Calgary

Deerfoot Trail Study

December 2020

Contents

Introduction

The City of Calgary and Alberta Transportation are pleased to present the final recommendations of the Deerfoot Trail Study.

The principal role of the Deerfoot Trail within The City of Calgary is to provide an efficient, reliable, and safe connection for motor vehicle traffic and goods movement within, to, and from the city.

The purpose of the Deerfoot Trail Study is to review and develop short-, medium- and long-term recommendations to enhance safety and mobility for all users, and improve and optimize overall operations throughout the corridor and adjacent network.

The study outcome is a long-term corridor plan for Deerfoot Trail that describes the recommended improvements to Deerfoot Trail to address current and future traffic needs. This is done by improving safety, mobility, and accessibility for all transportation modes though innovative traffic demand management techniques, targeted infrastructure improvements, and the expansion of various technology applications.

The recommendations for the long-term corridor plan are consistent with The City of Calgary's Transportation Plan.

In addition to describing the recommended improvements to the Deerfoot Trail corridor, this document provides a general overview of the study process which involved a comprehensive technical program and multiple engagement events with key stakeholders and city residents.

These key activities and analysis applied during the final phase of the study have led to the key recommendations and priorities.

"The study outcome is a long-term corridor plan for Deerfoot Trail that describes the recommended improvements to Deerfoot Trail to address current and future traffic needs."

Background and Fast Facts

The long-term Deerfoot Corridor Study:

- Is a joint initiative between The City of Calgary and Alberta Transportation.
- Reviews Deerfoot Trail between Stoney Trail North and Stoney Trail South.
- Covers approximately 35 kilometres of urban freeway.
- Includes 18 existing interchanges and one future interchange at 128 Street S.E.
- Looks at increasing capacity, reducing travel times and improving safety along the corridor.
- Plans for 30 years into the future to determine the amount of space (i.e. right-of-way) that may be required to accommodate all transportation needs including new connections, increased capacity, and active transportation improvements.
- Identifies multiple improvements throughout the corridor and recommends a potential phased approach including some short-, medium- and long-term improvements.

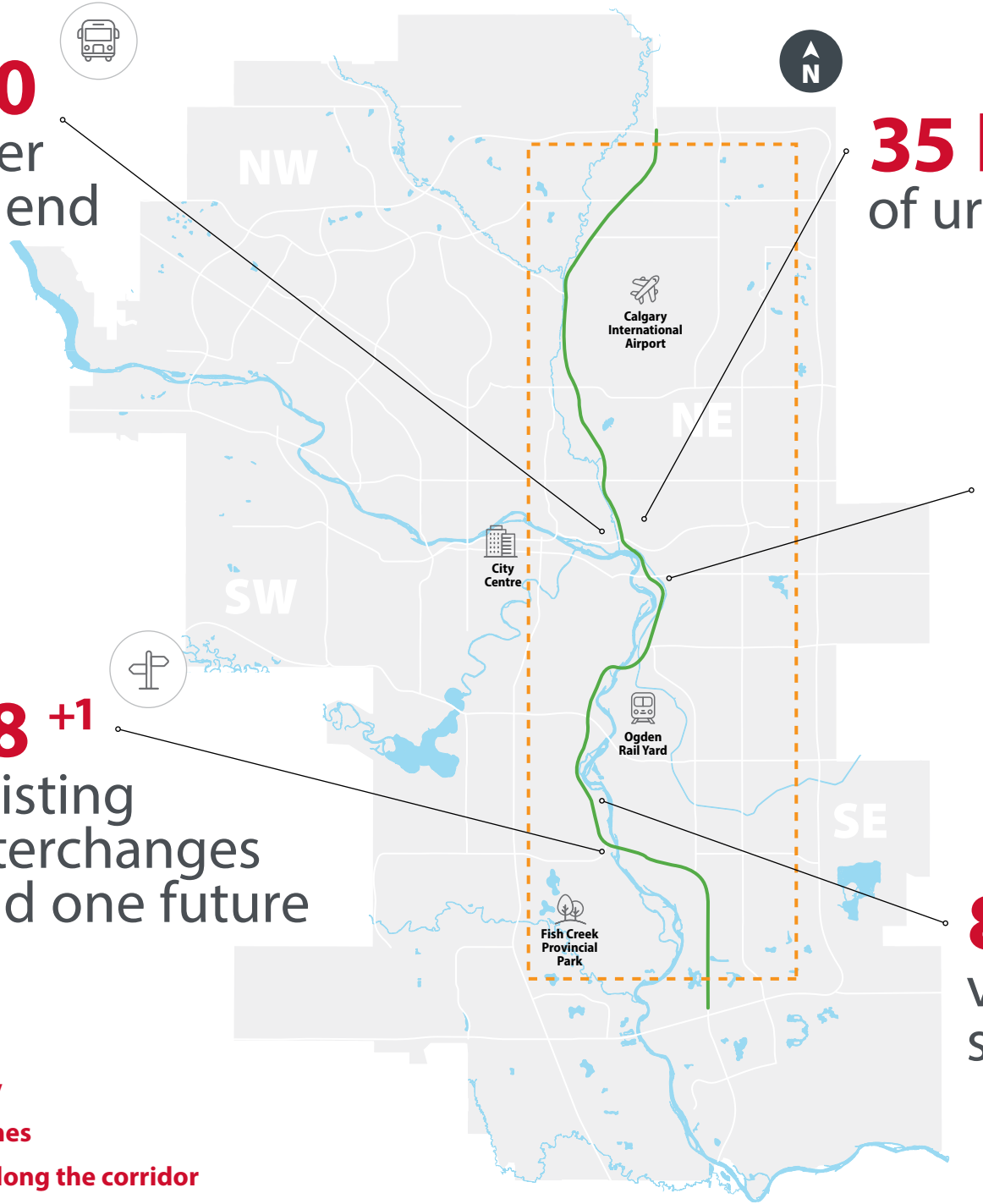
Fast facts about Deerfoot Trail:

- 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 of the corridor to approximately 170,000 vehicles per day north of Memorial Drive.
- Deerfoot Trail is the only route, other than Stoney Trail, providing a continuous north-south connection across the city and the only north-south skeletal road serving central and east Calgary.

Deerfoot Trail is part of the Primary Goods Movement network and is classified as a skeletal road in the Calgary Transportation Plan.

170,000
vehicles per day north end

35 km
of urban freeway



30-year
plan for the future

18 +1
existing interchanges and one future

83,000
vehicles per day south end

- **Increasing capacity**
- **Reducing travel times**
- **Improving safety along the corridor**

Study Goals, Objectives and Outcomes

The Study Goals

- Improve freeway operations and safety on Deerfoot Trail.
- Improve air quality and reducing vehicular emissions as part of The City's goal to reduce greenhouse gas emissions, and reduce the time needed to travel to and within the corridor.

The Study Objectives

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

Outcomes

The goals and objectives of the study were met, with a development of long-term corridor plan that will form the basis for the short-term and medium-term improvements.

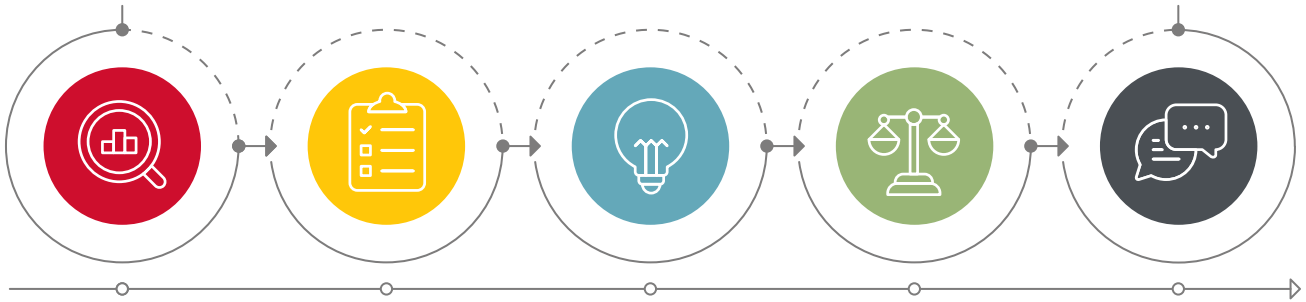
An implementation strategy **(outlined in section 11)** lays out the priorities through the short and medium terms to ultimately achieve the overall recommendations associated with the long-term corridor plan.

It should be noted that many of the recommended improvement options will be further refined and may change when they are advanced to subsequent design phases.

Recommend safety and mobility improvements for people who drive and take transit. — STUDY OBJECTIVE

Study Phases and Timeline

The study was conducted over five phases as shown in the figure below. The information presented in this discussion guide represent the outcomes of Phase 4 and the final activities under Phase 5.



Phase 1

Existing and Historical Conditions
- Develop overall framework for the study delivery
- Establish study context
- Collect relevant data

Phase 2

Problem Definition
- Define existing and future problems and deficiencies

Phase 3

Option Generation
- Develop concepts at key interchange locations and corridor options
- Preliminary option performance assessment

Phase 4

Option Evaluation and Refinement
- Evaluation of options
- Information to support a preferred corridor recommendation

Phase 5

Reporting
- Final recommendation
- Option refinement
- Implementation strategy

The final phase is an implementation strategy to determine the priority of the components of the long-term plan.

The key elements of each phase are described as follows:

Phase 1:

Existing and Historical Conditions

This phase involved developing the overall framework for the study delivery including the planned activities and schedule for each phase. Key activities of this phase included:

- Research to understand study context
- Data collection
- Stakeholder and public engagement

Phase 2:

Problem Definition

This phase involved extensive analysis to identify issues within the corridor for both the existing and future planning horizon. Key activities of this phase included:

- Review of existing corridor conditions
- Future traffic demand forecasts for the established 2048 planning horizon
- Safety analysis of historical collision data
- Review of active transportation facilities and identification of gaps or deficient connectivity
- Problem Definition Report identifying the key corridor issues
- Stakeholder and public engagement

Phase 3:

Option Generation

This phase involved developing various mitigation measures to address the corridor deficiencies identified in the previous study phase. Key activities of this phase included:

- Developing the "tool box" of potential corridor improvements and the formation of corridor applicable strategies
- Assessing the corridor strategies and the development of key concepts based on the results of the assessment
- Concept screening and development of more detailed improvement options at key locations along the study corridor
- Defining option packages that include traffic infrastructure, active transportation improvements, and technology applications
- Stakeholder and public engagement

Phase 4:

Option Evaluation and Refinement

This phase involved evaluating the options. Key activities of this phase included:

- Developing the evaluation framework to match the study objectives and corridor context
- Detailed analysis of each option package
- Refining options through feedback from the initial evaluation analysis
- Stakeholder and public engagement

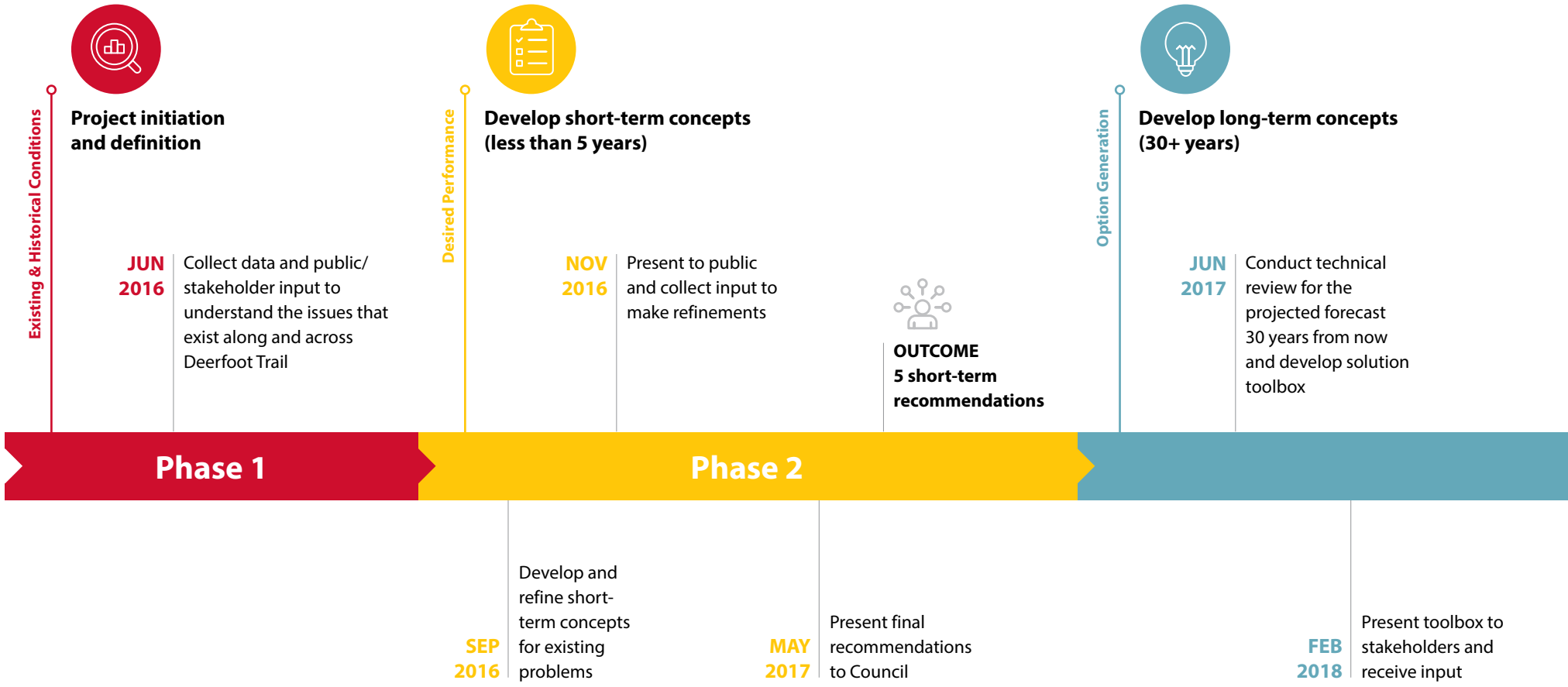
Phase 5:

