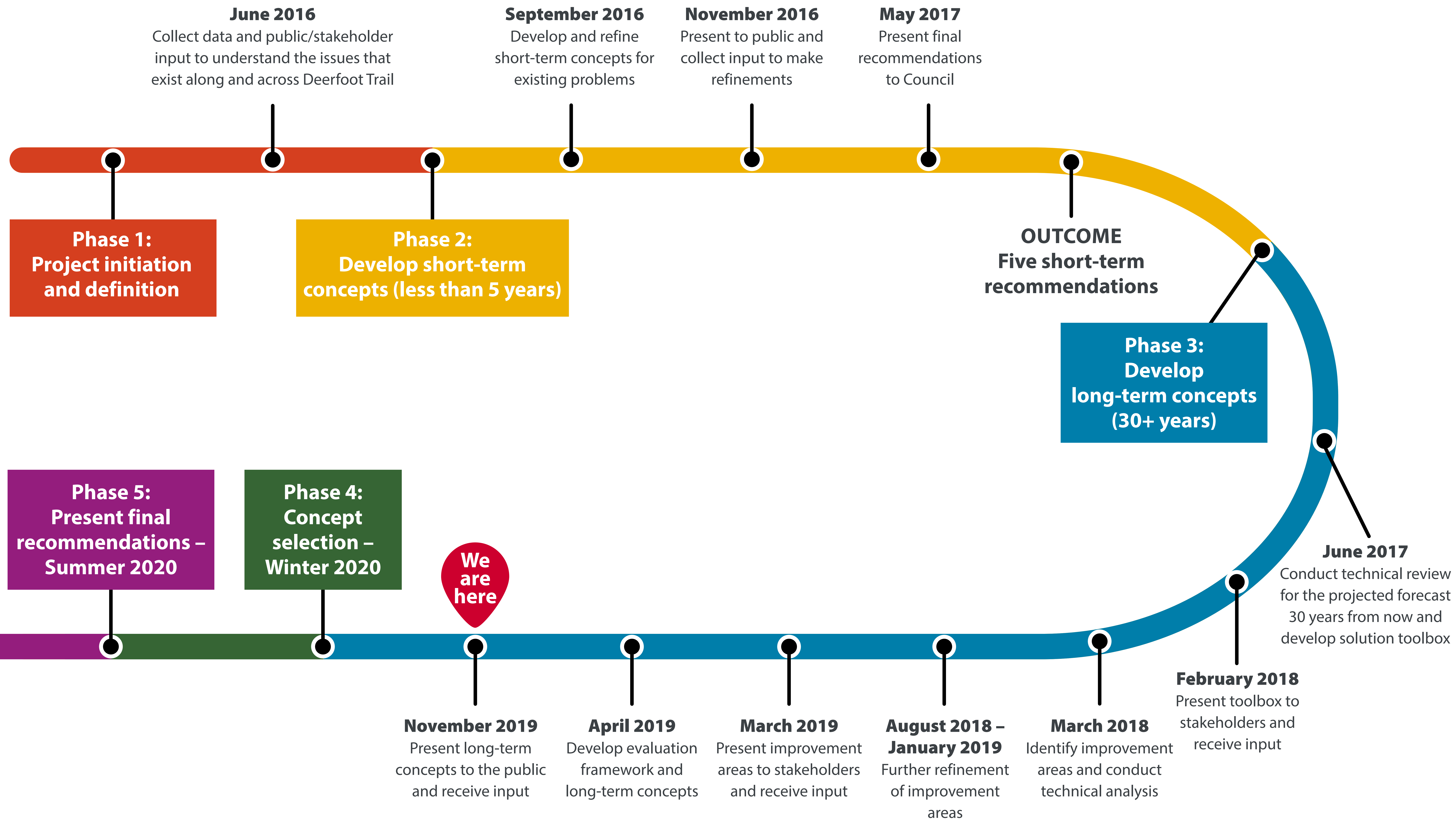
- Provide recommendations to improve highway operations and safety on Deerfoot Trail.
- Provide recommendations to improve air quality and reduce vehicular emissions as part of The City's goals to reduce greenhouse gas emissions and reduce travel time within the corridor.

## Objectives

- Develop potential improvements to preserve and enhance highway operations.
- Recommend safety and mobility improvements for people who drive, take transit, walk and cycle.
- Engage the public, community groups and stakeholders to identify users and demands for the corridor.
- Build a range of potential options.
- Develop an effective implementation strategy for the short, medium and long-term needs of the corridor.



# Deerfoot Trail Study timeline



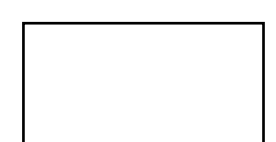


# Identifying challenges from Stoney Trail N.E. to McKnight Boulevard N.E.

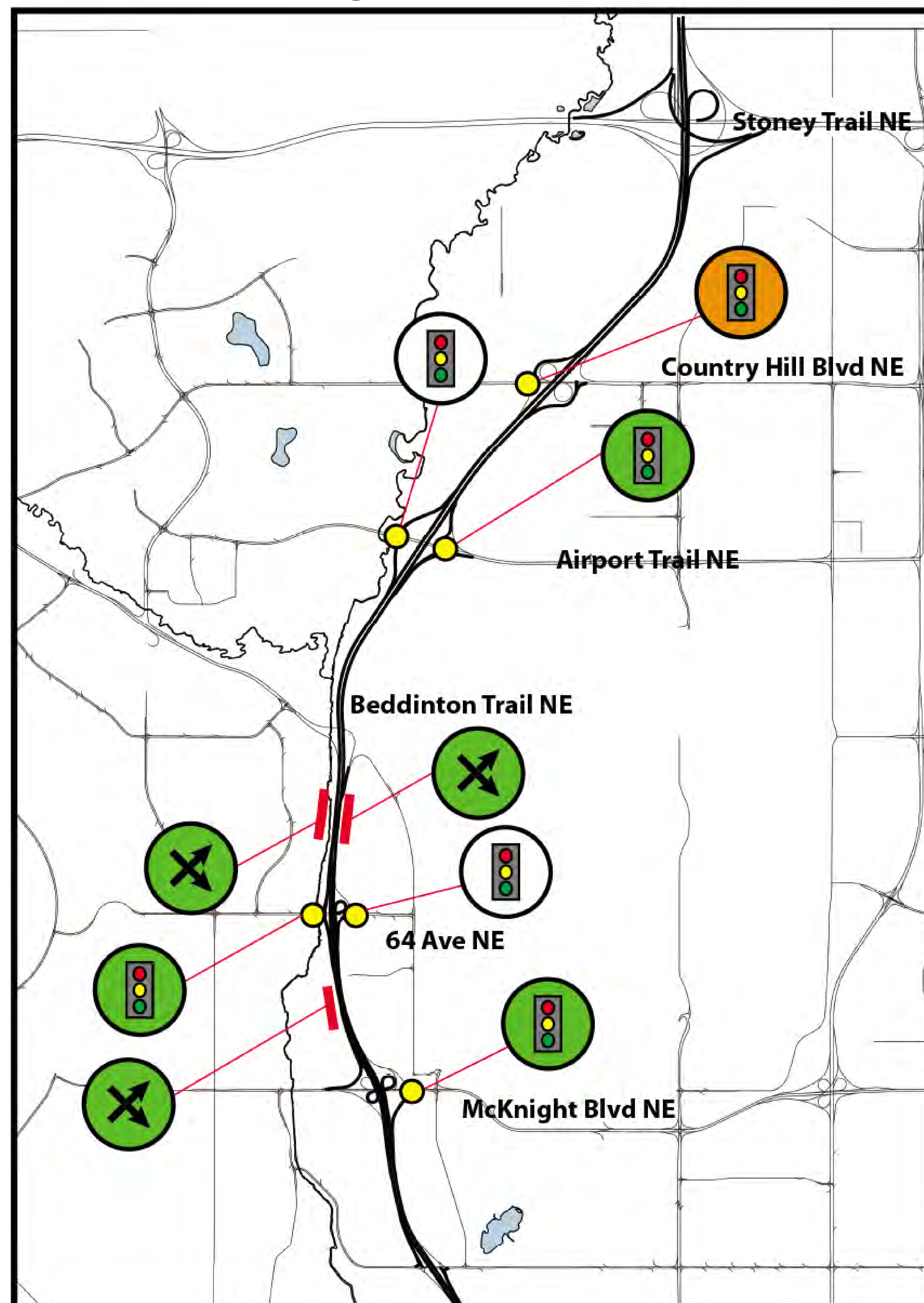
Many challenges have been identified through public input on both the Deerfoot Trail corridor and on the surrounding road networks. Technical analysis during Phase 1 of the study confirmed the need to address the following challenges along Deerfoot Trail:

-  Capacity
-  Weaving
-  Merging
-  Diverging
-  Intersection operations
-  Safety (collision)