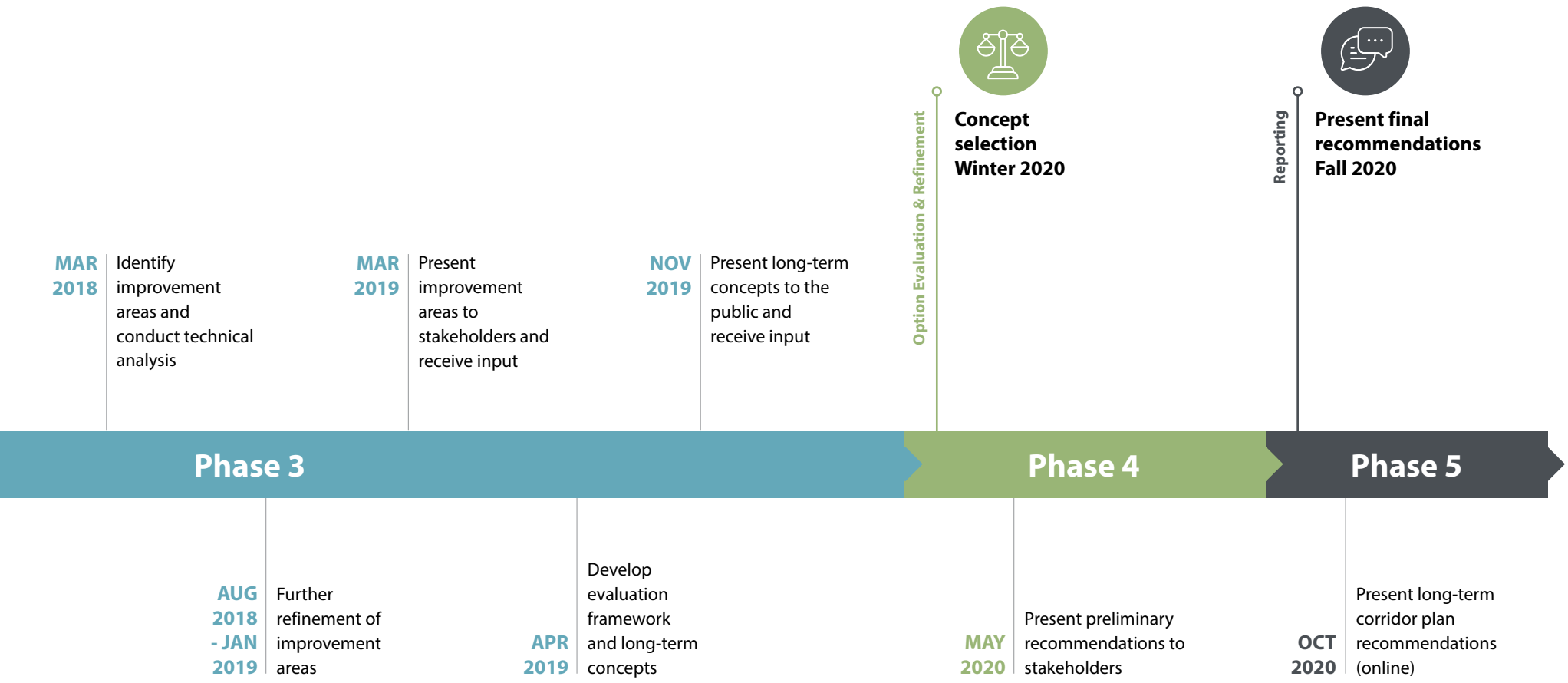
Report

This final phase of the study involved documenting the findings from Phase 4. Key activities of this phase included:

- Value engineering to identify refinements to the recommended long-term corridor plan
- Developing an implementation strategy to determine the priority of the various components of the long-term corridor plan for potential phased implementation over the short and medium terms
- Documenting the study process and findings
- Share study findings and overall recommendations

Study Phases and Timeline

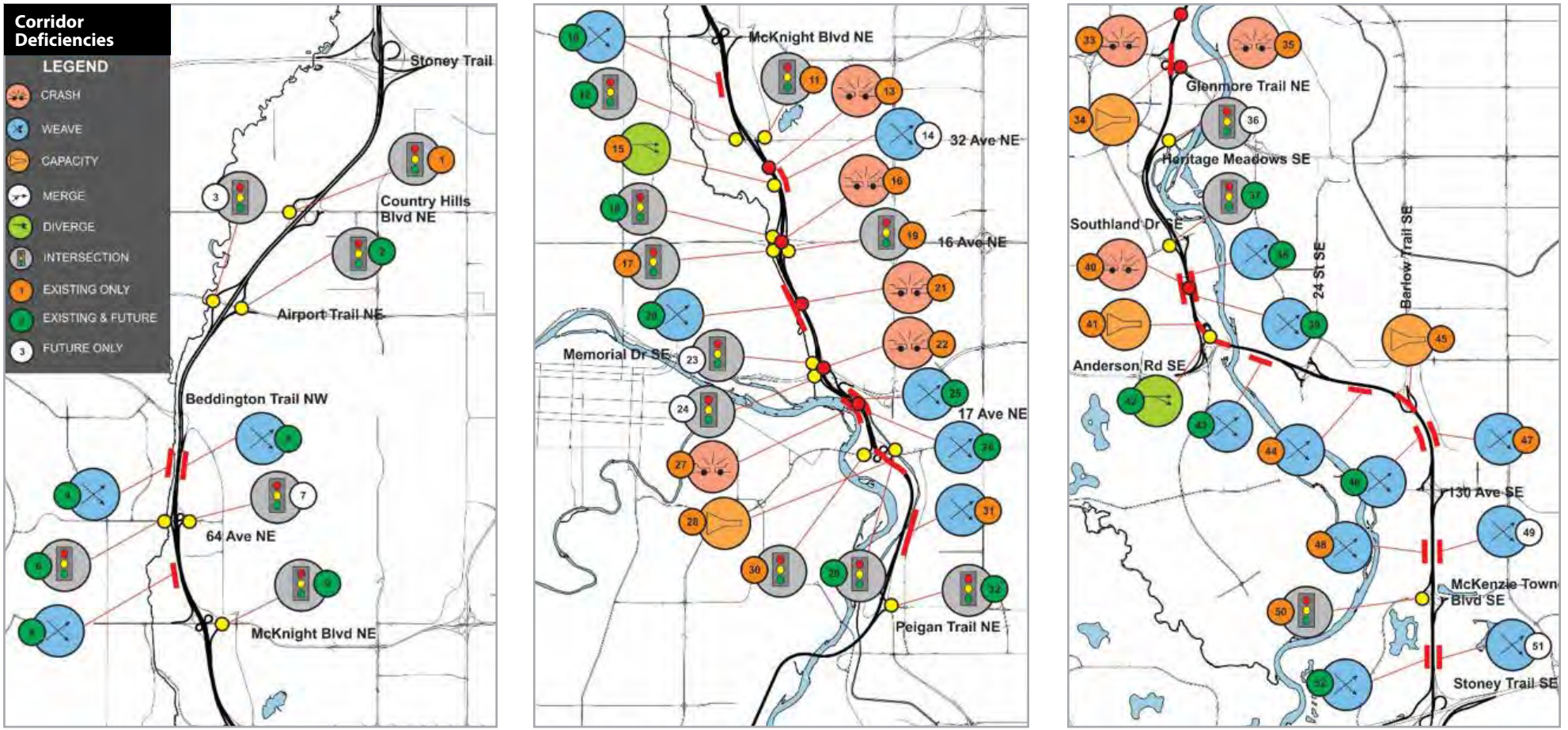



MAR 2018
Identify improvement areas and conduct technical analysis
MAR 2019
Present improvement areas to stakeholders and receive input
NOV 2019
Present long-term concepts to the public and receive input
Option Evaluation & Refinement
Concept selection Winter 2020
Reporting
Present final recommendations Fall 2020
Phase 3
Phase 4
Phase 5
AUG 2018 - JAN 2019
Further refinement of improvement areas
APR 2019
Develop evaluation framework and long-term concepts
MAY 2020
Present preliminary recommendations to stakeholders
OCT 2020
Present long-term corridor plan recommendations (online)

Identifying Challenges

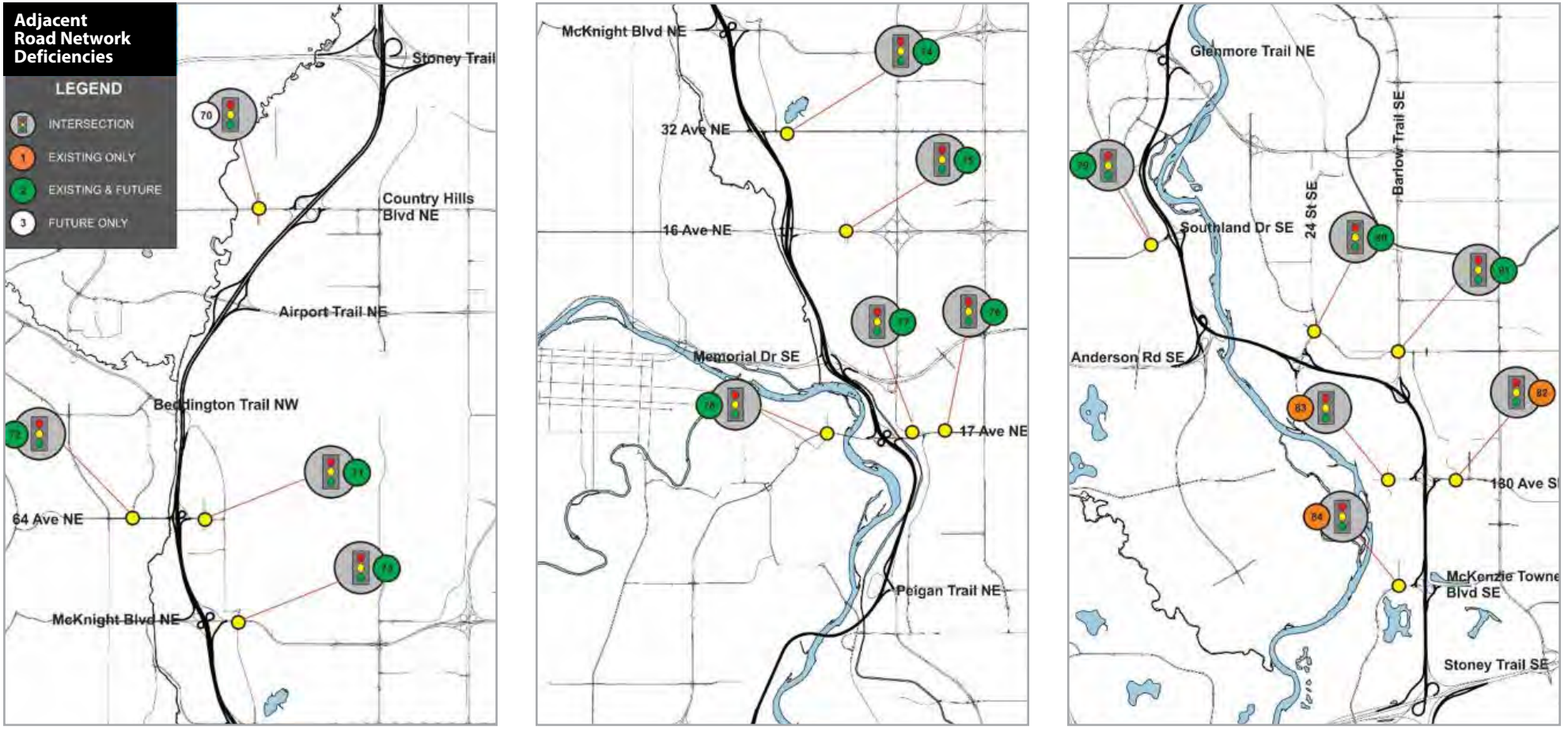
Extensive technical analysis was conducted along the entire length of the study corridor to identify safety issues, and issues affecting the operating performance of the highway and adjacent road network. This technical analysis was conducted in both the context of present day and for the 30-year planning horizon.