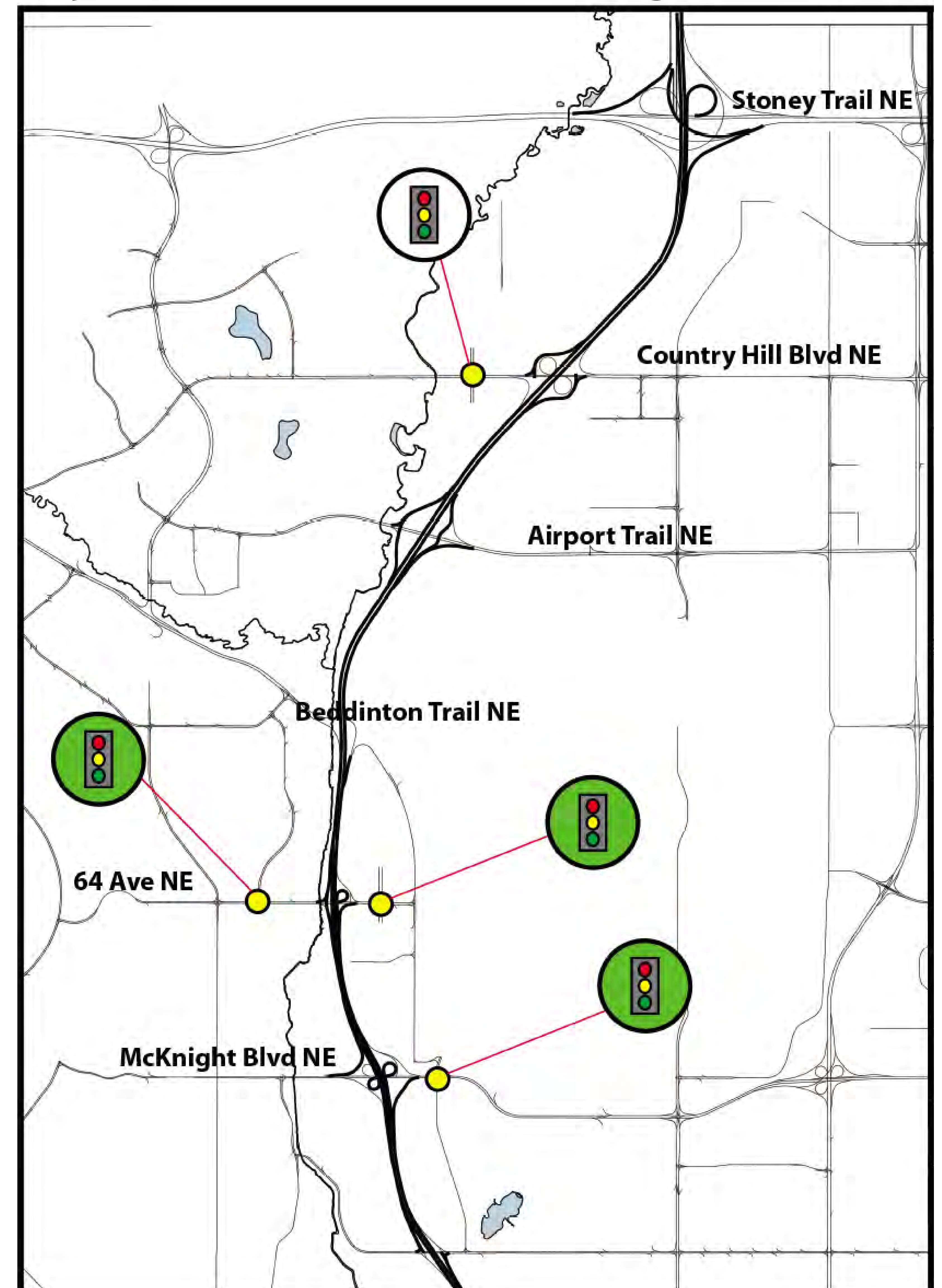
### Issue identification

-  Existing only
-  Existing and future
-  Future only

## Corridor challenges

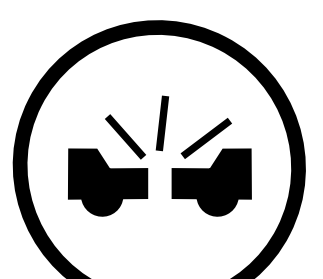


## Adjacent road network challenges






# Identifying challenges from McKnight Boulevard N.E. to Peigan Trail S.E.

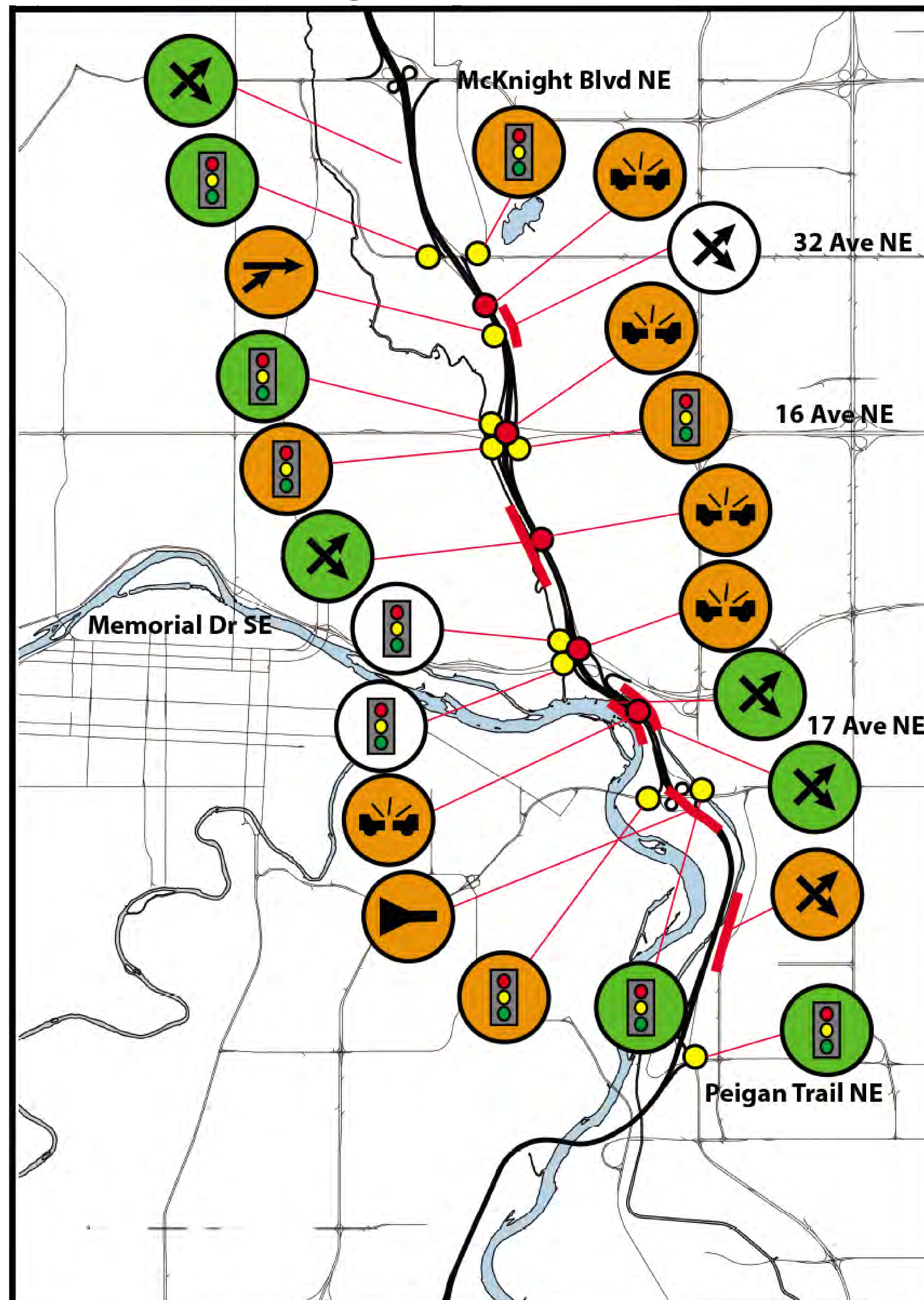
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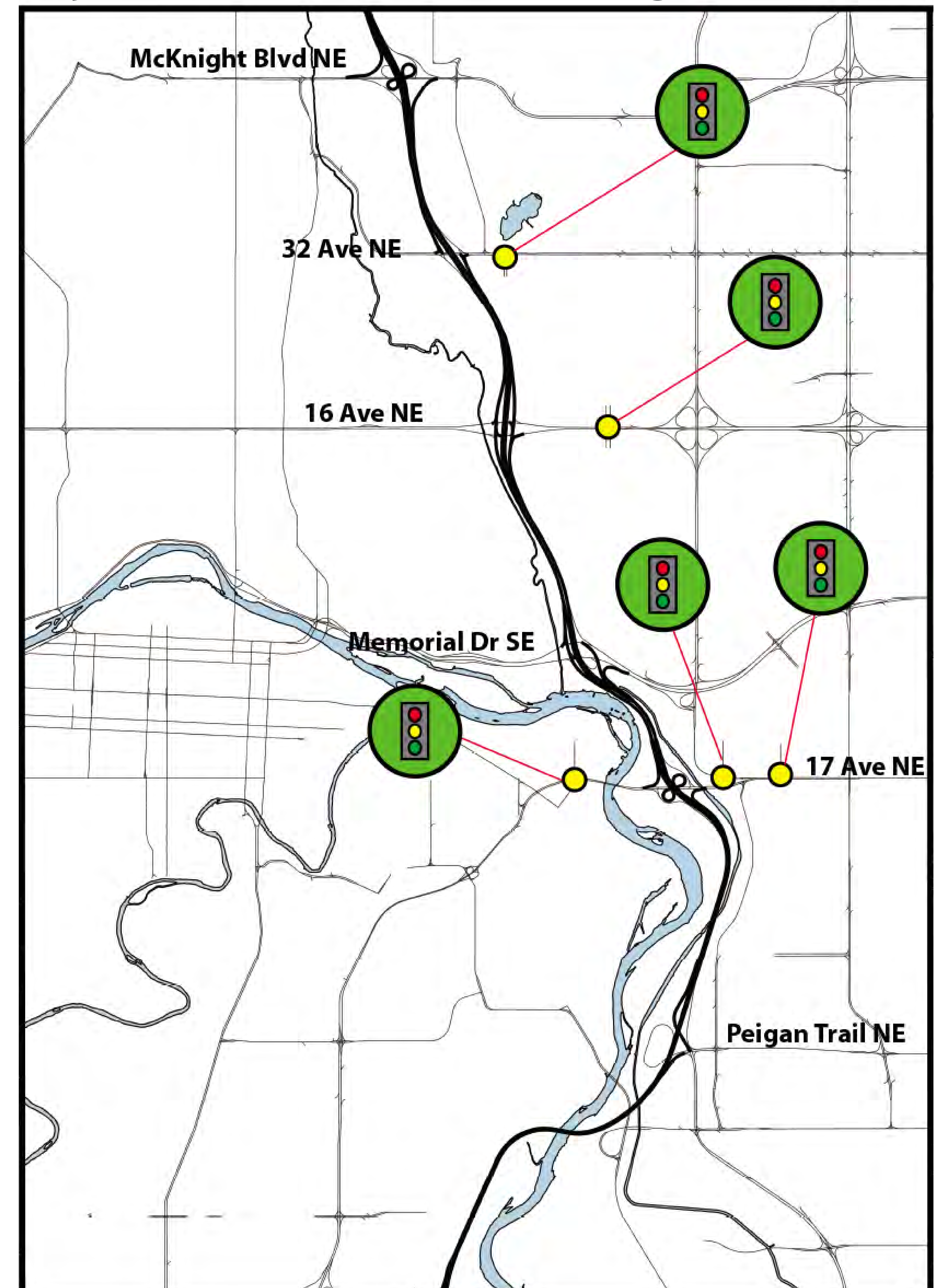
**Issue identification**

-  Existing only
-  Existing and future
-  Future only

**Corridor challenges**



**Adjacent road network challenges**






# Identifying challenges from Glenmore Trail S.E. to Stoney Trail S.E.

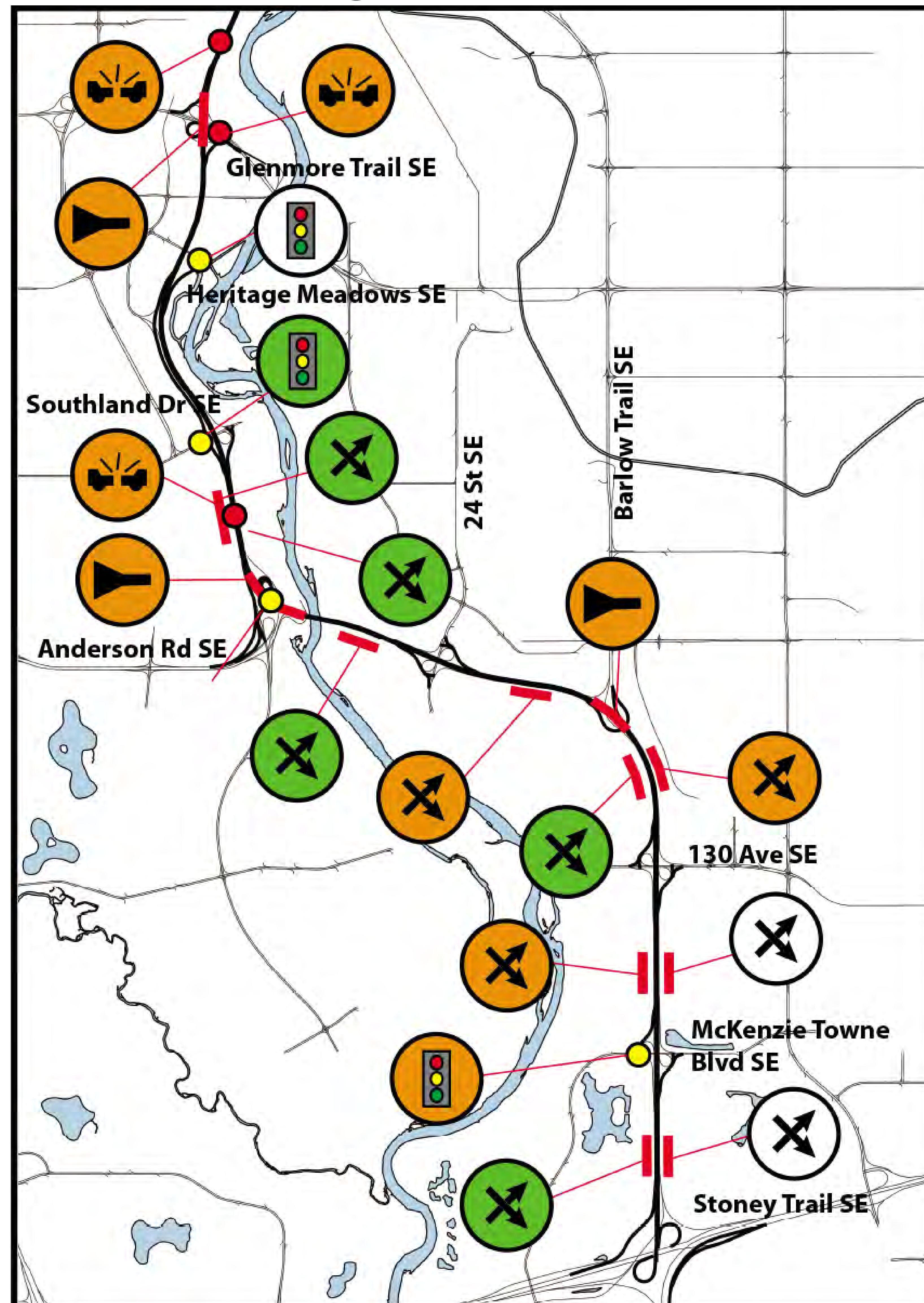
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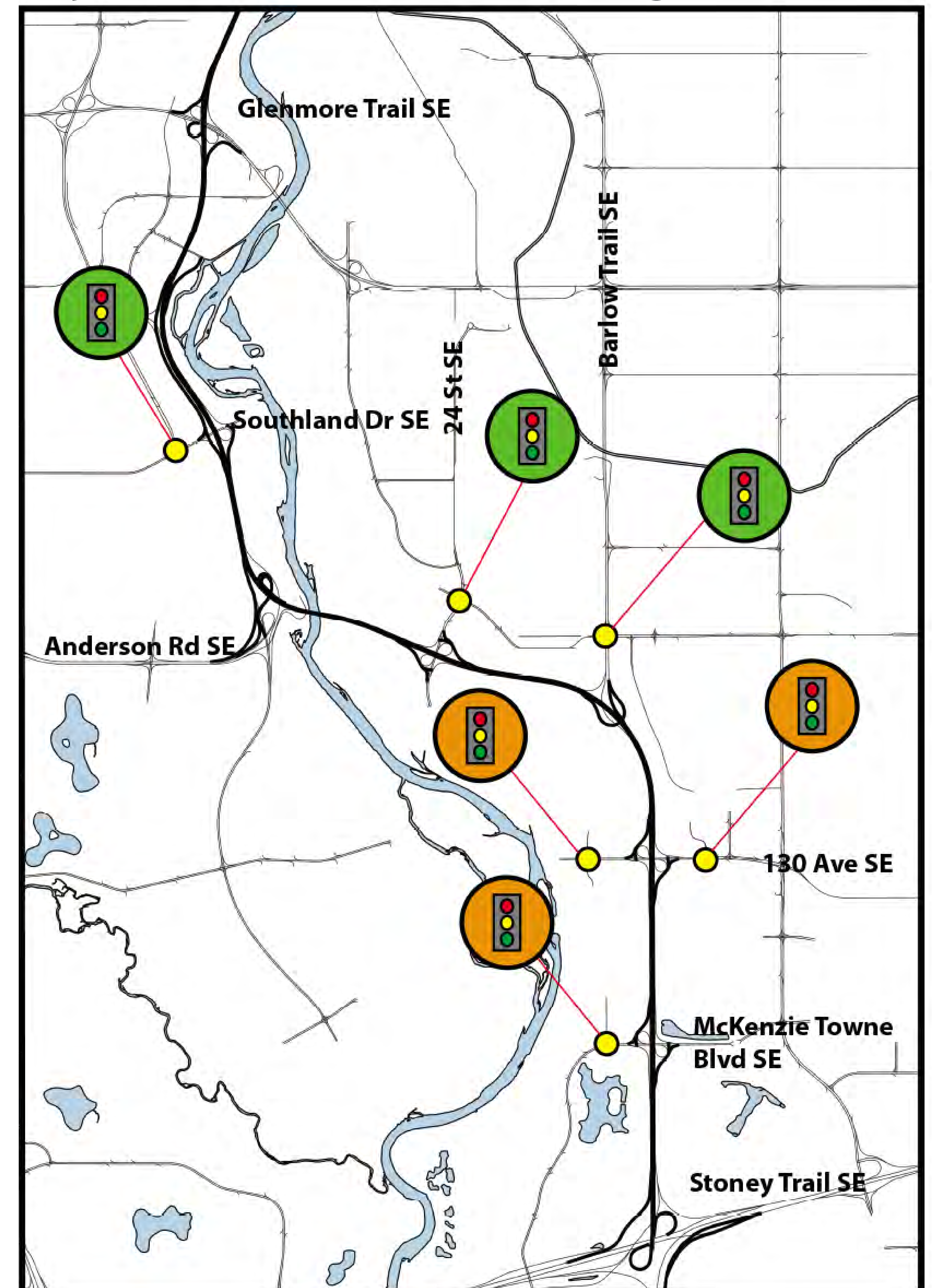
**Issue identification**

-  Existing only
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## Corridor challenges



## Adjacent road network challenges



# What we heard, what we did

| What we heard?   | What we did  |
|--|--|
| <p><b>Single occupancy vehicles</b><br/>People travel alone on Deerfoot Trail between 3 and 7 p.m. to commute to and from work.</p>  | <p>Developed concepts that address travel demand during the peak periods and encourage carpooling and transit.</p>   |
| <p><b>Reliability</b><br/>Most drivers experience delays along the study area most of the time.</p>  | <p>Developed concepts that improve capacity along the corridor to address bottleneck points. Reconfigured interchanges to address traffic operation concerns.</p>  |
| <p><b>Congestion</b><br/>The route most travelled is from Stoney Trail South to Glenmore Trail, while the most congested segment is McKenzie Lake Boulevard to Glenmore Trail.</p> | <p>Developed concepts that improve capacity along the corridor to address bottleneck points. Reconfigured interchanges to address traffic operation concerns.</p>  |
| <p><b>Safety</b><br/>Those who don't use Deerfoot Trail said it was because they don't feel safe on the road.</p>  | <p>Developed concepts that address safety issues by reconfiguring infrastructure. Further analysis is being conducted to develop additional mitigation measures.</p>   |
| <p><b>Satisfaction</b><br/>People are most satisfied with signage and traveler information and are least satisfied with duration of travel times and reliability.</p>              | <p>Developed concepts to improve travel times and reliability.</p>   |
| <p><b>Importance</b><br/>Efforts to clear collisions and stalls is the most important factor while the least important factor is visual appeal and appearance.</p>                 | <p>Look for in Phase 4: Investigating Intelligent Transportation Systems (ITS) to improve incident management activities and operations.</p>   |
| <p><b>Staging</b><br/>Improve 17th Avenue S.E. and Anderson Road first.</p>  | <p>Look for in Phase 4: Determining the long-term plan and providing recommendations to prioritize implementation.</p>   |
| <p><b>Top issues</b><br/>Lane reduction, poorly designed on and off ramps, poorly designed interchanges and congestion.</p>  | <p>Developed concepts that improve lane continuity, reconfigure ramps, improve capacity and reduce weaving along the through lanes. Developed network improvements to reduce short distance trips on the corridor.</p> |



# Developing improvement options for the Deerfoot Trail corridor

A three-step process is being used to generate, assess, screen and evaluate various corridor improvement options to address the challenges identified along Deerfoot Trail.

## Step one: Strategy assessment

**Purpose:** Assess several high-level corridor improvement strategies, based on key traffic management tools, that could potentially provide benefits to the Deerfoot Trail Corridor..

Six traffic management categories (toolboxes) were considered:

1. Traffic mobility
2. Demand management
3. Mode shift
4. Improved Safety
5. Capacity and geometry improvements
6. Intelligent Transportation Systems (ITS)

The toolboxes were screened into the following shortlist of applicable traffic management tools:

1. Managed lanes: High Occupancy Vehicles (HOV) and General-Purpose Lanes (GP)
2. Express lanes: Collector/distributor (CD) lanes
3. Cross street and parallel network improvements
4. Vehicle use restrictions
5. Walking and cycling reinforcement
6. Increased transit capacity
7. Ramp, interchange and intersection reconfigurations
8. Increasing number of lanes
9. Lane balance and continuity
10. Deceleration/acceleration and auxiliary lanes
11. Basket weave structures and ramps
12. ITS – Queue warnings
13. ITS – Ramp metering
14. ITS – Lane management
15. ITS – Speed harmonization
16. ITS – Incident detection and management

**Result:** Various combinations of the shortlisted tools were applied to the corridor and 13 improvement strategies were developed for further testing.

## Step two: Concept screening

Concepts are developed based on the findings of the strategy assessment to target as many of the traffic related issues identified as possible.

### How is a concept developed?

The 13 Strategies were assessed using high-level traffic performance criteria to identify which strategy and which traffic management tools were the most effective in improving traffic operations along Deerfoot Trail.

The most promising traffic management tools were advanced to form eight concepts. Specific network improvement and interchange reconfigurations were also developed.

**Screening process/criteria:** The eight concepts which included several key improvement areas and applied HOV or GP capacity on the mainline were screened with respect to traffic performance, cost and property impacts.

**Result:** Two key network improvement tools (HOV and GP) and several key improvement areas are taken forward for further consideration.

We are here

## Step three: Option package evaluation

Based on the findings of the concept screening, option packages are developed for public consultation.

Public input and further technical analysis will be used to determine the preferred concept.

### Key network improvement tools:

1. HOV lanes
2. GP lanes

### Key improvement areas:

1. Beddington Trail N.E.
2. McKnight Boulevard N.E.
3. 16th Avenue N.E.
4. 17th Avenue S.E./Memorial Drive N.E. (multiple options being considered)
5. Peigan Trail S.E./Barlow Trail S.E./50th Ave. connector
6. Glenmore Trail South
7. Anderson Road/Bow Bottom Trail S.E./Southland Drive S.E. (multiple options being considered)

**Evaluation process:** Two option packages will be developed based on the key improvement tools (HOV and GP), several common network and interchange improvements and the preferred options in the key improvement areas.

These option packages will be taken forward for final evaluation using the MAE criteria.

# Shortlisted corridor improvement tools

Implementing either tool will address congestion along the entire study area. Improvements at key areas along the corridor will address the remaining identified issues on Deerfoot Trail.

## High Occupancy Vehicle (HOV) Lane

### Benefits

- Encourages carpooling by allowing vehicles with two or more passengers to bypass congestion points, decreasing travel time and improving reliability.
- Reduces peak period trips and vehicle kilometres travelled (VKT).
- May reduce the need to add further roadway capacity.

### Trade-offs

- Median location makes enforcement challenging.
- May result in additional lane changing, as vehicles access and egress the proposed median HOV lane to enter or exit the highway.



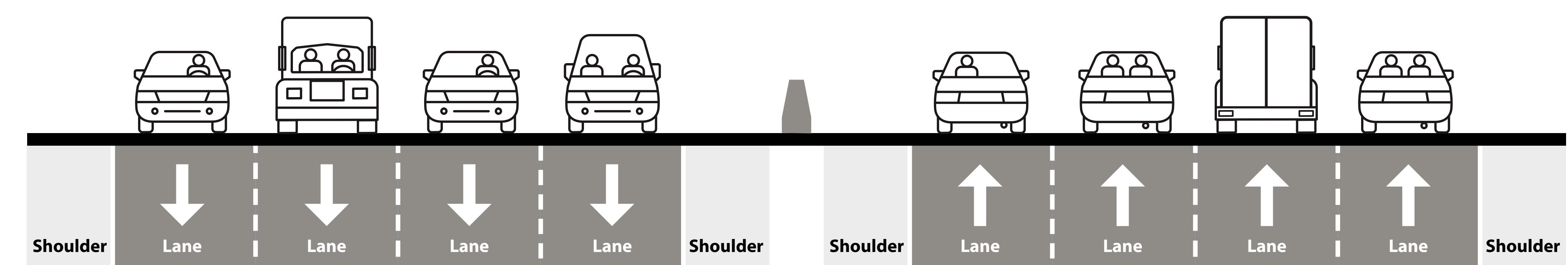
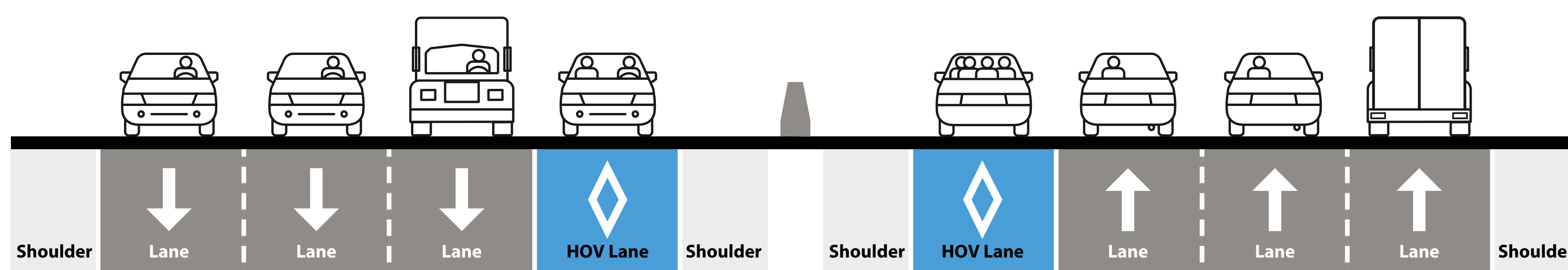
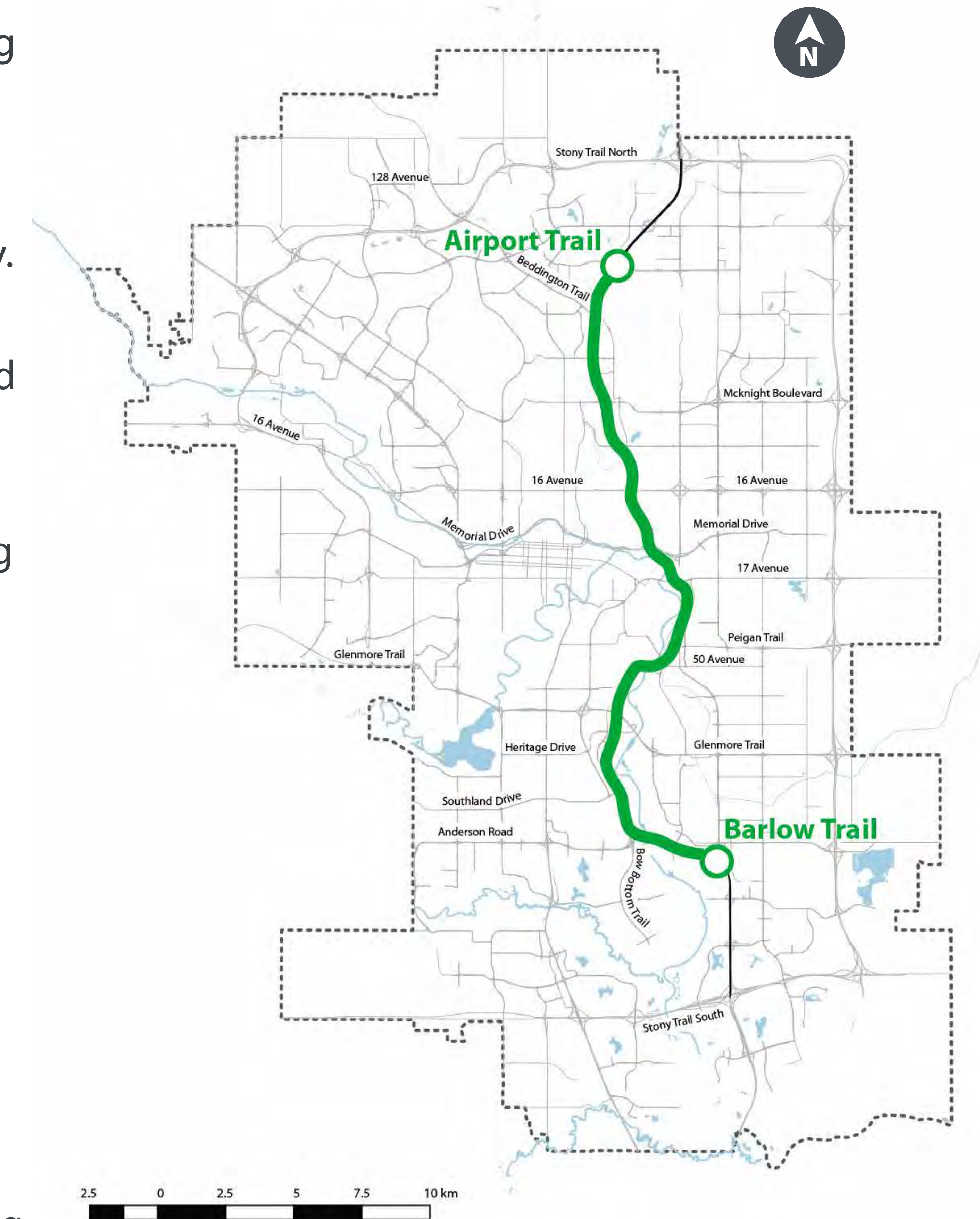
## General Purpose (GP) Lane

### Benefits

- Increases capacity along Deerfoot Trail resulting in reduced congestion, reduced travel times and improved reliability.
- Improves safety by reduced congestion and improving traffic flow.
- Improves goods movement by increasing overall capacity.

### Trade-offs

- Makes Deerfoot Trail more attractive for people who drive, potentially resulting in more vehicles using the corridor.
- Discourages more efficient modes of travel such as carpooling or taking transit.