Figure A: Corridor Deficiencies (Existing and Future Conditions)



The findings from this technical analysis are shown in **Figure A** for the corridor and in **Figure B** for the adjacent road network. The legend illustrates the types of issues along with the time frames in which the issues were identified.

Figure B: **Adjacent Road Network Deficiencies (Existing and Future Conditions)**



What We Heard, What We Did

Over the course of this study, in previous engagement activities, significant feedback was received from the public and stakeholders. The following table summarizes the key "What We Heard" themes during the Phase 1 engagement process, as well as "What We Did" actions that were subsequently undertaken through Phase 2 and Phase 3.

What We Heard	What We Did
Single Occupancy Vehicles: People travel alone on Deerfoot Trail between 3 and 7 p.m. to commute to and from work.	Developed concepts that address travel demand during the peak periods and encourage carpooling and transit.
Reliability: Most drivers experience delays along the study area most of the time.	Developed concepts that improve capacity along the corridor to address bottleneck points. Reconfigured interchanges to address traffic operation concerns.
Congestion: The route most travelled is from Stoney Trail South to Glenmore Trail, while the most congested segment is McKenzie Lake Boulevard to Glenmore Trail.	Developed concepts that improve capacity along the corridor to address bottleneck points. Reconfigured interchanges to address traffic operation concerns.
Safety: Those who don't use Deerfoot Trail said it was because they don't feel safe on the road.	Developed concepts that address safety issues by reconfiguring infrastructure. Further analysis is being conducted to develop additional mitigation measures.
Satisfaction: People are most satisfied with signage and traveler information and are least satisfied with duration of travel times and reliability.	Developed concepts to improve travel times and reliability.
Importance: Efforts to clear collisions and stalls is the most important factor while the least important factor is visual appeal and appearance.	Investigated Intelligent Transportation Systems (ITS) to improve incident management activities and operations.
Staging: Improve 17th Avenue S.E. and Anderson Road first.	Determined the long-term plan and providing recommendations to prioritize implementation.
Top Issues: Lane reduction, poorly designed on and off ramps, poorly designed interchanges and congestion.	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.

What We Heard, What We Did

The last engagement process was conducted in the Fall of 2019 at the end of Phase 3. Feedback from the public and stakeholders is summarized in the following table under the "What We Heard" column. The subsequent actions undertaken by the study team are listed under the "What We Did" column.

What We Heard	What We Did
High Priority Staging: Identified as high-priority interchanges: Glenmore Trail S.E.	An implementation strategy was developed that prioritizes the delivery of the various recommendations over the short-, medium- and long-term time frames of the 30-year corridor improvement plan. Given the importance of the Glenmore Trail interchange and supporting data, these improvements have been advanced to an early implementation phase.
Low Priority Staging: Identified as low priority interchange: 50th Ave & Peigan Trail.	An important element of the Deerfoot Trail Corridor Plan was identifying which interchanges to prioritize. The 50 Avenue Connector is recommended for delivery in a later phase as other priorities were identified.
Additional Problem Identification: Challenges and issues shared on the entire Deerfoot Trail corridor from North to South in its current state.	Most of the challenges and issues identified through the technical analysis aligned with the issues shared by the public and stakeholders.

What We Heard	What We Did
General Agreement on Overall Concept(s): Beddington Tr N.E. / McKnight Blvd N.E / 16th Ave N.E. / 17th Ave & Memorial S.E. (all concepts) / 50th Ave & Peigan Trail / Glenmore Trail S.E / Anderson Rd & Bow Bottom Trail	Further refinements were made to several concepts during the evaluation process. These concepts have remained consistent with the initial concepts presented in the fall of 2019.
Additional Suggestions to the Draft Concepts: Beddington Tr N.E. / McKnight Blvd / 16th Ave N.E. / 17th Ave & Memorial S.E. (all concepts) / 50th Ave & Peigan Trail /Glenmore Trail S.E / Anderson Rd & Bow Bottom Trail	Further refinements were made to several concepts during the evaluation process. These concepts have remained consistent with the initial concepts presented in the fall of 2019. Many of the recommended improvement options will be further refined when they are advanced to subsequent design phases closer to construction.
General Disagreement on Overall Concept: Beddington Tr N.E. / McKnight Blvd/ 16th Ave N.E.	Upon review, the configuration of these concepts remained consistent with the initial concepts presented in the fall of 2019 due to continued support from the technical analysis. Some refinements were made.

What We Heard	What We Did
Traffic Lights Disagreement Proposed in the Draft Concept: 16th Ave N.E	The concept separates the through traffic on 16 Avenue from the interchange traffic which was found to provide significant benefits for traffic along 16 Avenue and Deerfoot Trail. Analysis of other options was undertaken in a previous study conducted in 2015 specifically for the 16 Avenue corridor, and the best performing option stemming from the evaluation process is presented in this study.
Concept-Specific Benefits Identified: Anderson Rd & Bow Bottom Trail	Rigorous technical analysis was conducted for the three concepts under consideration for the Anderson Road / Bow Bottom Trail interchange – a key focus area along the study corridor. The best performing interchange configuration was selected as part of the long-term corridor plan for Deerfoot Trail.

Developing Improvement Options

The development of improvement options for the Deerfoot Trail corridor involved a three-stage process to assess, screen, and evaluate various corridor improvements to address numerous deficiencies identified along the entire length of the study corridor.

The three stages were:

- Stage 1: Strategy Assessment
- Stage 2: Concept Screening
- Stage 3: Option Package Evaluation

This three-stage process is shown in ***Figure C*** (Page 19). It involves progressively more detailed analysis as the strategies are narrowed down toward defining concepts and subsequent option packages.

In the first stage, **Strategy Assessment,** improvement strategies were developed using a "toolbox" of traffic infrastructure-related corridor improvement such as additional highway capacity, high occupancy vehicle lanes, and new connections in the adjacent road network.

The strategies, based on corridor-wide themes, only included significant improvements that would result in changes in traffic demand and assignment within the corridor and adjacent road network.

These strategies were then assessed to determine which strategies/themes provide the most improvements to the corridor with respect to a set of high-level assessment criteria.

In the second stage, **Concept Screening,** the findings from the first stage were used to develop new concepts which included combining improvements from the original strategies to create concepts or hybrids as well as adding other improvements at specific areas along the corridor.

These concepts were then screened using a larger set of assessment or criteria to determine which concepts are feasible while providing positive changes in the performance of the highway.

Between the **Concept Screening** and the **Option Package Evaluation** stages, a round of public and stakeholder engagement was conducted to obtain input on the concepts under consideration.

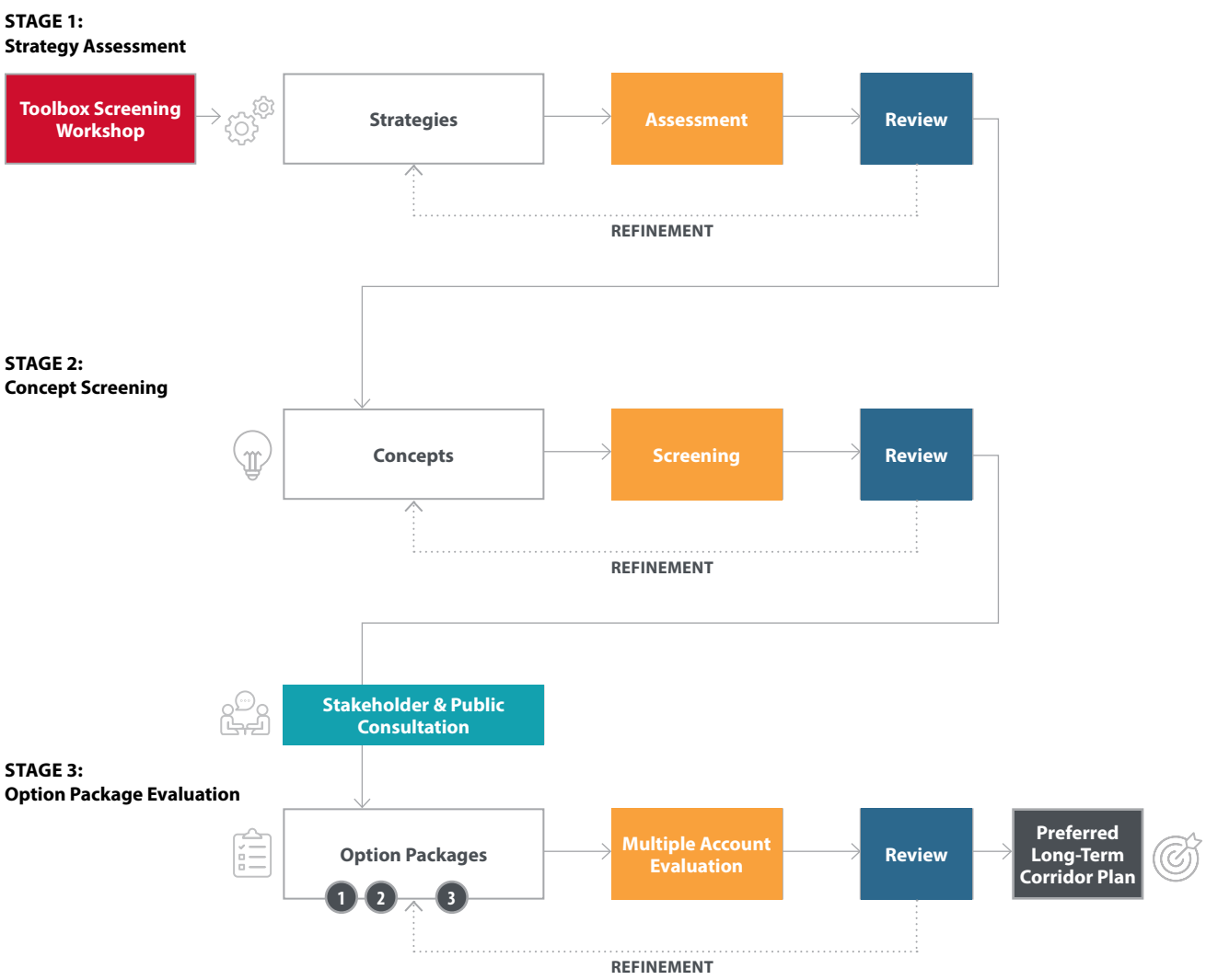
This feedback allowed for further refinements prior to moving forward with formation of the final set of option packages.

Based on the findings from stage two, the third and final stage, **Option Package Evaluation,** involved repackaging the most feasible and promising improvements by combining improvements identified to create three separate option packages.

Other more detailed and focused improvements were also added to these options packages to address specific traffic operations or safety-related deficiencies.

These final set of option packages were subsequently subjected to the full Multiple Account Evaluation process. In addition, active transportation improvements were included in the final set of option packages along with several technology applications that were identified to assist in improving traffic safety, traffic operations, and corridor reliability.

Figure C: Option Generation / Development Process



Feedback allowed for further refinements prior to moving forward with formation of the final set of option packages.

Option Packages

Through the final stage of option generation, three option packages were defined with the basis of each package being one of the three being considered in the Southland Drive interchange to Anderson Road/Bow Bottom Trail interchange area.

In all option packages, a general approach of adding capacity in the corridor with a high occupancy vehicle lane in each direction was assumed given the benefits identified in the earlier stage, tendency to affect changes in traffic demand, and to provide flexibility in the future to explore a priced-managed lane system. The option of providing capacity in the form of a general purpose lane was no longer considered.

Each option package is summarized below:

- **Option Package 1:** Collector Distributor System begins at Barlow Trail and extends to Glenmore Trail (based on Focus Area Option 3B).
- **Option Package 2:** Collector Distributor System begins at Barlow Trail and extends to Glenmore Trail with direct access between the core lanes and Blackfoot Trail (based on Focus Area Option 3C).
- **Option Package 3:** Collector Distributor System begins at Anderson Road / Bow Bottom Trail and extends to Glenmore Trail (based on Focus Area Option 3A).

The primary contents of each option package are described in the following table (Page 21). A brief description of each improvement follows, including elements related to Active Transportation Enhancements and Technology Applications, all of which are common to all three option packages.