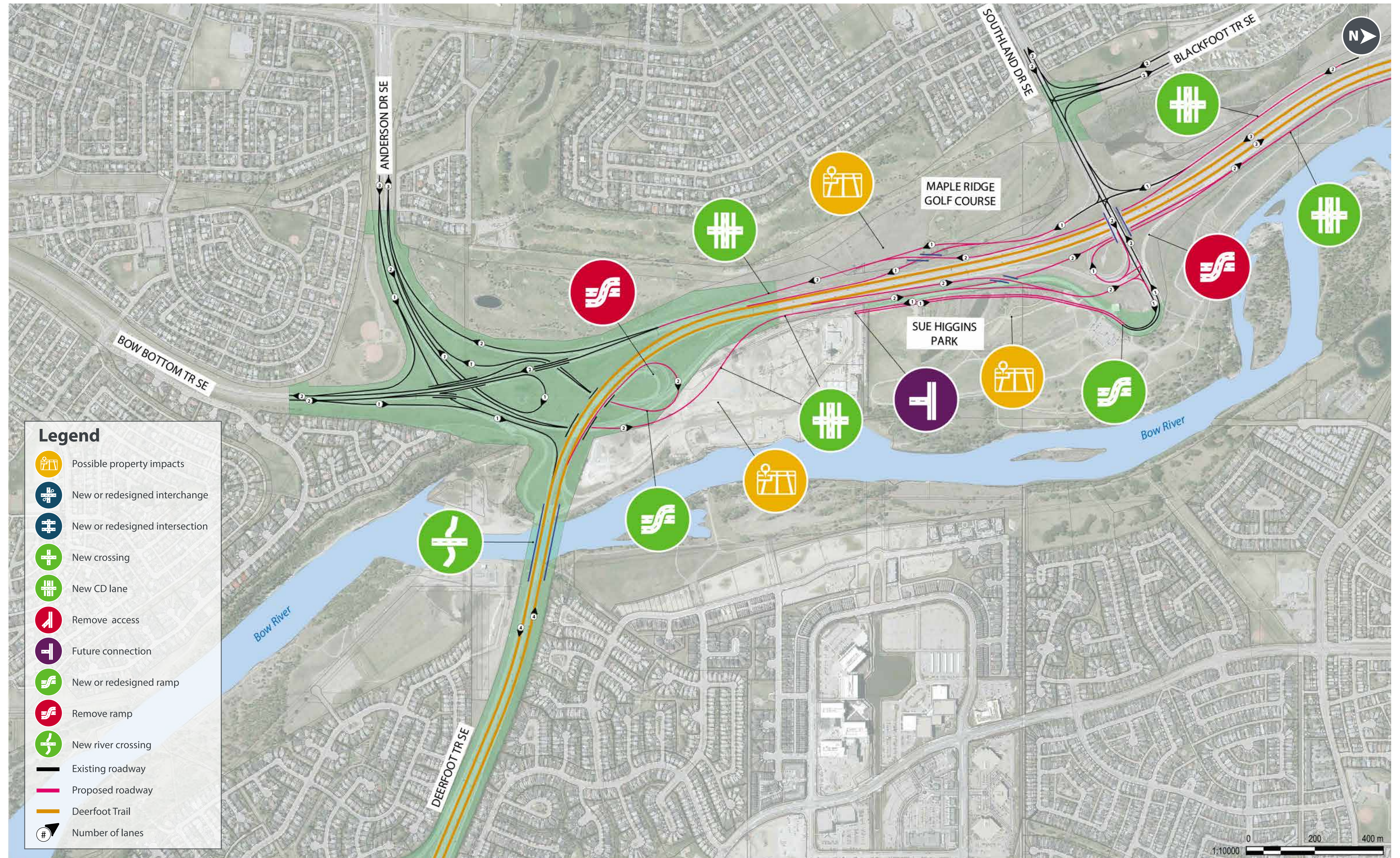
# Anderson Road/Bow Bottom Trail S.E./ Southland Drive S.E. (preliminary concept #1)

## Benefits

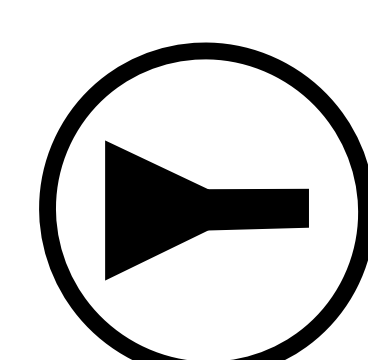
- Reduces weaving along Deerfoot Trail by adding a collector distributor (CD) lane in each direction between Southland Drive S.E. and Anderson Road/Bow Bottom Trail S.E. This separates the highway through movements from the interchange movements at the entrance and exit ramps.
- Provides more capacity with an additional lane in each direction across the Bow River and with the CD lanes north of Southland Drive.
- East/west traffic continues to use the Deerfoot Trail corridor via the CD lanes north of Anderson Road/Bow Bottom Trail S.E. interchange while the core lanes are primarily reserved for north/south traffic.
- Improves the diverging operations along northbound Deerfoot Trail by enlarging the loop ramp for Anderson Road/Bow Bottom Trail S.E.

## Trade-offs

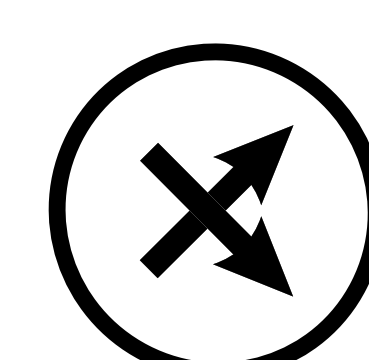
- Potential impacts to properties including Sue Higgins Park, Maple Ridge Golf Course and private property.
- Moderate costs due to constructing new overpasses for basket weave structures and separating the exit and entrance ramps between Anderson Road/Bow Bottom Trail S.E. and Southland Drive S.E. interchanges.



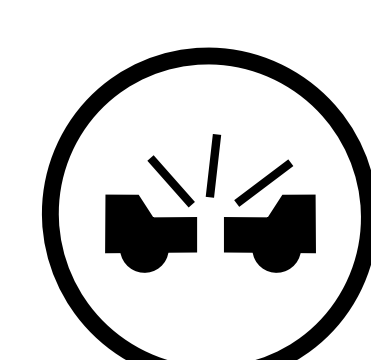
## Key issues it addresses



Capacity and resulting congestion



Weaving



Safety

\$\$\$ Cost

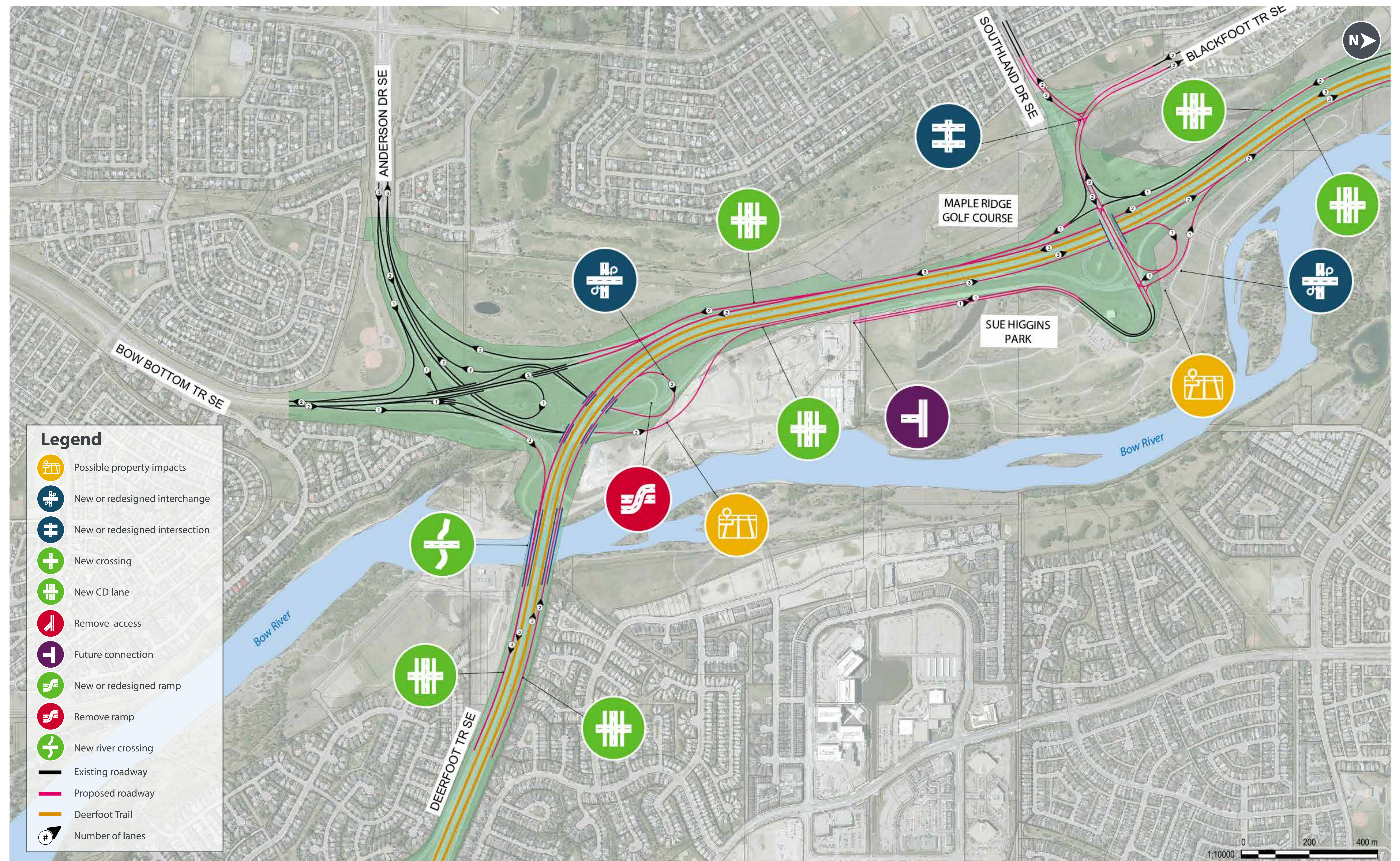
# Anderson Road/Bow Bottom Trail S.E./ Southland Drive S.E. (preliminary concept #2)

## Benefits

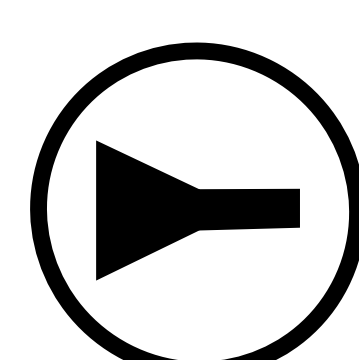
- Reduces weaving along Deerfoot Trail by adding a collector distributor (CD) lane between Southland Drive S.E. and Anderson Road/Bow Bottom Trail S.E., separating the highway through movements from the interchange movements at the entrance and exit ramps.
- Provides additional highway capacity, including across the Bow River, with the two CD lanes in each direction starting at Barlow Trail.
- Provides improved traffic operations along Deerfoot Trail as the CD lanes accommodate east/west local trips separately from the north/south trips that would primarily use the core travel lanes.
- Improves the diverging operations along northbound Deerfoot Trail by enlarging the loop ramp for Anderson Road/Bow Bottom Trail S.E.
- Provides additional distance northbound to change lanes by reconfiguring the ramps at Southland Drive.
- Provides easier connection between Blackfoot Trail and Southland Drive by reconfiguring intersection.

## Trade-offs

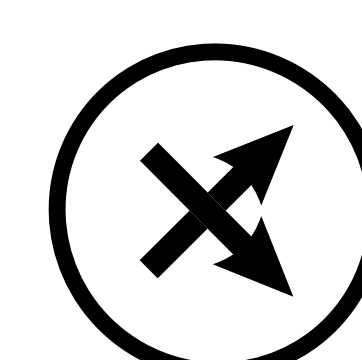
- Potential impacts to properties including Sue Higgins Park and private property.
- Moderate to high costs, primarily associated with the new structures across the Bow River and through the Anderson Road/ Bow Bottom Trail S.E. interchange to accommodate the northbound and southbound CD lanes.



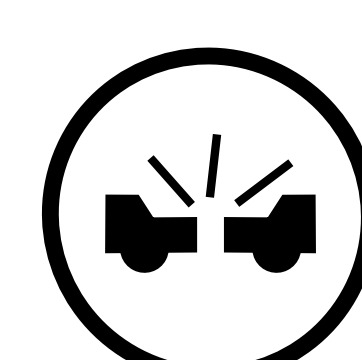
## Key issues it addresses



Capacity and resulting congestion



Weaving



Safety

\$\$\$\$\$ Cost

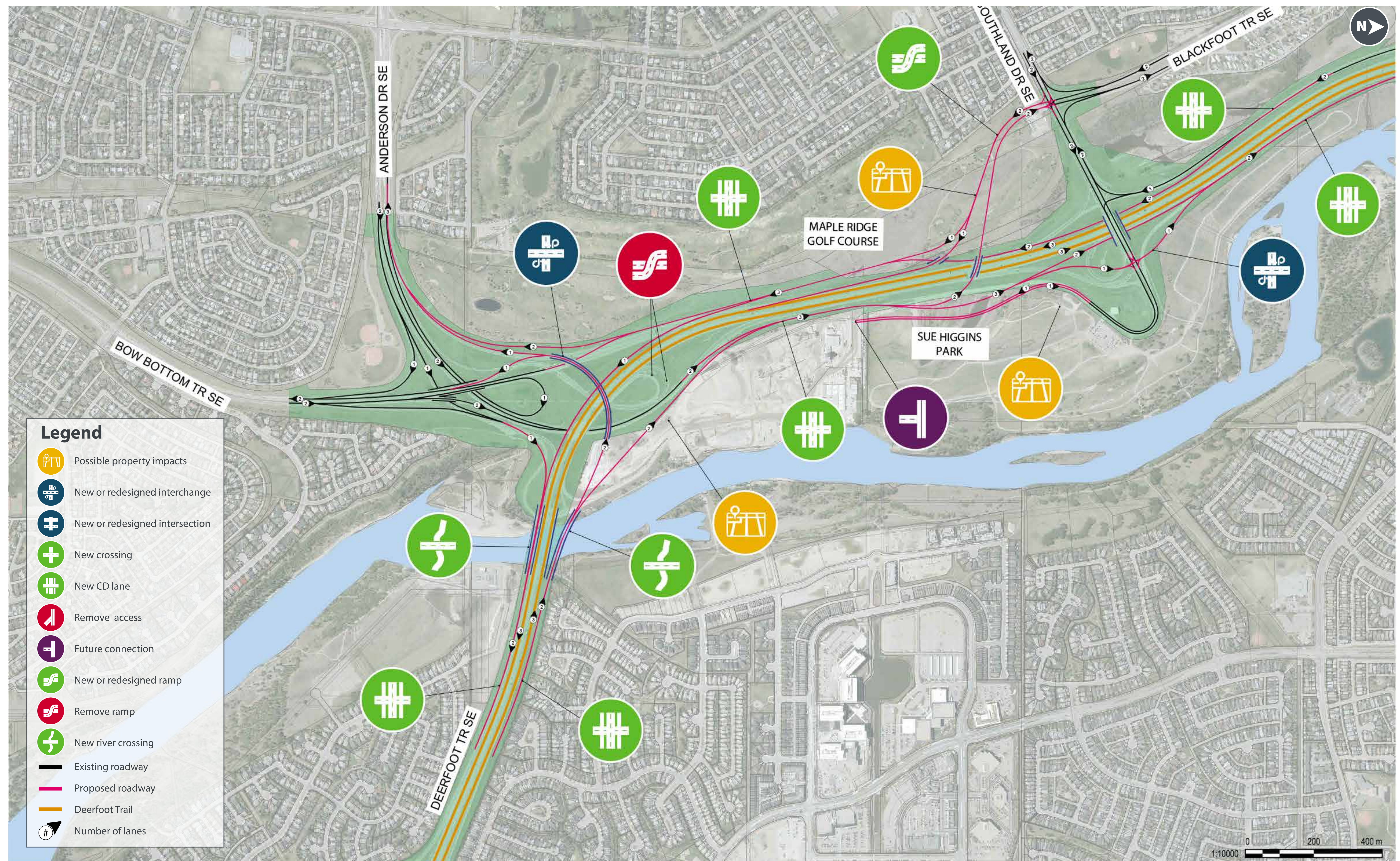
# Anderson Road/Bow Bottom Trail S.E./ Southland Drive S.E. (preliminary concept #3)

## Benefits

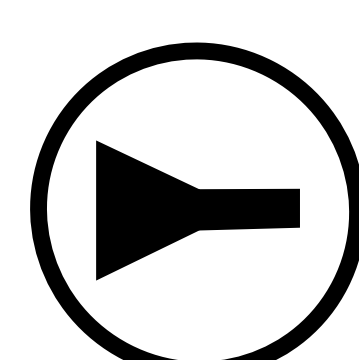
- Reduces weaving along Deerfoot Trail by adding collector distributor (CD) lanes in each direction between Southland Drive S.E. and Anderson Road/Bow Bottom Trail S.E., separating the highway through movements from the interchange movements at the entrance and exit ramps.
- Provides additional highway capacity, including across the Bow River with the two CD lanes in each direction starting at Barlow Trail.
- Provides improved traffic operations along Deerfoot Trail as the CD lanes accommodate east/west local trips separately from the north/south trips that would primarily travel in the core lanes.
- Provides direct access between Blackfoot Trail and Deerfoot Trail.
- Increases capacity and improves traffic operations by replacing existing loop ramp with directional ramp at Deerfoot Trail and Anderson Road.