These final set of option packages were subsequently subjected to the full Multiple Account Evaluation process.

Component	Package 1	Package 2	Package 3
128 Avenue (planned connection)	■	■	■
Country Hills Boulevard	■	■	■
Airport Trail (incorporate planned improvements WB-SB)	■	■	■
Beddington Trail (full movement interchange / current concept)	■	■	■
64 Avenue (no improvements proposed)	—	—	—
McKnight Boulevard (with new modifications developed)	■	■	■
32 Avenue (intersection improvements at 12 Street / 32 Avenue)	■	■	■
16 Avenue (incorporate planned improvements)	■	■	■
Memorial Drive (free-flow modifications - Focus Area Option 2B)	■	■	
Memorial Drive (no modifications - Focus Area Option 2C)			■
17 Avenue (Focus Area Option 2B)	■	■	
17 Avenue (Focus Area Option 2C)			■
Peigan Trail (new modifications developed - SB entrance ramp)	■	■	
50 Avenue Connector (with existing Deerfoot Trail Alignment)		■	■
50 Avenue Connector (with alternate Deerfoot Trail Alignment)	■		
Glenmore Trail (CD System Terminus)			■
Heritage Meadows Way (Modifications to Accommodate CD System)			■
Southland Drive (Modifications to Accommodate CD System)			■
Anderson Road / Bow Bottom Trail (Focus Area Option 3A)			■
Glenmore Trail (No CD System)	■		
Heritage Meadows Way (No CD System)	■		
Southland Drive (CD System Terminus)	■		
Anderson Road / Bow Bottom Trail (Focus Area Option 3B)	■		
Glenmore Trail (No CD System)		■	
Heritage Meadows Way (No CD system)		■	
Southland Drive (CD System Terminus)		■	
Anderson Road / Bow Bottom Trail (Focus Area Option 3C)		■	
24 Street (Modifications to Accommodate CD System)	■	■	
24 Street (Modifications to widen highway to four lanes per direction)			■
Barlow Trail (Modifications to accommodate CD system terminus)	■	■	
Barlow Trail (Modifications to widen highway to four lanes per direction)			■
130 Avenue (no improvements for traffic operation proposed)	—	—	—
McKenzie Towne Boulevard (no improvement for traffic operations)	—	—	—

A brief description of each improvement follows, including elements related to Active Transportation Enhancements and Technology Applications, all of which are common to all three option packages.

Option Packages

The final set of concepts that were taken forward for inclusion in the three option packages are briefly described below in terms of Traffic Infrastructure, Active Transportation, and Technology Applications.

TRAFFIC INFRASTRUCTURE

- **McKenzie Towne Boulevard Interchange –** No changes are proposed for traffic operations.

MCKENZIE TOWNE BOULEVARD

- **130 Avenue S.E. Interchange –** No changes are proposed for traffic operations.

130 AVENUE S.E.

- **Barlow Trail Interchange –** Two modifications are under consideration for this interchange:
  - **Modification 1:** The interchange ramps would be modified to accommodate the extension of the collector distributor system which will terminate / start just south of this interchange. This alternative is consistent with Focus Area Option 3B and Focus Area Option 3C.

BARLOW TRAIL

  - **Modification 2:** The interchange ramps would be modified to accommodate widening of Deerfoot Trail with an additional lane in each direction of travel. This alternative is consistent with Focus Area Option 3A.

- **24 Street S.E. Interchange –** Two modifications are under consideration for this interchange:
  - **Modification 1:** The interchange ramps would be modified to accommodate the extension of the collector distributor lanes to Barlow Trail. This alternative is consistent with Focus Area Option 3B and Focus Area Option 3C.

24 STREET S.E.

  - **Modification 2:** The interchange ramps would be modified to accommodate widening of Deerfoot Trail with an additional lane in each direction of travel. This alternative is consistent with Focus Area Option 3A.

- **Glenmore Trail Interchange to Anderson Road / Bow Bottom Trail –** Three alternatives for this segment of the corridor, and the basis for the three options packages, are under consideration.
  - **Focus Area Option 3A:**
    - **Glenmore Trail Interchange** – Upgraded to permit all movements between Deerfoot Trail and Glenmore Trail through the provision of several new directional ramps. The interchange has been configured as the terminus of the collector distributor system. Includes modifications to the Blackfoot Trail / Glenmore Trail interchange.
    - **Heritage Meadows Way Interchange** – Reconfigured to connect to the collector distributor lane system.
    - **Southland Drive Interchange** – Reconfigured to connect to the collector distributor lane system.
    - **Anderson Road / Bow Bottom Trail Interchange** – Reconfigured as the terminus of the collector distributor system. The configuration is consistent with the concept presented at the public engagement events in the fall of 2019.

GLENMORE TRAIL 3A

HERITAGE MEADOWS WAY 3A

SOUTHLAND DRIVE 3A

Legend:

- Existing Roadway
- Proposed Roadway
- Deerfoot Trail (Modified)
- Collector-Distributor Road

Option Packages

- **Focus Area Option 3B:**
  - **Glenmore Trail Interchange** – Upgraded to permit all movements between Deerfoot Trail and Glenmore Trail through the provision of several new directional ramps. Includes modifications to the Blackfoot Trail / Glenmore Trail interchange.
  - **Heritage Meadows Way Interchange** – Minor modifications to the interchange to connect to the widened segment of Deerfoot Trail.
  - **Southland Drive Interchange** – Reconfigured to connect to the collector distributor lane system.
  - **Anderson Road / Bow Bottom Trail Interchange** – Reconfigured to connect to the collector distributor system. The configuration is consistent with the concept presented at the public engagement events in the fall of 2019.

GLENMORE TRAIL 3B

HERITAGE MEADOWS WAY 3B

SOUTHLAND DRIVE 3B

Legend:

- Existing Roadway
- Proposed Roadway
- Deerfoot Trail (Modified)
- Collector-Distributor Road

- **Focus Area Option 3C:**
  - **Glenmore Trail Interchange** – Upgraded to permit all movements between Deerfoot Trail and Glenmore Trail through the provision of several new directional ramps. Includes modifications to the Blackfoot Trail / Glenmore Trail interchange.
  - **Heritage Meadows Way Interchange** – Minor modifications to the interchange to connect to the widened segment of Deerfoot Trail.
  - **Southland Drive Interchange** – Reconfigured to connect to the collector distributor lane system.
  - **Anderson Road / Bow Bottom Trail Interchange** – Reconfigured to connect to the collector distributor system. Direct ramps to / from the core lanes in Deerfoot Trail to Blackfoot Trail / Southland Drive intersection. The configuration is consistent with the concept presented at the public engagement events in the fall of 2019.

GLENMORE TRAIL 3C

HERITAGE MEADOWS WAY 3C

SOUTHLAND DRIVE 3C

Legend:

- Existing Roadway
- Proposed Roadway
- Deerfoot Trail (Modified)
- Collector-Distributor Road

Option Packages

- **50 Avenue S.E. Connector –** Two alternative configurations are under consideration for this proposed network improvement:
  - **Alternative 1:** Deerfoot Trail would remain in the existing highway alignment and the new four lane connector between 50 Avenue S.E. and 11 Street S.E. would follow a new alignment across the Bow River. The alignment for the connector approximately parallels the Deerfoot Trail corridor across the Bow River to minimize impacts to a proposed stormwater pond on the west side of the river and to reduce conflicts with the future Greenline LRT alignment. The alignment over the WID canal and Ogden Road was refined to enhance constructability, assuming that the existing two-lane bridge would be twinned to achieve the four-lane cross section.

50 AVENUE S.E. ALTERNATIVE 1

  - **Alternative 2:** Deerfoot Trail would be realigned to cross the Bow River further south of the existing bridge, which would allow the new four-lane connector between 50 Avenue S.E. and 11 Street S.E. to use the existing Calf Robe Bridge to cross the Bow River. This configuration is consistent with the concept presented at the public engagement events in the fall of 2019.

50 AVENUE S.E. ALTERNATIVE 2

- **Peigan Trail Interchange –** Minor modifications are proposed at this interchange to remove the large loop ramp for the westbound to southbound movement and to replace this existing ramp with a directional ramp.

PEIGAN TRAIL

Legend:

- Existing Roadway
- Proposed Roadway
- Deerfoot Trail (Modified)
- Collector-Distributor Road

- **17 Avenue S.E. Interchange –** Two alternatives are under consideration for this interchange, both of which are consistent with the concepts presented at the public engagement events in the fall of 2019:
  - **Alternative 1:** As per Focus Area Option 2B, the interchange would be reconfigured to allow Blackfoot Trail to connect to Barlow Trail. A full movement interchange, in a Parclo B configuration, would remain between Deerfoot Trail and the new connector. An upgraded interchange, in the form of a diverging diamond, is proposed at the junction of Memorial Drive and Barlow Trail.
  - **Alternative 2:** As per Focus Area Option 2C, the interchange is proposed to be reconfigured as a diverging diamond interchange. Basket weave structures are proposed between the 17 Avenue S.E. interchange and the Memorial Drive interchange to eliminate the weaving operations between the entrance ramps and exit ramps in both directions of travel.

17 AVENUE S.E. ALTERNATIVE 1

17 AVENUE S.E. ALTERNATIVE 2

- **Memorial Drive Interchange –** Two alternatives are under consideration for this interchange, both of which are consistent with the concepts presented at the public engagement events in the fall of 2019:
  - **Alternative 1:** As per Focus Area Option 2B, the Memorial Drive interchange configuration would be modified to remove the south facing ramps. The southbound to eastbound movement would be provided through a directional ramp. All at-grade intersections along Memorial Drive would be removed.

MEMORIAL DRIVE ALTERNATIVE 1

MEMORIAL DRIVE ALTERNATIVE 2

Legend:

- Existing Roadway
- Proposed Roadway
- Deerfoot Trail (Modified)
- Collector-Distributor Road

- **Alternative 2:** As per Focus Area Option 2C, the Memorial Drive interchange configuration would remain as per the current configuration. Basket weave structures are proposed between the 17 Avenue S.E. interchange and the Memorial Drive interchange to eliminate the weaving operations between the entrance ramps and exit ramps in both directions of travel.

  A Parclo B Interchange is a Partial Cloverleaf interchange with loop ramps exiting the highway, located in the opposite quadrants of the interchange.

  A Diverging Diamond interchange is a configuration where the arterial road traffic crosses to the other side of the roadway through the interchange area to allow movements to and from the highway to operate with less conflicts, and therefore, more efficiently. This configuration is ideally suited for high volume movements that would normally be configured in a left turn arrangement at a signalized ramp terminal intersection.

Option Packages

- **16 Avenue N.E. Interchange –** Proposed upgrades to this interchange include a third level for 16 Avenue N.E. traffic such that this through traffic is removed from the existing ramp terminal intersections. This configuration remains consistent with the previous plans developed for the 16 Avenue / 19 Street N.E. functional planning study (2015).

16 AVENUE N.E.

- **32 Avenue N.E. Interchange –** Minor ramp widening is proposed on the northbound off-ramp to provide two right turn lanes and two left turn lanes onto 32 Avenue N.E. east and west respectively. Minor intersection changes are proposed at the 12 Street N.E. intersection including the addition of a "jug handle" connection to the intersection to eliminate weaving manoeuvres across 32 Avenue N.E. between the northbound off-ramp and the left turn lane to 12 Street N.E.

32 AVENUE N.E.

- **McKnight Boulevard Interchange –** Proposed modifications to the interchange configuration include the provision of a directional ramp for the eastbound to northbound movement and the removal of the westbound to southbound loop ramp. Access to 11 Street S.E. from Deerfoot Trail is only from the new left turn movement at the loop ramp terminal.

MCKNIGHT BOULEVARD

- **64 Avenue N.E. Interchange –** No traffic infrastructure-related changes are proposed.

64 AVENUE N.E.

- **Beddington Trail Interchange –** Upgrades to this interchange are proposed to provide full movements, with the exception of the westbound to southbound movement – an anticipated low volume movement. This configuration remains consistent with the concept presented at the Phase 3 public and stakeholder engagement events in the fall of 2019.

BEDDINGTON TRAIL

- **Airport Trail Interchange –** Upgrades are proposed to provide loop ramps for the northbound to westbound movement and the southbound to eastbound movement as well as a directional ramp for the westbound to southbound movement. The western at-grade intersection would be removed. This new configuration is consistent with previous plans.

AIRPORT TRAIL

- **Country Hills Boulevard Interchange –** Upgrades to this interchange are proposed to provide additional capacity across Deerfoot Trail as per the current planning study being conducted by The City of Calgary. calgary.ca/CountryHillsWidening

COUNTRY HILLS BOULEVARD

- **128 Avenue N.E. Interchange –** A new interchange is proposed with a half-diamond configuration as per the current planning study being conducted by The City of Calgary. calgary.ca/128AveNE

128 AVENUE N.E.

ACTIVE TRANSPORTATION

The improvements being considered are to enhance opportunities to cross the highway at either existing crossings or at proposed crossings

- **128 Street N.E. Interchange –** Include a multi-use path on one or both sides of the cross street when the interchange is constructed.
- **Country Hills Boulevard Interchange –** Include a multi-use path on one or both sides of the cross street when the interchange is upgraded.
- **Airport Trail Interchange –** Consider upgrades to the existing facilities to create a multi-use path, ideally on the north side of Airport Trail.
- **Beddington Trail Interchange –** Include a multi-use path on the north side of the new bridge structure crossing the Deerfoot Trail corridor as part of the proposed interchange upgrade.
- **McKnight Boulevard Interchange –** Develop a multi-use path on the north side of the existing bridge structure by repurposing the westbound auxiliary lane between the ramp terminal intersections. To be considered in conjunction with the proposed interchange upgrades and the reconfiguration of the ramp terminal intersections to remove the free-flow movements to / from McKnight Boulevard.
- **32 Avenue N.E. Interchange –** Consider upgrades to the existing bridge structure to include a multi-use path on the south side of the roadway.
- **16 Avenue N.E. Interchange –** Develop a multi-use path on the north side of the existing north bridge structure by repurposing one of the westbound lanes between the ramp terminal intersections. To be considered in conjunction with the proposed interchange upgrades where the through traffic along 16 Avenue N.E. will be relocated to a new structure.
- **8 Avenue N.E. Overpass –** Consider upgrades to the existing bridge structure to include a multi-use path on one side of the roadway.
- **Pedestrian Overpass –** Replace existing pedestrian overpass immediately south of the Memorial Drive interchange to improve accessibility. To be considered in conjunction with the proposed Memorial Drive and 17 Avenue S.E. interchange improvements.
- **50 Avenue N.E. Connector –** Include a multi-use path as part of the proposed 50 Avenue N.E. Connector either on the existing Calf Robe Bridge (repurposed deck space) or on a new alignment.
- **Heritage Drive Interchange –** Consider upgrades to the existing bridge structure to include a multi-use path on one side of the roadway. Depending upon the new cross-section on Deerfoot Trail, the existing bridge structure may need to be replaced.
- **Southland Drive Interchange –** Consider upgrades to the existing bridge structure to include a multi-use path on one side of the roadway. Depending upon the new cross-section on Deerfoot Trail, the existing bridge structure may need to be replaced.

Option Packages

- **24 Street S.E. Interchange –** Consider modifications to the ramp terminal intersections to improve accessibility across the highway by removing the free-flow movements to / from 24 Street S.E.
- **Barlow Trail Interchange Area –** Consider providing new multi-use path across Deerfoot Trail south of Barlow Trail.
- **130 Avenue S.E. Interchange -** Consider modifications to the ramp terminal intersections to improve accessibility across the highway by removing the free-flow movements to / from 130 Avenue S.E. Possible extension of a multi-use path across Bow River to be investigated.
- **McKenzie Towne Boulevard Interchange -** Consider modifications to the ramp terminal intersections to improve accessibility across the highway by removing the free-flow movements to / from McKenzie Towne Boulevard.

TECHNOLOGY APPLICATIONS

In this study, technology applications in the form of **Intelligent Traffic Systems (ITS)** are defined as the application of advanced information and communications technology to surface transportation to achieve enhanced safety and mobility while reducing the environmental impact of transportation. As part of the package of corridor improvements, ITS tools are also being proposed to augment any infrastructure changes to further improve traffic safety, operations, and reliability.

As part of an option generation workshop attended by City and Alberta Transportation representatives, several ITS applications were identified as possible candidates for the Deerfoot Trail corridor. During the development and continued refinement of the traffic infrastructure-related **improvements** through the strategy assessment and concept screening stages, several potential ITS applications were deemed to be unnecessary or to be considered in the long-term future. The retained ITS applications to be assigned to the three option packages include:

Network Management (Advance Traveller Information Systems)

The concept of using parallel roadways requires setting up a logical road network that can be managed. The logical network for Calgary at this point is Deerfoot Trail and Stoney Trail with connections between the two highways such as 16 Avenue N.E., Peigan Trail, and Glenmore Trail. To be able to manage the road network, knowledge of traffic conditions is required. To understand traffic conditions on the network, travel times for all roads in the network are required through approaches such as web-based big data systems or through corridor systems such as Bluetooth readers. With travel times available, dissemination of this information to drivers is required to permit decisions to be made with regards to route choice. This will require the deployment of variable message signs (VMS) at key locations, approximately 900 to 1,200 metres upstream of a network interchange (route choice).

Maintenance of Existing Capacity – Incident Management

There are a number of components required to efficiently manage incidents as follows:

- Quick detection of the incident
- Quick confirmation of the incident and determination of incident details
- Quick response to the incident scene of necessary services to respond to all the needs at the scene
- Coordinated and efficient action at the scene
- Information to warn motorists about the incident and lane blockage details to minimize secondary collisions
- Traffic condition information to motorists to allow them to use alternate routes if appropriate
- Traffic incident information to motorists to provide traffic calming

Based on the existing deployment of CCTV along the corridor, an enhanced incident management system would include further vehicle detection along the corridor, improved CCTV coverage, and additional dynamic message signs (DMS) to provide information to other drivers. Improved functionality at the traffic management centre will be required to manage detected incidents in terms of confirmation, response actions, coordination of agencies, and information dissemination to drivers and other stakeholders.

Queue Warning System

To improve traffic safety along the corridor, especially in areas of recurring congestion, or to prevent secondary incidents resulting from traffic congestion related to an earlier incident, a queue warning system is suggested as part of the overall package of corridor improvements.

A queue warning system would require vehicle detection, similar to the incident management system introduced above, and a way to share warnings with drivers which could be provided by strategically placed dynamic message signs along the corridor. This application could form part of a comprehensive Advanced Traffic Management System (ATMS).

Lane Management

Lane management provides information to drivers on the status of each lane ahead, and this information is provided at regular intervals along the highway corridor. The lane status, typically indicated through the use of lane control signals mounted overhead, will warn approaching drivers of a closed lane and the need to change lanes in advance.

A lane management system will provide information to drivers on the lane status because of an incident ahead, maintenance activity, or congestion.

Speed Harmonization

Speed harmonization involves the use of variable speed signs that recommend lower speeds to improve highway operations when traffic flow is approaching "breakdown" conditions. The variable speed signs would be mounted overhead and located at regular intervals along the highway corridor. In addition to improving the efficiency of the highway operations / capacity, the variable speed signs can also be used to improve safety during adverse weather conditions or in congested traffic when lower travel speeds are advisable.

Speed harmonization involves the use of variable speed signs that recommend lower speeds to improve highway operations when traffic flow is approaching "breakdown" conditions.

Option Evaluation

A comprehensive evaluation framework using a Multiple Account Evaluation (MAE) methodology was developed to assess each option package.

The evaluation framework is structured to systematically identify and document both quantifiable and non-quantifiable benefits, impacts, and costs associated with each option package – without assigning subjective weights. The resulting product is intended to provide relevant information to decision-makers.

In keeping with accepted practice, the evaluation framework developed for this study incorporates performance measures under the following four accounts:

Financial Performance Account:

Documents the overall cost of each option package over a prescribed analysis period, or life cycle; this analysis is financially quantitative.

Customer Service Account:

Documents the user benefits (or dis-benefits) accrued over the analysis period; this analysis includes financially quantitative and qualitative aspects.

Socio-Community Account:

Documents the major community impacts and trade-offs associated with each option package and is largely qualitative.

Environmental Account:

Documents the type, extent and magnitude of any environmental, biophysical or archaeological impacts associated with each option package; the analysis includes both non-financially quantitative and qualitative aspects.

The four main accounts and the underlying criteria in each account are depicted in the following figure.

Customer Service
- Travel time savings
- Vehicle operation cost savings
- Road safety
- Accommodating pedestrian, cycling and transit service facilities
- Constructibility 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

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

Financial Performance
- Capital costs
- Operational and maintenance costs
- Salvage costs
- Property costs
- Benefit-cost ratio and net present value (NVP)

The criteria under each account represent indicators that can be measured either quantitatively or qualitatively as compared to current conditions.

- Quantitative evaluation is used in instances where specific measurements of impacts can be made. Where feasible, a quantitative assessment using monetary values is preferred. However, many criteria cannot be evaluated using a commonly accepted monetary value per unit of impact, such as in the Socio-Community and Environmental Accounts.

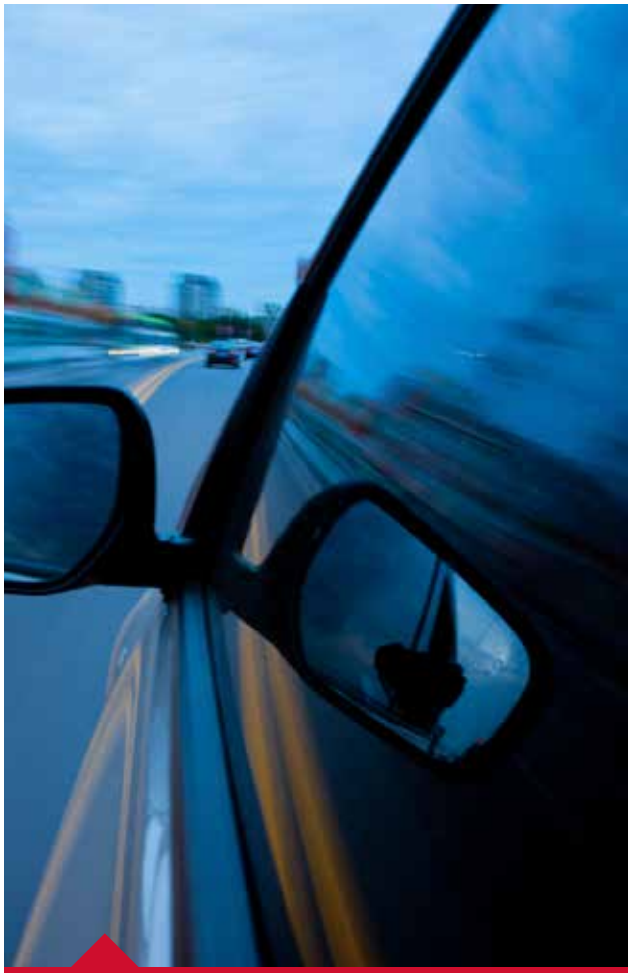
  For example, under the Socio-Community Account: Residential Impact criterion, the number of properties impacted by each of the option packages can be counted and an evaluation provided. In this example, the purpose of this criterion is to assess the social impact to the affected area, not the financial cost to the project delivery agency to purchase the property.

- Qualitative evaluation is used when specific measurements cannot readily be made, but there are obvious benefits or impacts as compared to the base case. These qualitative evaluations are more prominent in the Customer Service, Socio-Community and Environmental accounts.

To evaluate qualitative scoring consistently, a five-level rating system was applied as shown in the table below:

Qualitative Scoring Format

SCORE	MEANING
	Significantly Worse
	Somewhat Worse
	Similar to Base Case / Neutral
	Somewhat Better
	Significantly Better



The option evaluation process is intended to provide relevant information to decision-makers.

Option Evaluation

A summary of the multiple account evaluation of each option package is provided in ***Table A***. The results indicated that Option Package 1 is the preferred option package based on the following key factors:

- All three option packages feature positive travel time savings and vehicle operating cost savings, as well as negative road safety savings.
- Option Package 1 has a significantly higher net present worth and benefit cost ratio, relative to Option Package 3 which features a negative net present value when not monetizing latent traffic demands. The net present value and benefit cost of Option Package 1 is slightly lower, although the total is still within five percent of Option Package 2.
- Option Package 1 has a slightly lower cost than Option Package 2, a difference of approximately $23 million dollars.
- Option Packages 1 and 2 feature very similar Socio-Community qualitative evaluations, however Option Package 1 impacts two fewer business / commercial properties as well as approximately 29.6 hectares less of recreational and park land (mostly consisting of the Maple Ridge Golf Course).
- Option Package 1 is considered to feature slightly less impacts to wildlife and wetlands relative to Option Package 2.

In summary, Option Package 1 shows significant monetary benefits over Option Package 3 and has less strenuous impacts while maintaining a still reasonable level of benefits relative to Option Package 2.

As such, it is recommended that Option Package 1 forms the basis of the preferred long-term corridor plan for Deerfoot Trail.