## Trade-offs

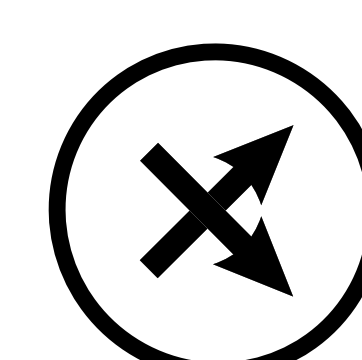
- Potential impacts to properties including Sue Higgins Park, Maple Ridge Golf Course and private property.
- High costs due to constructing new access between Deerfoot Trail and Blackfoot Trail, new bridges across the Bow River to accommodate the CD lanes and reconfiguring the Anderson Road/Bow Bottom Trail S.E. interchange.



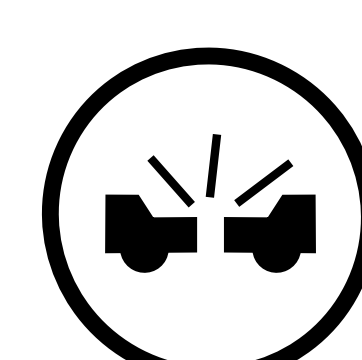
## Key issues it addresses



Capacity and resulting congestion



Weaving



Safety

\$\$\$\$\$\$ Cost

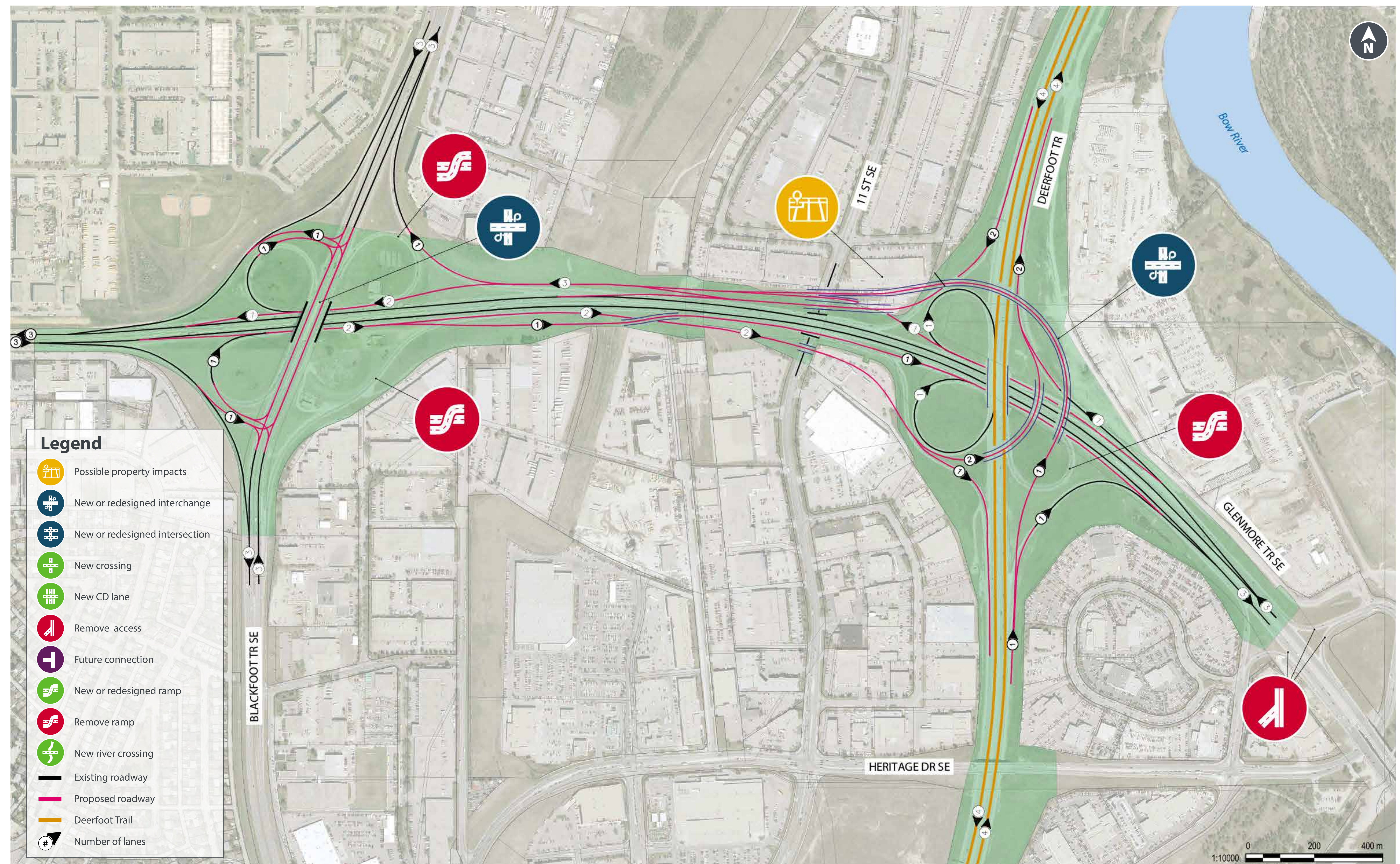
# Glenmore Trail (preliminary concept)

## Benefits

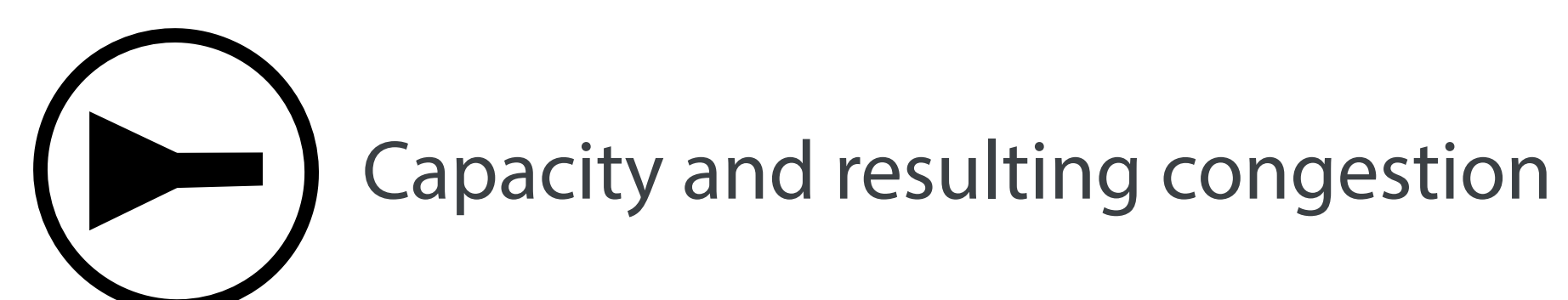
- Reconfigured interchange at Blackfoot Trail reduces weaving around Deerfoot Trail and Glenmore Trail.
- Reconfigured interchange at Glenmore Trail provides for all movements and removes the use of Heritage Meadows Road to perform northbound to westbound movement.
- Reduces congestion on Deerfoot Trail from northbound Heritage Meadows Road off-ramp.

## Trade-offs

- Potential impacts to commercial/ industrial properties.
- New design accommodates all the movements at the Glenmore Trail and Deerfoot Trail interchange and warrants removal of the right-in/ right-out access on Glenmore Trail in both directions.
- High costs due to constructing new ramps.



## Key issues it addresses



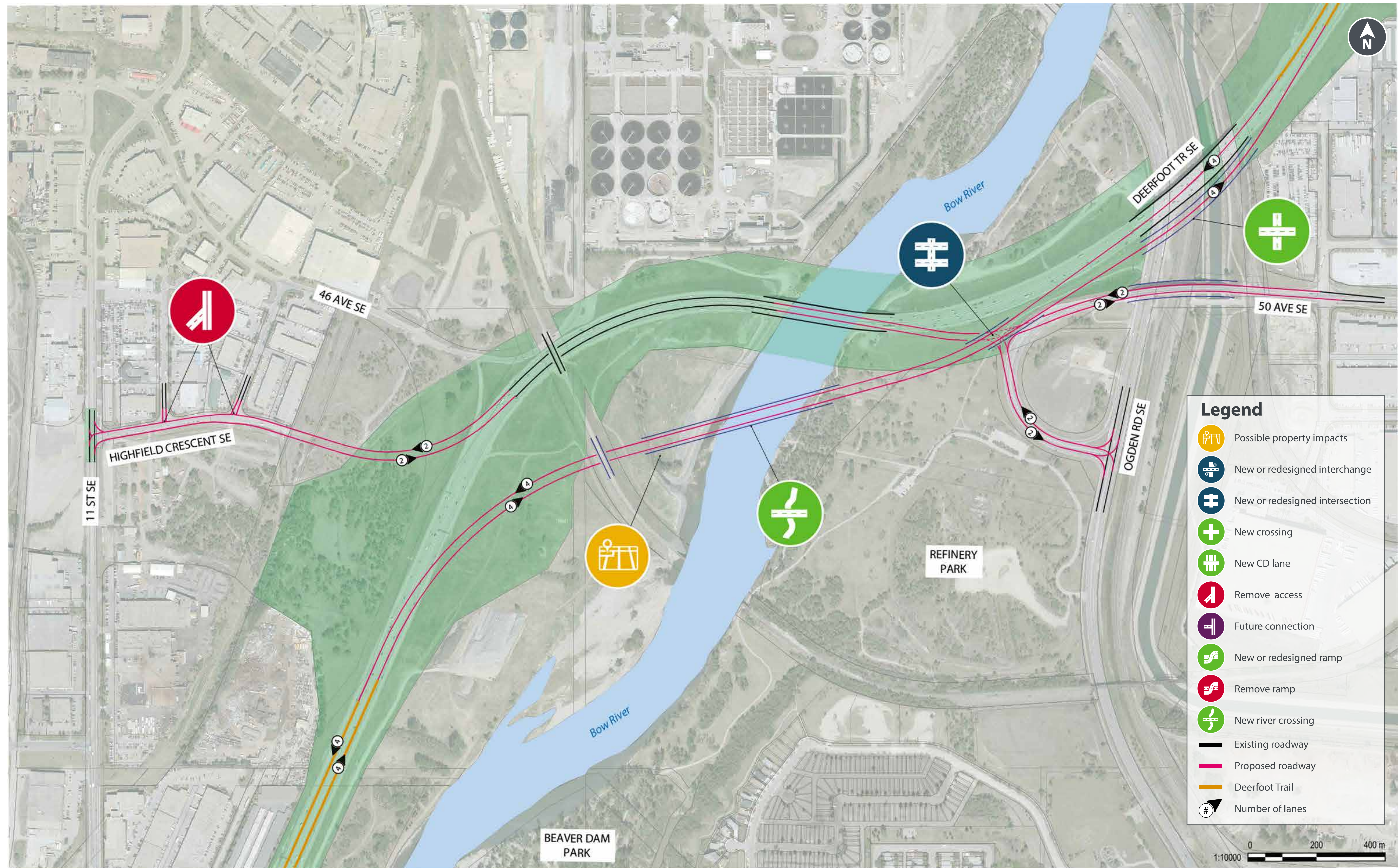
# 50th Avenue/Peigan Trail (preliminary concept)

## Benefits

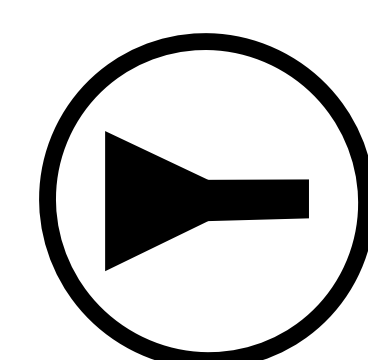
- Reduces east/west traffic and local trips using Deerfoot Trail between Peigan Trail and Glenmore Trail.
- Increases capacity along Deerfoot Trail by redirecting local trips. Approximately 1,500 vehicles/hour are anticipated to use the new connector in the long-term planning horizon (2048).
- 50th Avenue connector can use existing Deerfoot Trail Bow River bridge.
- Will address the lack of existing east/west connections between 17th Avenue and Glenmore Trail.

## Trade-offs

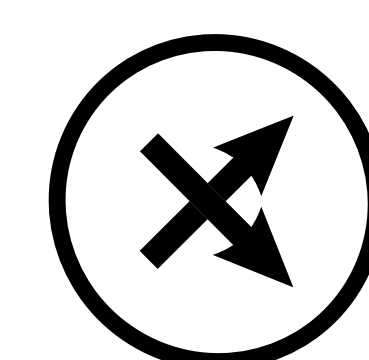
- New crossing over the Bow River is required to realign Deerfoot Trail which may cause some environmental impacts.
- Potential impacts to Refinery Park and Beaver Dam Park.
- Potential impacts to City of Calgary Parks lands.
- High costs due to constructing a new bridge across the Bow River.