Table A

CRITERIA
Financial
Capital Cost
Operations / Maintenance Cost
Salvage Cost
Property Cost
Total Cost (Capital + Property)
Customer Service
Travel Time Savings (Vehicle Hours Travelled)
Vehicle Operation Cost Savings
Road Safety (Reduction in Collisions)
Pedestrian and Cycling Accommodation
Transit Service Accommodation
Constructability / Maintenance of Traffic
Rail Impacts
Socio-Community
Property Impacts
Visual Impacts
Noise Impacts
Emergency Service Accessibility
Environmental
Aquatic Risk / Complexity Rating
Vegetation Risk / Complexity Rating
Wildlife Risk / Complexity Rating
Historical Resources Risk / Complexity Rating
Air Quality / Vehicle Emissions
Greenhouse Gases (25-year period)
BENEFIT COST ANALYSIS
Total Costs
Total Benefits
NPV
Benefit / Cost Ratio (B/C)

MEASUREMENT	UNITS	OPTION PACKAGE 1	OPTION PACKAGE 2	OPTION PACKAGE 3
($2020)	$	$ 2.25 B	$ 2.30 B	$ 2.15 B
($2020)	$	$ 2.20 M	$ 2.20 M	$ 2.00 M
(PV $2020)	$	- $ 335 M	- $ 340 M	- $ 320 M
($2020)	$	$ 40.0 M	$ 50.0 M	$ 40.0 M
($2020)	$	$ 2.29 B	$ 2.34 B	$ 2.20 B
(PV $2020)	$	$ 1.89 B	$ 2.03 B	$ 1.23 B
(PV $2020)	$	$ 15.1 M	$ 14.5 M	$ 10.6 M
(PV $2020)	$	- $ 19.6 M	- $ 19.9 M	- $ 22.1 M
Qualitative		Somewhat Better	Somewhat Better	Somewhat Better
Qualitative		Somewhat Better	Somewhat Better	Neutral
Qualitative		Significantly Complex	Significantly Complex	Significantly Complex
Qualitative		Neutral	Somewhat Worse	Neutral
		Somewhat Worse	Significantly Worse	Somewhat Worse
Qualitative		Somewhat Worse	Somewhat Worse	Neutral
Qualitative		Somewhat Worse	Somewhat Worse	Neutral / Somewhat Worse
Qualitative		Somewhat Worse	Somewhat Worse	Neutral
		Somewhat Worse	Somewhat Worse	Somewhat Worse
		Somewhat Worse	Somewhat Worse	Somewhat Worse
		Somewhat Worse	Significantly Worse	Significantly Worse
		Significantly Worse	Significantly Worse	Significantly Worse
CO2 (PV $2020)	Tonnes ($M)	- 101,000 tonnes ($ 2.6 M)	- 98,000 tonnes ($ 2.5 M)	- 71,000 tonnes ($ 1.9 M)
(PV $2020)	$	$ 0.98 B	$ 1.00 B	$ 0.94 B
(PV $2020)	$	$ 1.89 B	$ 2.03 B	$ 1.21 B
(PV $2020)	$	$ 0.91 B	$ 1.02 B	$ 0.27 B
-	-	1.92	2.02	1.29

Recommended Improvements

The corridor improvements associated with the recommended long-term corridor plan are shown in Figure D.

The recommended long-term plan includes the following components under the three categories:

- Traffic Infrastructure
- Active Transportation
- Technology Applications

Traffic Infrastructure

- Mainline Capacity – Buffer Separated Median HOV Lanes in both directions between Barlow Trail and Airport Trail.
- Key Improvement Areas:
  - Anderson Road / Bow Bottom Trail Area – Collector Distributor Lanes extending in both directions between Barlow Trail and Southland Drive.
  - Glenmore Trail Interchange
  - 50 Avenue S.E. Connector
  - 17 Avenue S.E. to Memorial Drive (Option 2 – Blackfoot Trail connection to Barlow Trail)
  - 16 Avenue N.E. Interchange - Deerfoot Trail to Barlow Trail
  - McKnight Boulevard Interchange
  - Beddington Trail Interchange
  - Airport Trail Interchange
  - Country Hills Boulevard Interchange
  - 128 Avenue N.E. Interchange

Active Transportation

- 128 Street N.E. Interchange – Multi-use path on one or both sides of the cross street when the interchange is constructed.
- Country Hills Boulevard Interchange – Multi-use path on one or both sides of the cross street when the interchange is upgraded.
- Airport Trail Interchange – Upgrades to the existing facilities to create a multi-use path on the northside of Airport Trail.
- Beddington Trail Interchange – Multi-use path on the north side of the new bridge structure crossing the Deerfoot Trail corridor as part of the proposed interchange upgrade.
- McKnight Boulevard Interchange – Develop a multi-use path on the north side of the existing bridge structure by repurposing the westbound auxiliary lane between the ramp terminal intersections.
- 32 Avenue N.E. Interchange – Upgrades to the existing bridge structure to include a multi-use path on the south side of the roadway.
- 16 Avenue N.E. Interchange - Develop a multi-use path on the north side of the existing north bridge structure by repurposing one of the westbound lanes between the ramp terminal intersections.

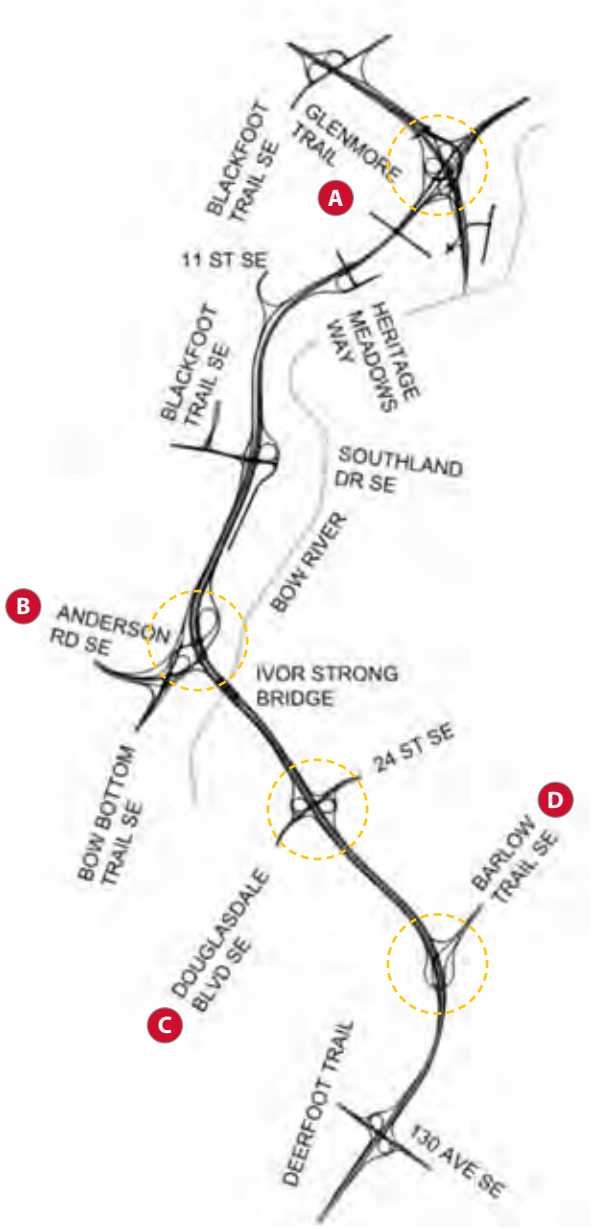
- 8 Avenue N.E. Overpass – Upgrades to the existing bridge structure to include a multi-use path on one side of the roadway.
- Pedestrian Overpass – Replace existing pedestrian overpass immediately south of the Memorial Drive interchange to improve accessibility.
- Peigan Trail Interchange – The primary proposed active transportation improvement in this area consists of a new separate multi-use path and bridge structure over Deerfoot Trail that connects the pathway bordering the WID Canal to Peigan Trail and 26 Street S.E. The existing sidewalk on the Gosling Way bridge structure over Deerfoot Trail would also be upgraded to a multi-use path through widening, likely by narrowing the travel lanes upon the existing bridge.
- 50 Avenue S.E. Connector – Multi-use path as part of the proposed 50 Avenue S.E. Connector either on the existing Calf Robe Bridge (repurposed deck space) or on a new alignment.
- Heritage Drive Interchange – Upgrades to the existing bridge structure to include a multi-use path on one side of the roadway. Depending upon the new cross-section on Deerfoot Trail, the existing bridge structure may need to be replaced.
- Southland Drive Interchange – New bridge structure to include a multi-use path on one side of the roadway.
- 24 Street S.E. Interchange – Modifications to the ramp terminal intersections to improve accessibility across the highway by removing the free-flow movements to / from 24 Street S.E.
- Barlow Trail Interchange Area – New multi-use path across Deerfoot Trail south of Barlow Trail.
- 130 Avenue S.E. Interchange - Modifications to the ramp terminal intersections to improve accessibility across the highway by removing the free-flow movements to / from 130 Avenue S.E.
- McKenzie Towne Boulevard Interchange - Modifications to the ramp terminal intersections to improve accessibility across the highway by removing the free-flow movements to / from McKenzie Towne Boulevard.

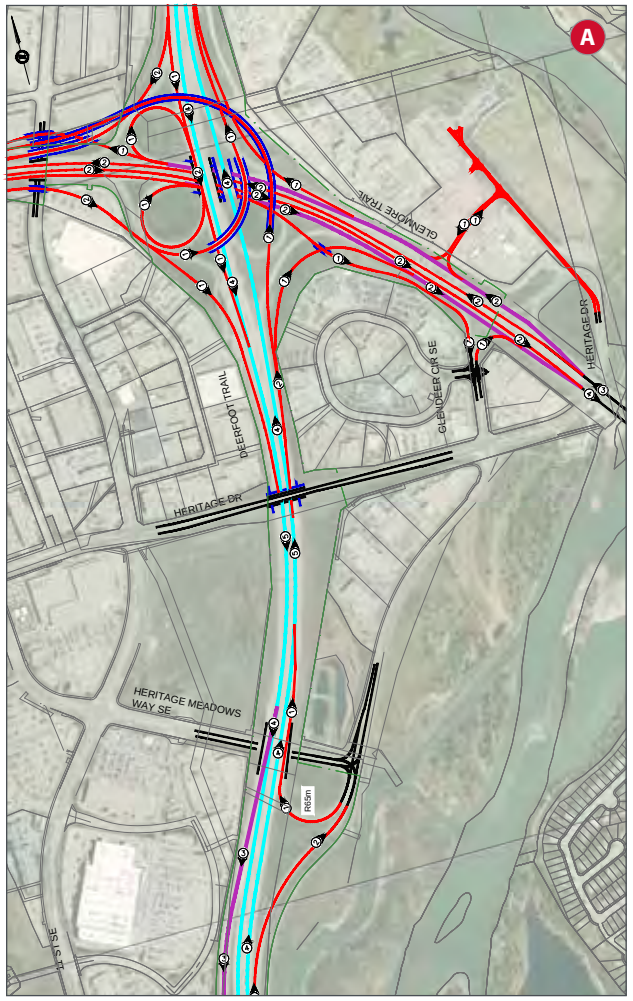
Technology Applications

- Incident Management
- Network Management
- Queue Warning
- Speed Harmonization
- Lane Management

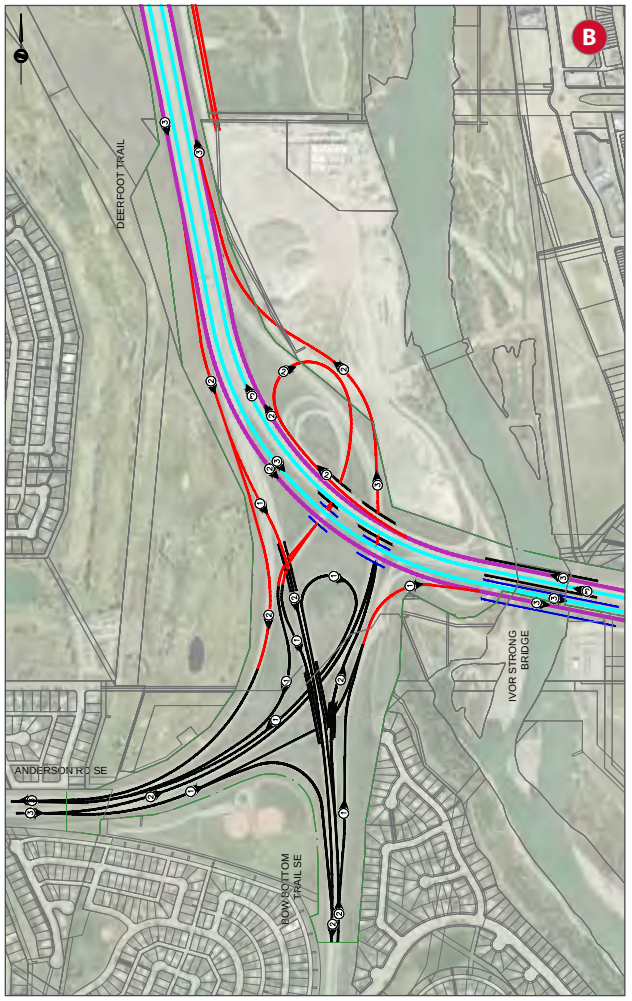
Active mode improvements being considered to enhance opportunities to cross Deerfoot Trail.