## Key issues it addresses



Capacity and resulting congestion



Weaving

\$\$\$\$\$ Cost

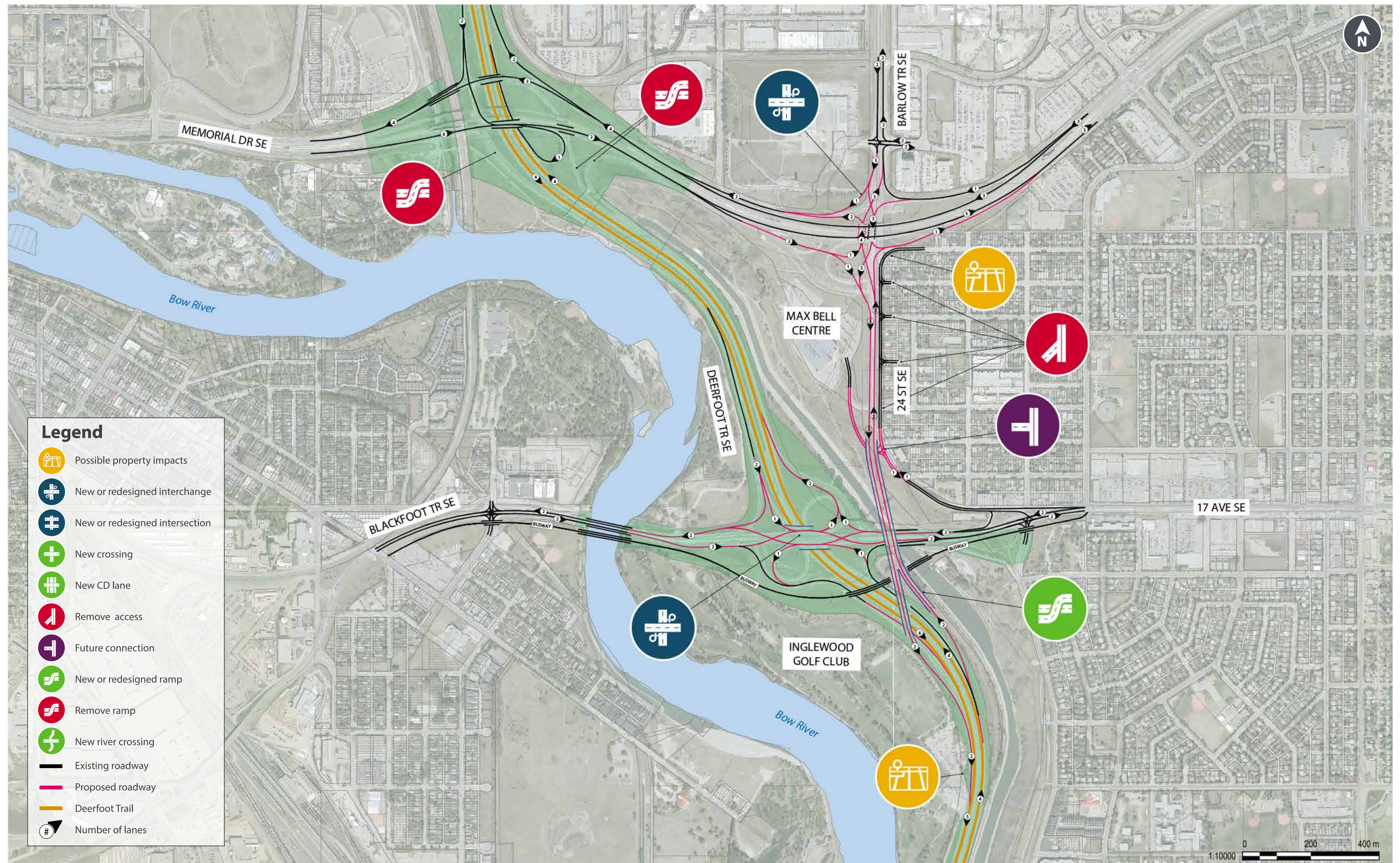
# 17th Avenue S.E./Memorial Drive S.E. (preliminary concept #1)

## Benefits

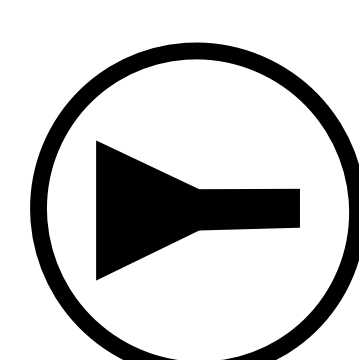
- Addresses high left turn movements by reconfiguring the 17th Avenue interchange into a diverging diamond interchange.
- Addresses high left turn movements by reconfiguring the Memorial Drive and Barlow Trail interchange into a diverging diamond interchange.
- Eliminates weaving between Memorial Drive and 17th Avenue by removing south facing ramps at Memorial Drive.
- Increases capacity along Deerfoot Trail by providing an additional lane in each direction.

## Trade-offs

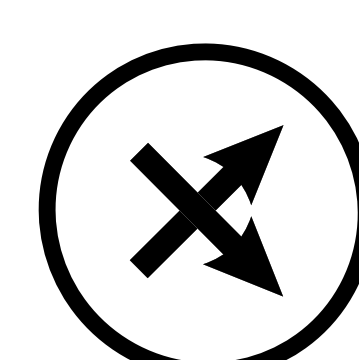
- Potential property impacts to the Inglewood Golf Club by widening Deerfoot Trail.
- Potential impacts to residential properties by reconfiguring the Memorial Drive and Barlow Trail interchange.
- Access to Max Bell Centre is relocated to 17th Avenue.
- Access to 24th Street S.E. from Barlow Trail is removed to avoid closely spaced and potentially unsafe intersections along Barlow Trail.
- Moderate to high costs due to constructing a new connection between Deerfoot Trail South and Barlow Trail and reconfiguring the 17th Avenue and Memorial Drive/Barlow Trail interchanges.



## Key issues it addresses



Capacity and resulting congestion



Weaving

\$\$\$\$ Cost



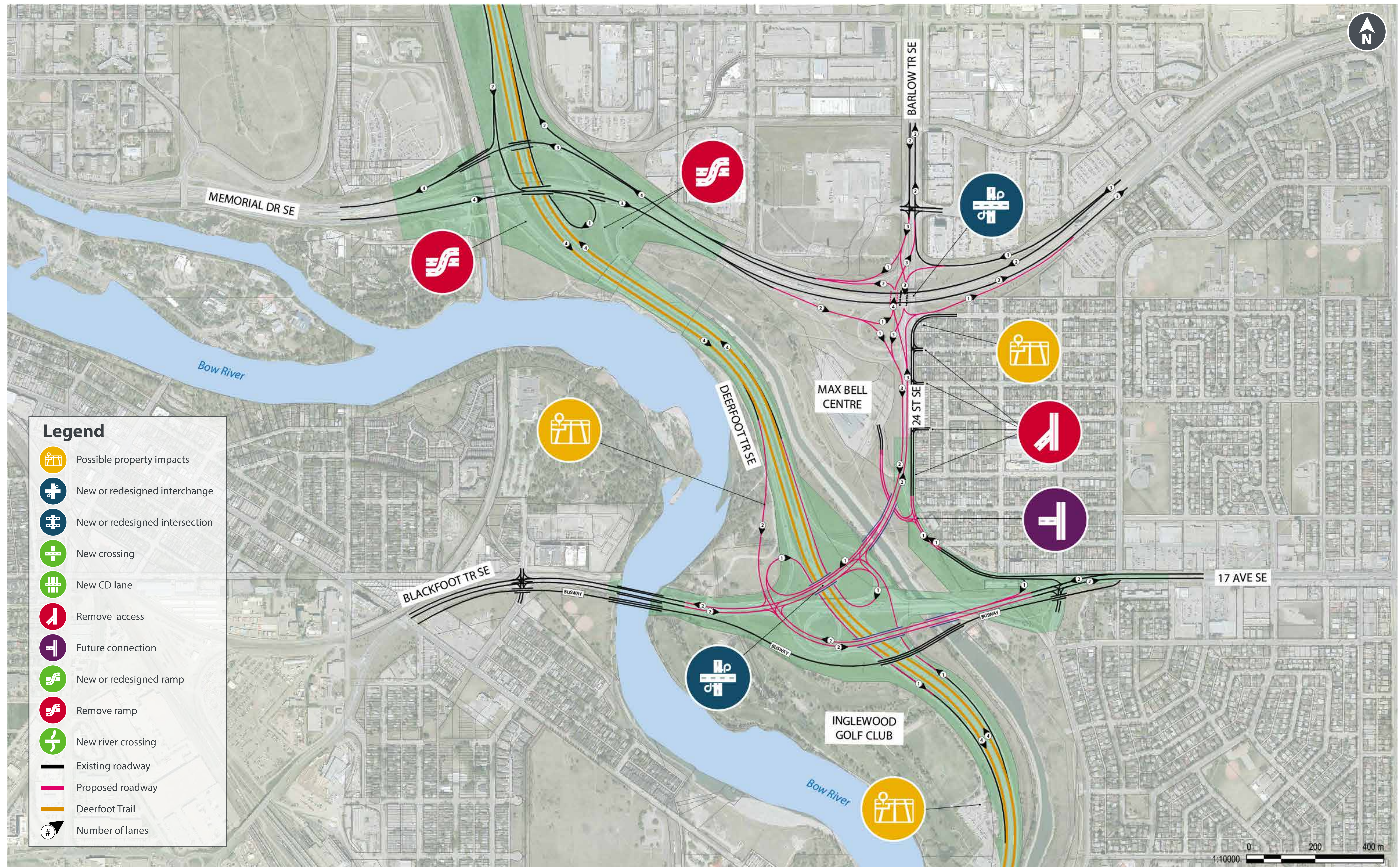
# 17th Avenue S.E./Memorial Drive S.E. (preliminary concept #2)

## Benefits

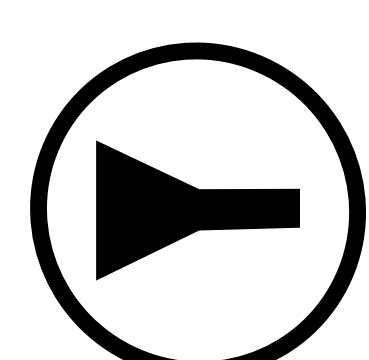
- Provides direct connection between Blackfoot Trail and Barlow Trail by reconfiguring the 17th Avenue interchange.
- Addresses high left turn movements by reconfiguring the Memorial Drive and Barlow Trail interchange into a diverging diamond interchange.
- Eliminates weaving between Memorial Drive and 17th Avenue by removing south facing ramps at Memorial Drive.
- Increases capacity along Deerfoot Trail by providing additional lane in each direction.
- Provides new connection to Barlow Trail from Deerfoot Trail and Blackfoot Trail.

## Trade-offs

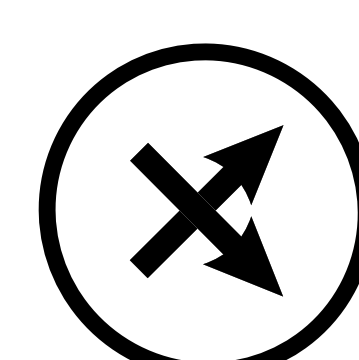
- Potential property impacts to the Inglewood Golf Club and Parks land by widening Deerfoot Trail.
- Potential impacts to residential properties by reconfiguring the Memorial Drive and Barlow Trail interchange.
- Access to Max Bell Centre is relocated to 17th Avenue.
- Access to 24th Street S.E. from Barlow Trail is removed to avoid closely spaced and potentially unsafe intersections along Barlow Trail.
- Moderate to high costs due to constructing a new connection between Deerfoot Trail South and Barlow Trail and reconfiguring the 17th Avenue and Memorial Drive/Barlow Trail interchanges.



## Key issues it addresses



Capacity and resulting congestion



Weaving

\$\$\$\$ Cost

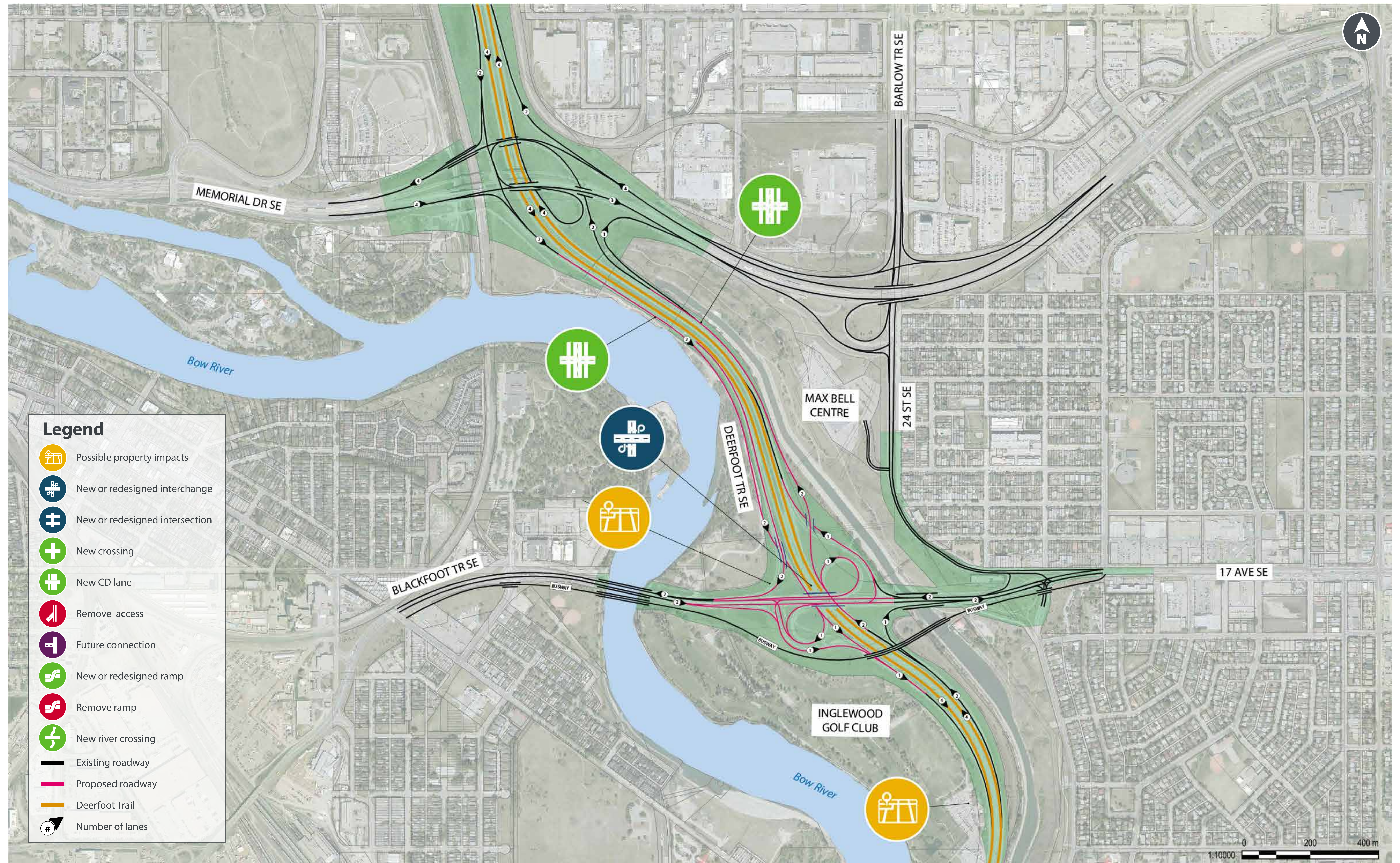
# 17th Avenue S.E./Memorial Drive S.E. (preliminary concept #3)

## Benefits

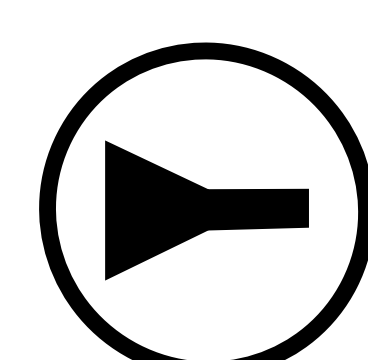
- Eliminates weaving by separating entrance and exit ramps between Memorial Drive and 17th Avenue S.E.
- Increases capacity along Deerfoot Trail by adding another lane in each direction.
- Maintains existing travel patterns and routes between Blackfoot Trail, 17th Avenue S.E., Memorial Drive and Deerfoot Trail.
- No impacts to Bow River.

## Trade-offs

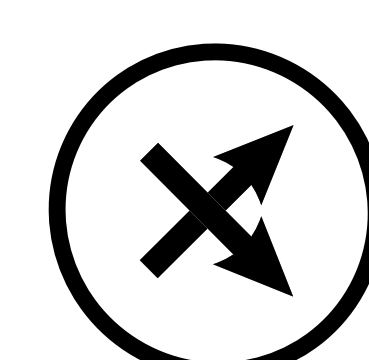
- Potential property impacts to the Inglewood Golf Club by widening Deerfoot Trail.
- Potential impacts to City of Calgary Parks lands in the northwest quadrant of the 17th Avenue S.E. interchange.
- Potential impacts to Western Irrigation District Canal.
- Moderate costs due to constructing new overpass to separate the entrance and exit ramps between Memorial Drive and 17th Avenue S.E. as well as reconfiguring the 17th Avenue S.E. interchange.



## Key issues it addresses



Capacity and resulting congestion



Weaving

\$\$\$ Cost

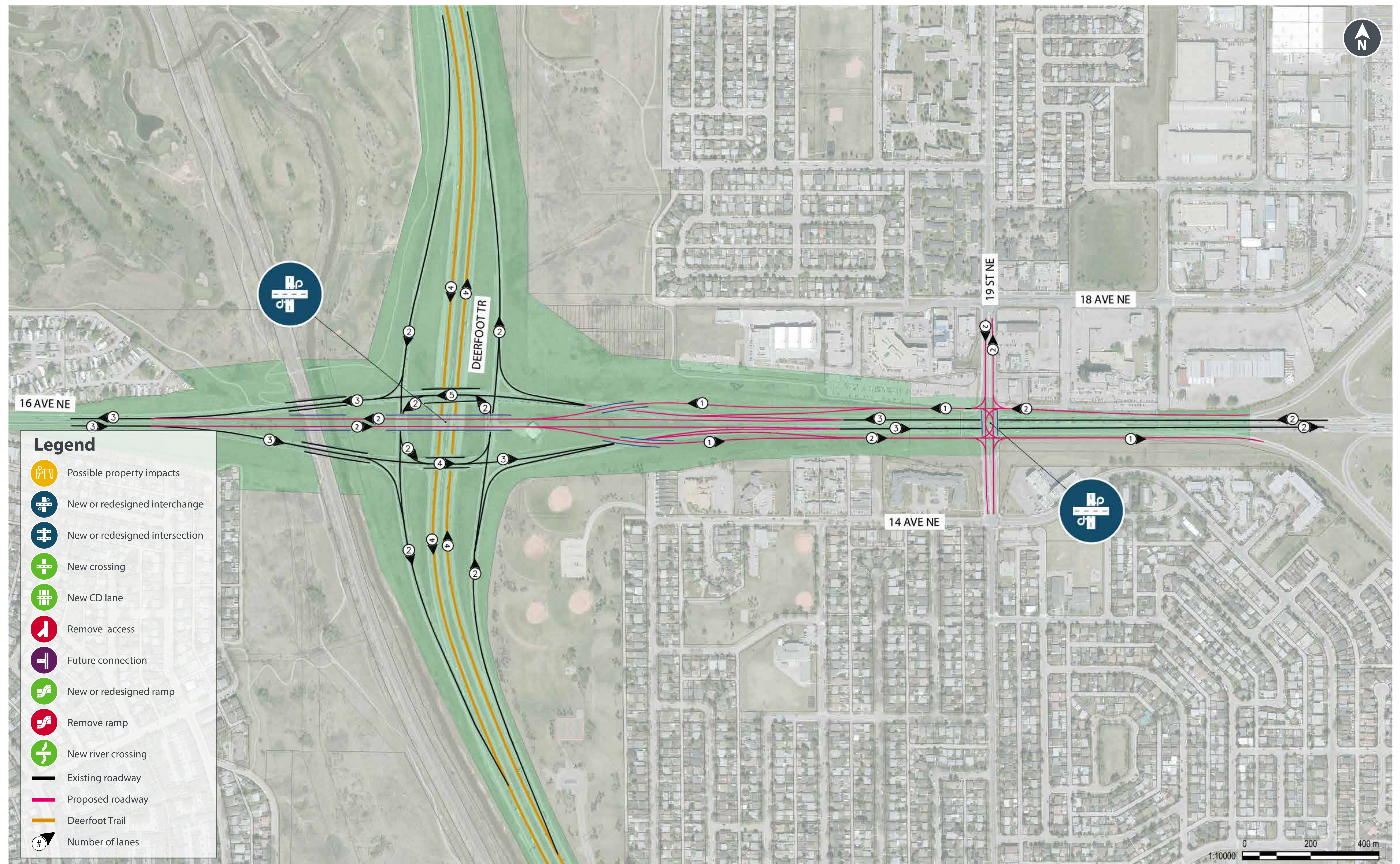
# 16th Avenue (preliminary concept)

## Benefits

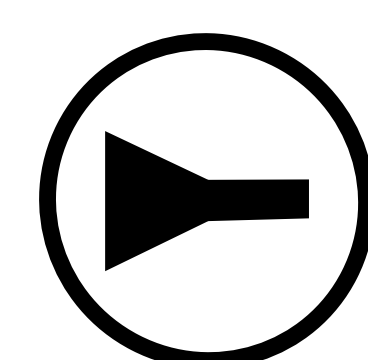
- Reduces weaving and the resulting congestion between 19th Street N.E. and Deerfoot Trail by grade separating entrance and exit ramps
- Increases capacity of the 16th Avenue N.E. and Deerfoot Trail interchange by adding a new bridge crossing for east/west through traffic.
- Improves operations at 16th Avenue N.E. and 19th Street N.E. by constructing a new interchange to replace the existing signalized intersection.

## Trade-offs

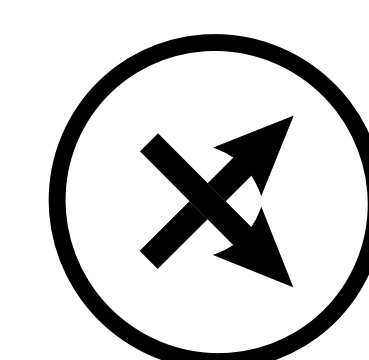
- Significant costs as several new bridge structures are required at the 16th Avenue N.E./Deerfoot Trail interchange and at the proposed 19th Street N.E. /16th Avenue N.E. interchange.



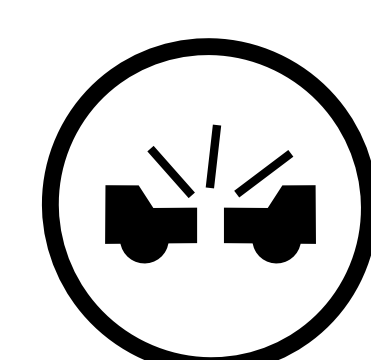
## Key issues it addresses



Capacity and resulting congestion



Weaving



Safety

\$\$\$\$\$ Cost

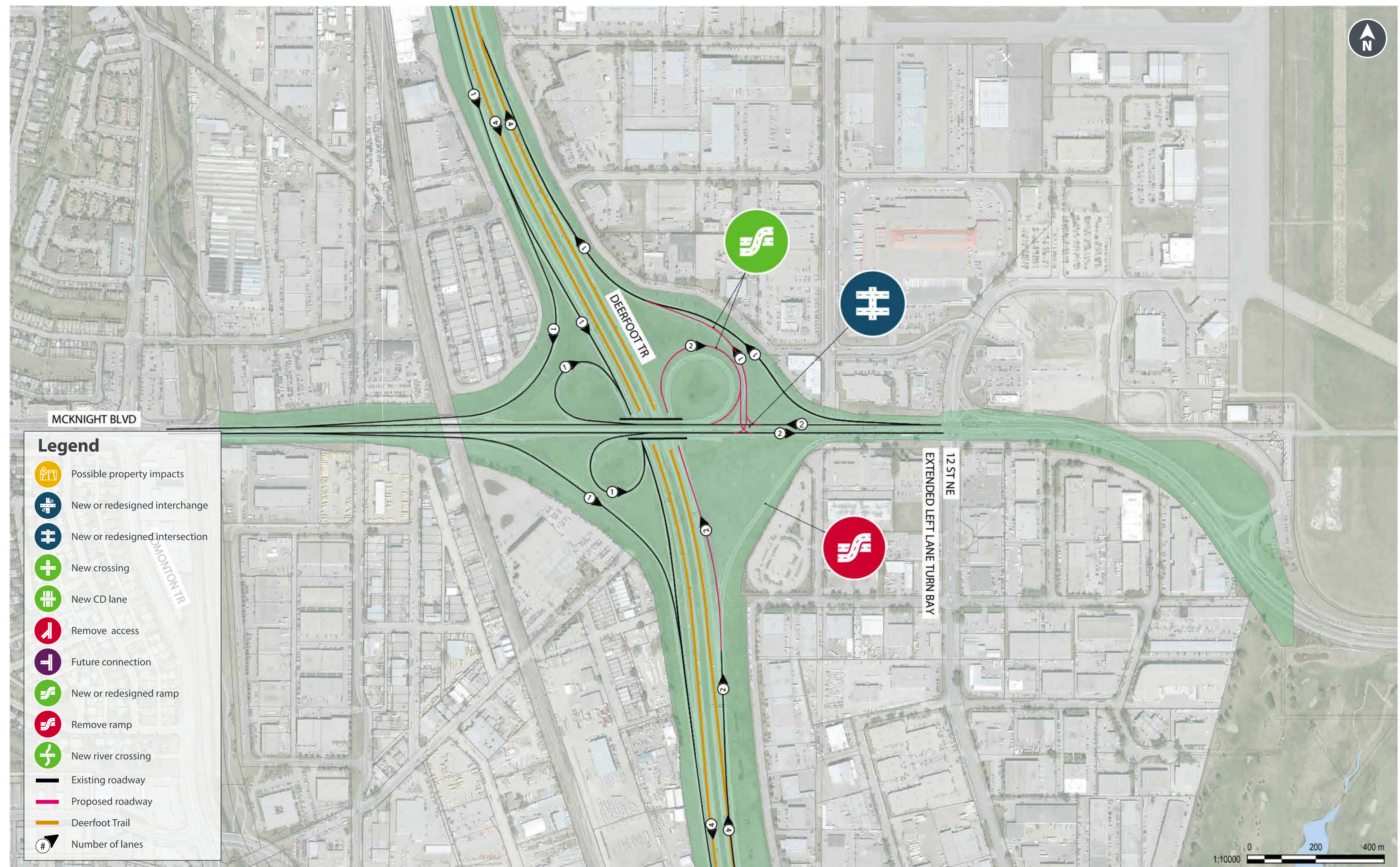
# McKnight Boulevard N.E. (preliminary concept)

## Benefits

- Moves northbound right vehicles turning left at 12th Street N.E. onto the appropriate side of McKnight Boulevard, resulting in less weaving.
- Allows for the extension of the eastbound left turn lane at 12th Street N.E.

## Trade-offs

- A new traffic signal will control northbound right movement rather than allowing free-flowing traffic.



## Key issues it addresses



\$\$ Cost

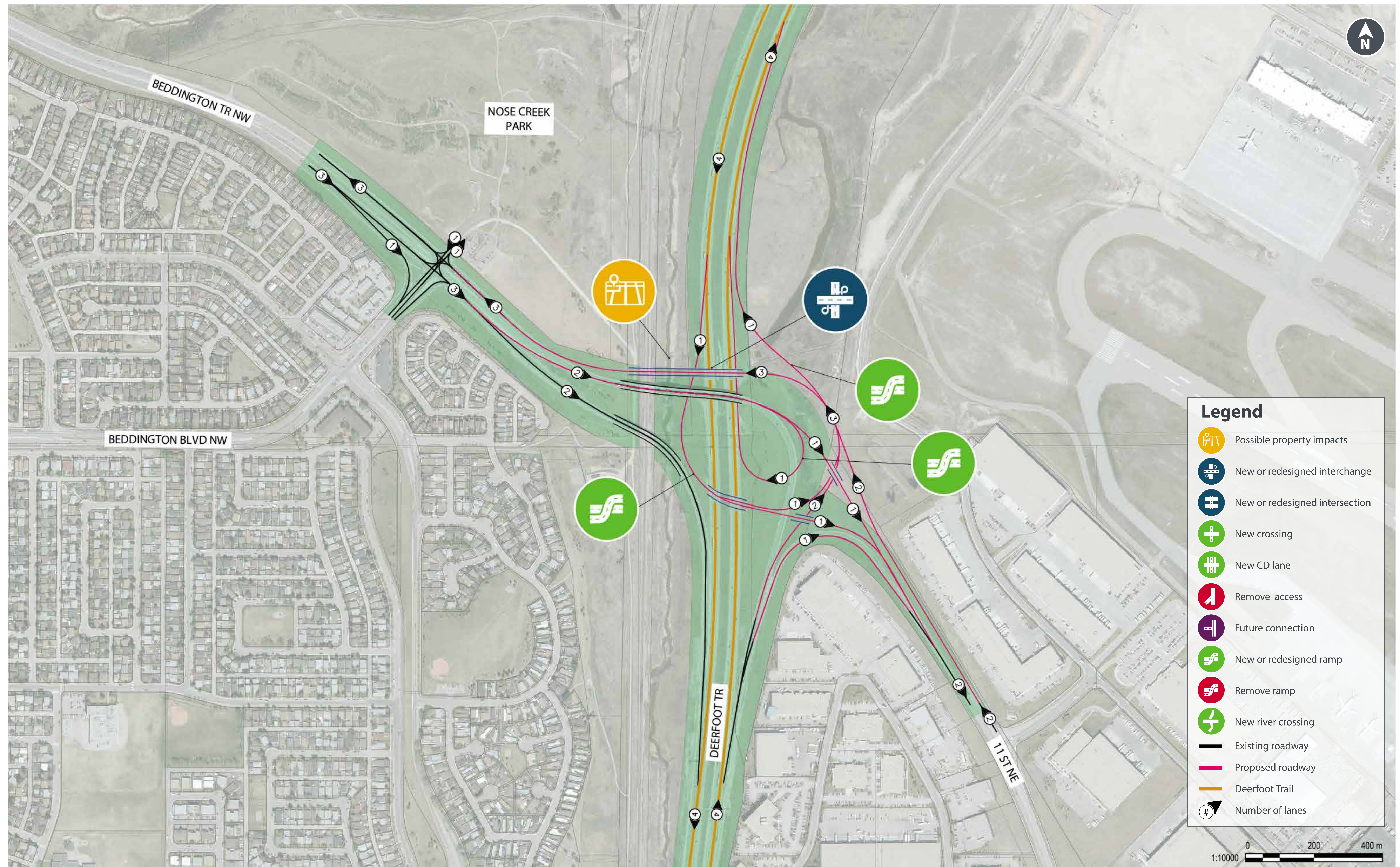
# Beddington Trail N.E. (preliminary concept)

## Benefits

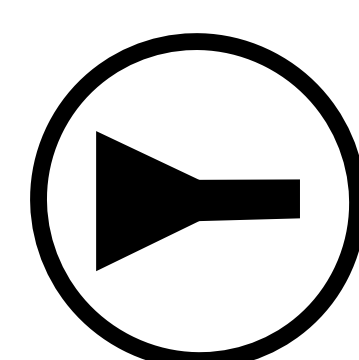
- Provides connection between Beddington Trail and 11th Street N.E., reducing traffic on Deerfoot Trail. (900+ vehicles are forecasted to use this proposed east/west connection during peak hours by the long-term planning horizon (2048).
- Reduces weaving northbound on Deerfoot Trail due to the large amount of commuter, industrial and airport delivery traffic between McKnight Boulevard and Beddington Trail being diverted to this new connection.
- Improved access to residential communities and industrial areas

## Trade-offs

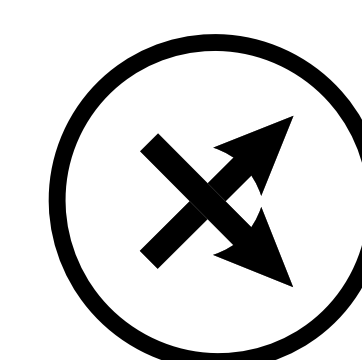
- Potential impacts to the Nose Creek Park including the creek itself and adjacent wetlands.
- High costs due to constructing a new bridge across the Deerfoot Trail, rail line and Nose Creek Park as well as constructing new ramps for the Beddington Trail/11th Street N.E. connection.



## Key issues it addresses



Capacity and resulting congestion



Weaving

\$\$\$\$\$ Cost

# In Phase 4, the project team will present the preferred concepts and ideas to:

## 1. Improve walking and biking connections

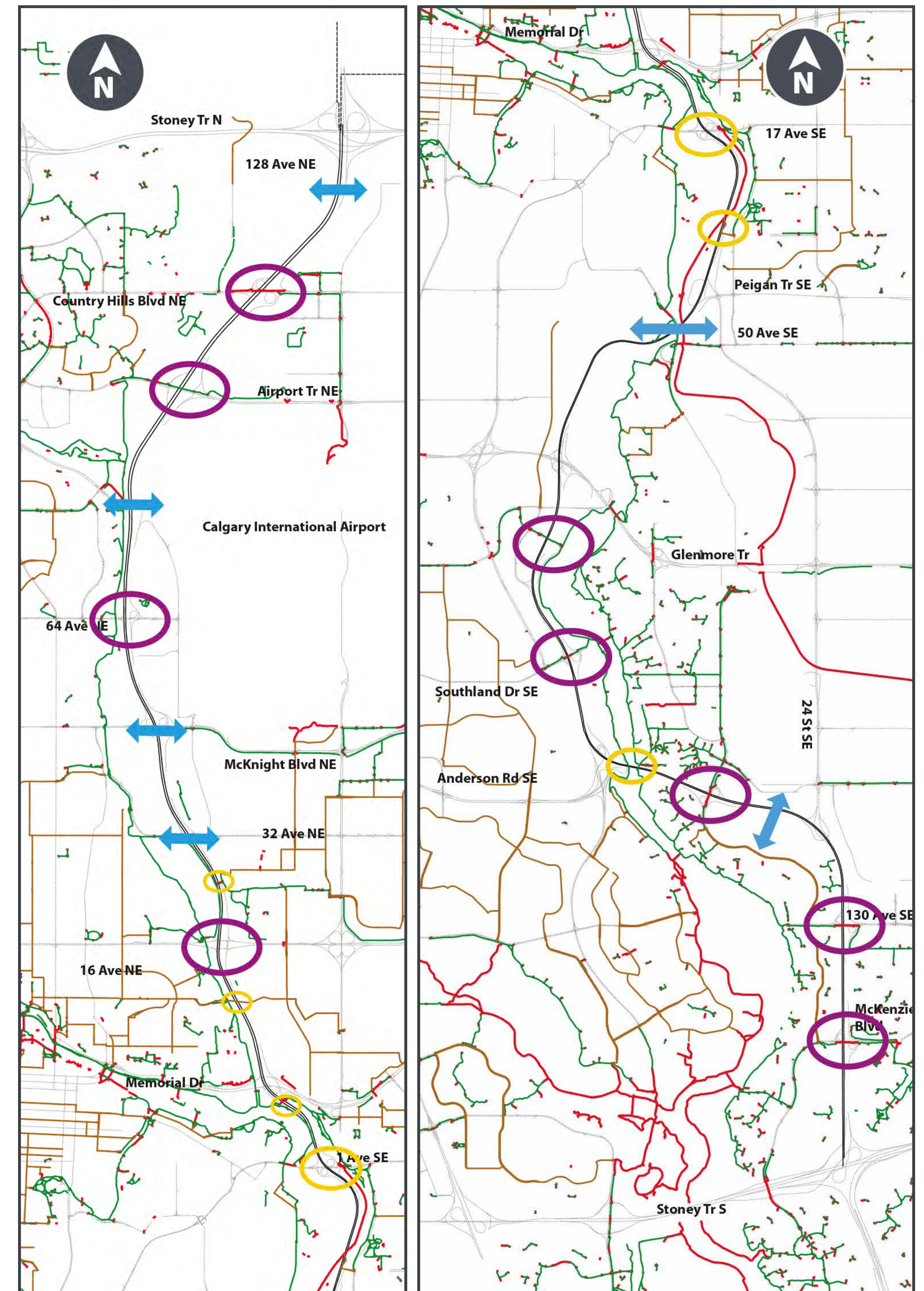
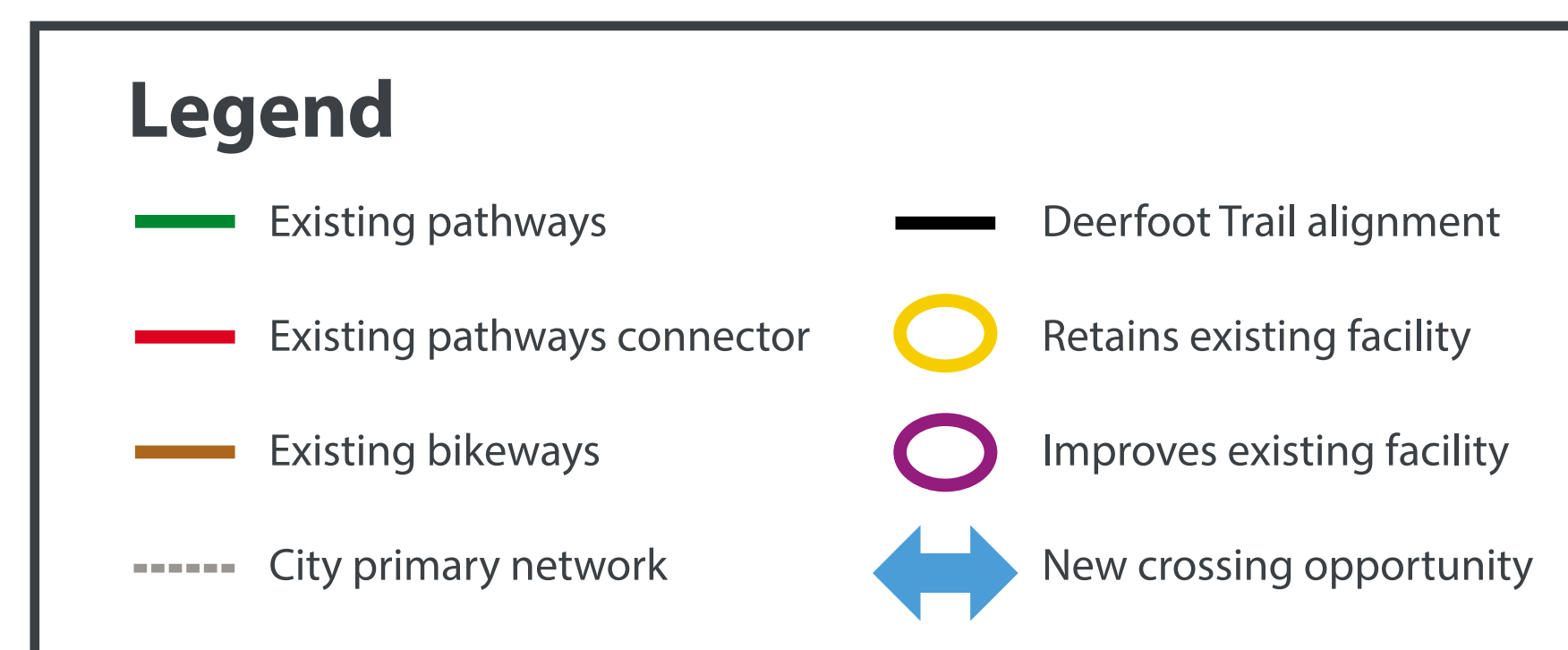
- Potential locations for new active transportation crossing and for existing active transportation crossing upgrades are currently being considered.
- The recommendations for additional and/or improved active transportation facilities within or across the corridor will be made when the project team identifies a set of preferred corridor improvement options.

## 2. Improve transit service

- If the HOV lane option is chosen, the added capacity provides travel time benefits for transit and other buses using the corridor.
- The study team is also currently exploring other HOV priorities measures such as direct ramps from the proposed median HOV lanes at key interchanges.
- Improved interchange operations will in turn improve east-west traffic flow on many of the east-west arterials crossing the Deerfoot Trail corridor. Existing transit services using these east-west arterials will also benefit with travel time savings and improved reliability.

## 3. Technology

- The study team is also investigating the further use of technology along the corridor to improve safety, travel time reliability and traveler information.
- Intelligent Transportation Systems (ITS) applications such as queue warning systems, automated incident detection systems and additional travel time/speed advisory signs are currently being considered.
- The most appropriate applications will be recommended as part of an overall package of future corridor improvements.



# Multiple Account Evaluation (MAE)

## Criteria

There are four main accounts that make up the MAE. Each has specific criteria the project team will analyze in Phase 4.

Each of the preliminary long-term concepts are evaluated using the MAE. The results along with public input will inform the preferred concept selection.





**Customer service**

- Travel time savings
- Vehicle operation cost savings
- Road safety
- Accommodating pedestrian, cycling and transit service facilities
- Constructability and maintenance of traffic
- Traffic operations
- Rail impacts




**Socio-community**

- Property impacts (residential and commercial)
- Special areas (agricultural, parks, schools, institutions and heritage properties)
- Visual impacts
- Noise impacts
- Emergency service accessibility



**Environmental**

- Aquatic impacts
- Terrestrial impacts
- Sensitive land impacts
- Air quality and vehicle emissions



**Financial performance**

- Capital costs
- Operation and maintenance costs
- Salvage costs
- Property costs
- Benefit-cost ratio and net present value (NPV)



# Thank you for participating

Your input, along with our continued technical review will help us identify a set of final recommendations to present to Calgarians in 2020.

**Stay informed. Have your say.** Provide input on the preliminary concepts between October 30 and November 25 at [calgary.ca/deerfoot](https://calgary.ca/deerfoot). You can also sign up for project updates emailed to your inbox.