Recommended Improvements

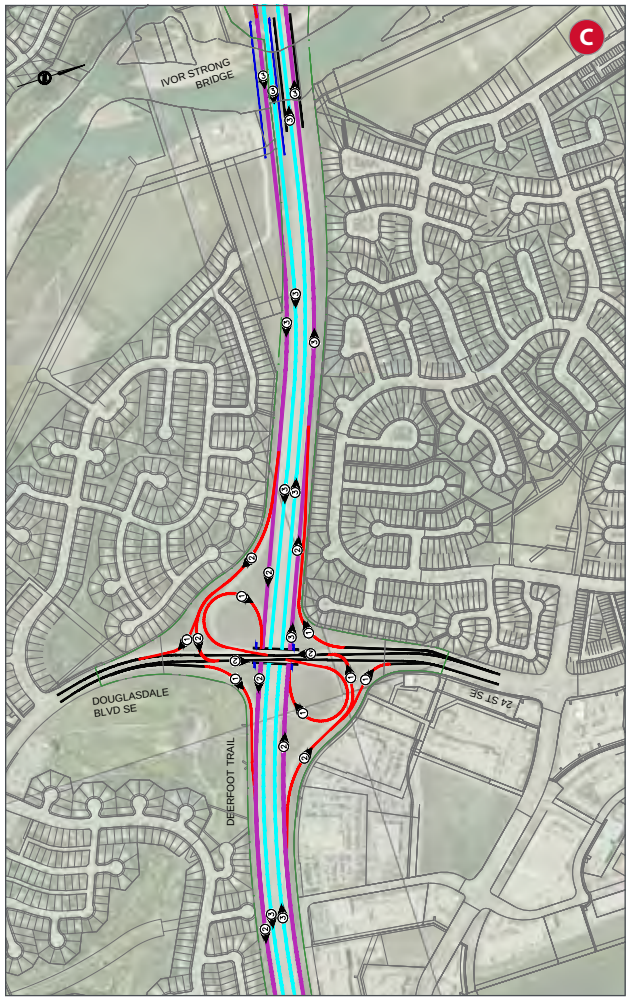




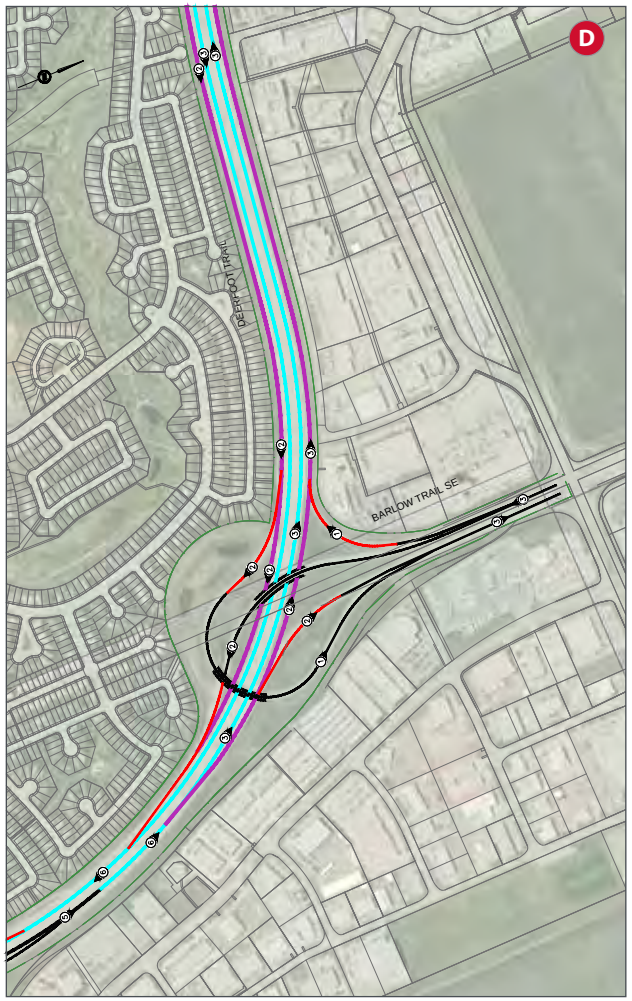
Glenmore Trail / Heritage Meadows Way Interchange



Anderson Road / Bow Bottom Trail / Southland Drive Interchange



Douglasdale Boulevard and 24 Street S.E. Interchange

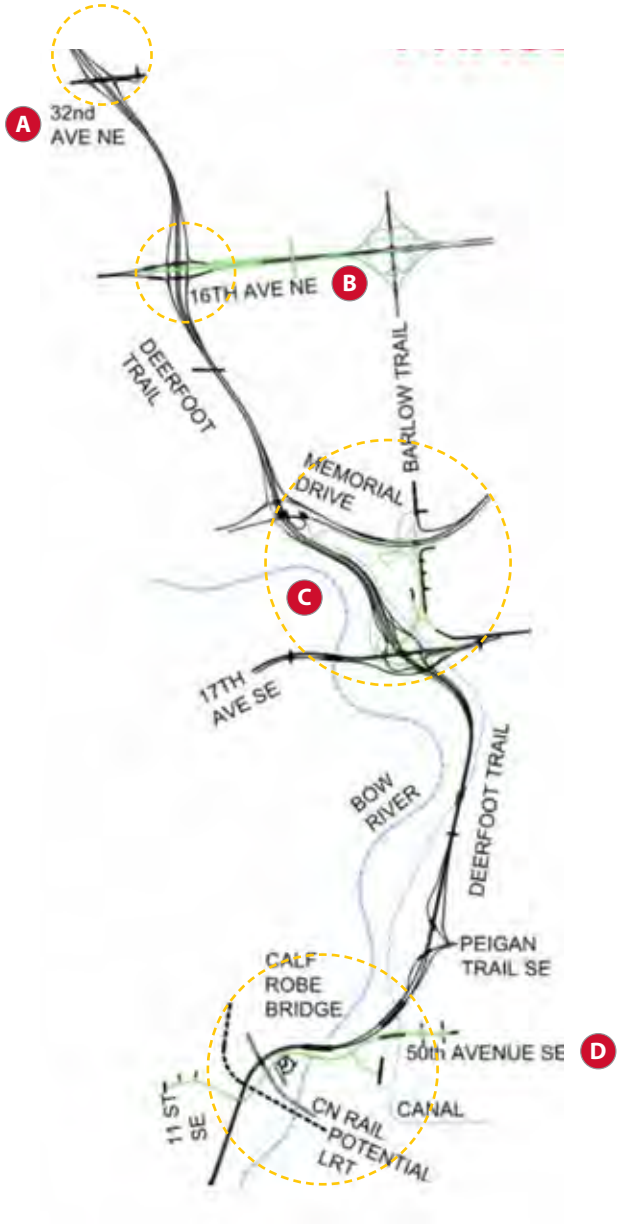


Barlow Trail Interchange

Legend:

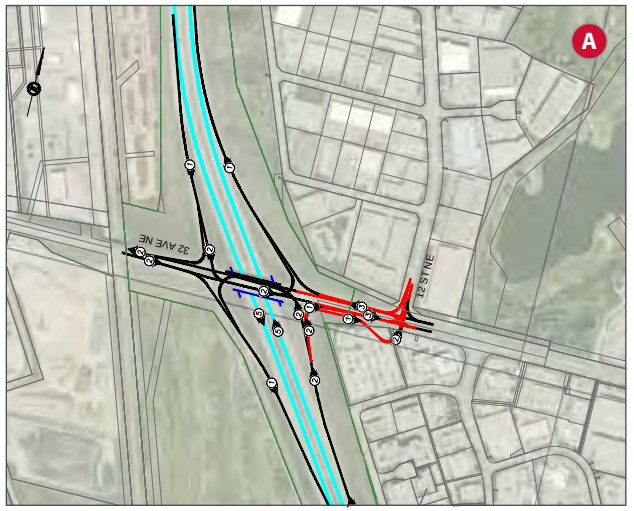
- Existing Roadway
- Proposed Roadway
- Deerfoot Trail (Modified)
- Collector-Distributor Road

Recommended Improvements

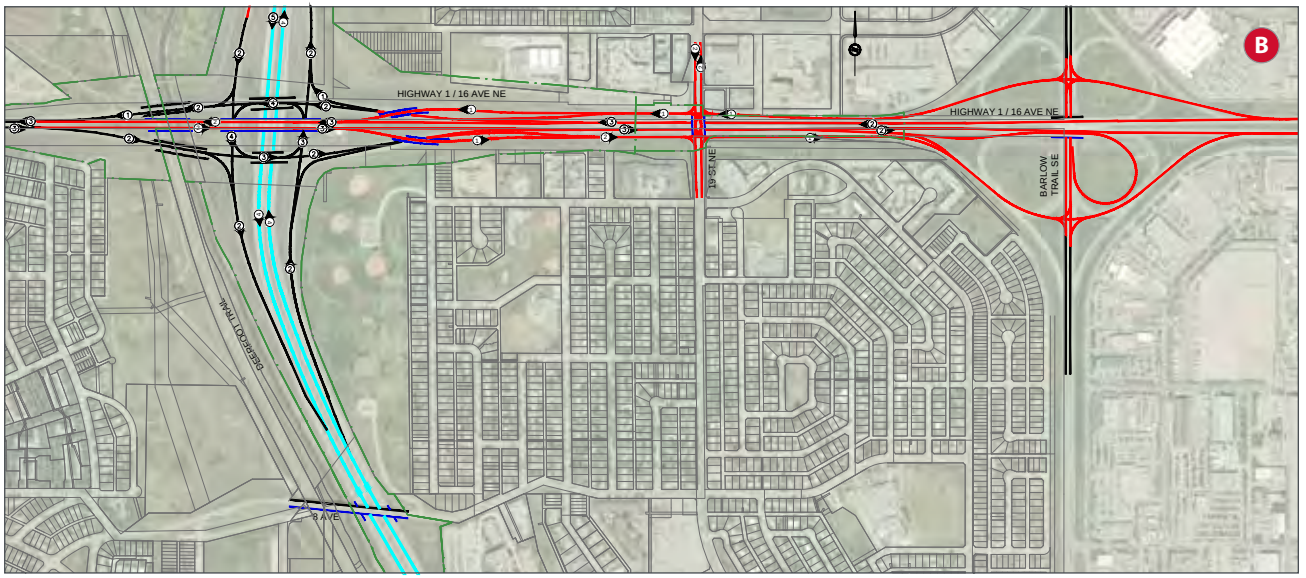


Legend:

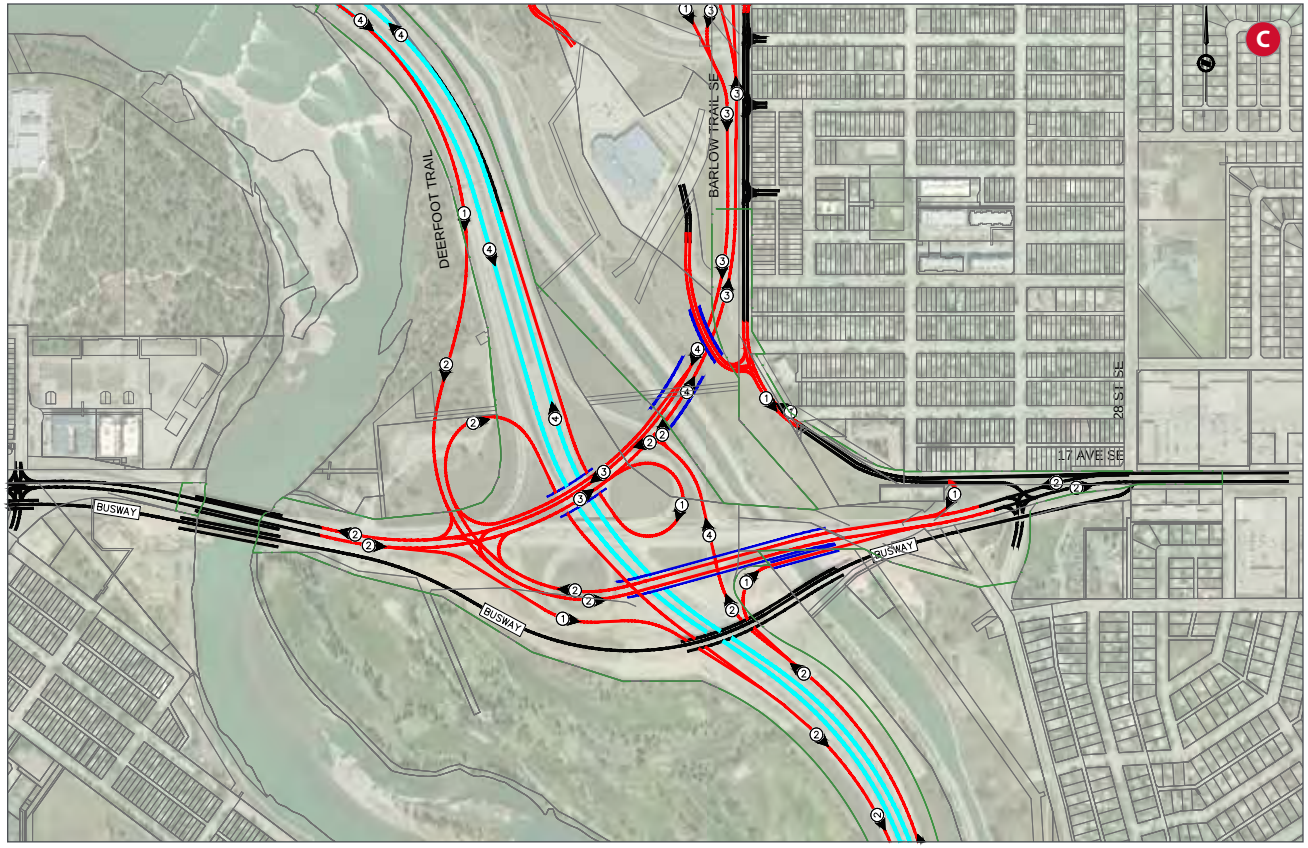
- Existing Roadway
- Proposed Roadway
- Deerfoot Trail (Modified)
- Collector-Distributor Road



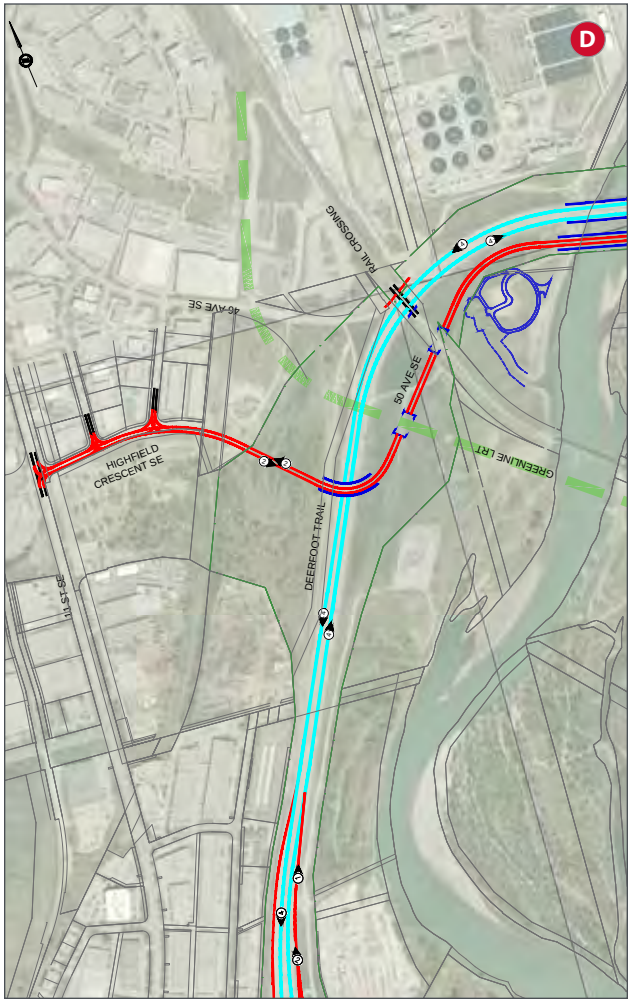
32 Avenue N.E. Interchange



16 Avenue N.E. Interchange

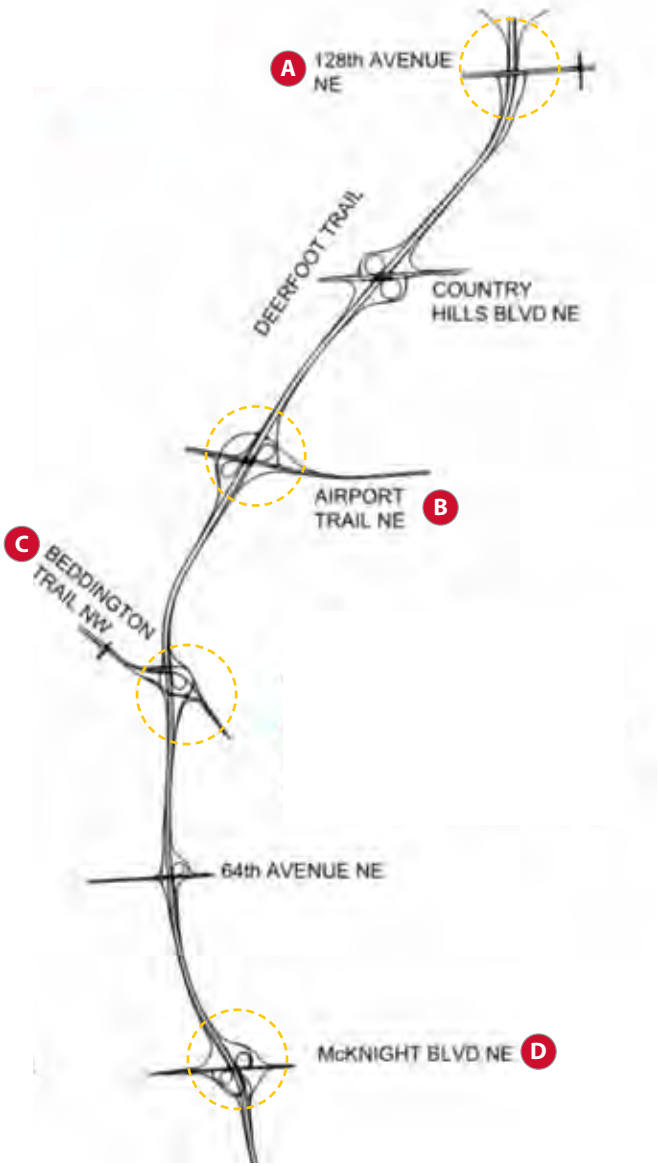


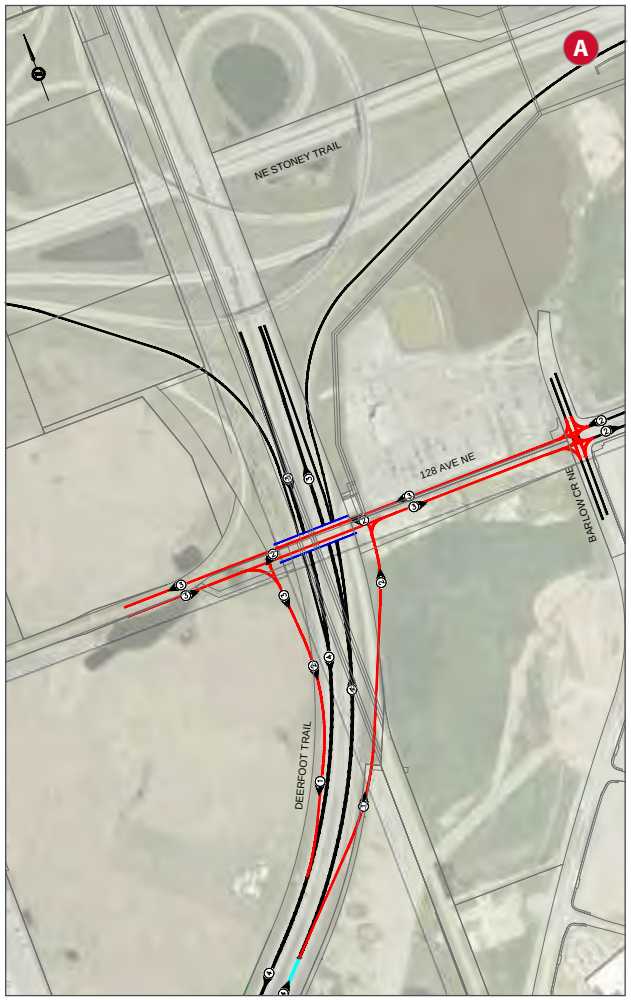
17 Avenue S.E. and Memorial Drive Interchange



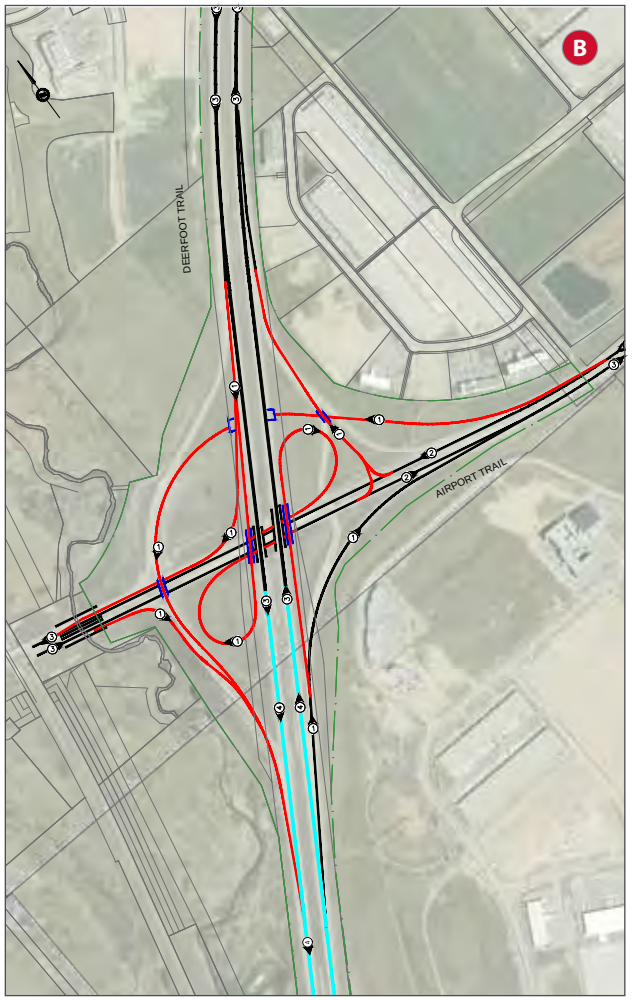
50 Avenue S.E. Interchange

Recommended Improvements

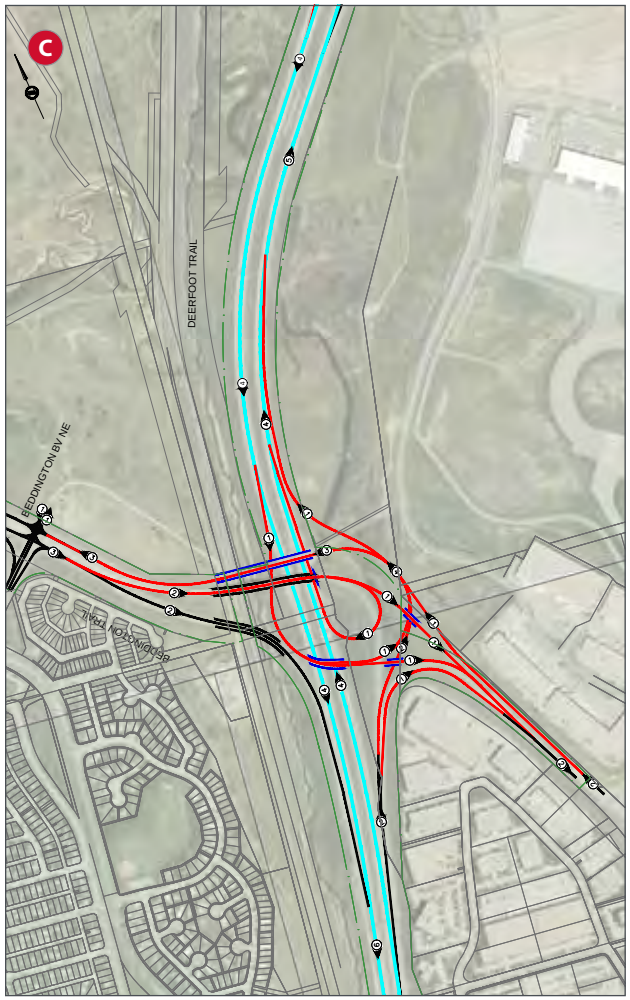




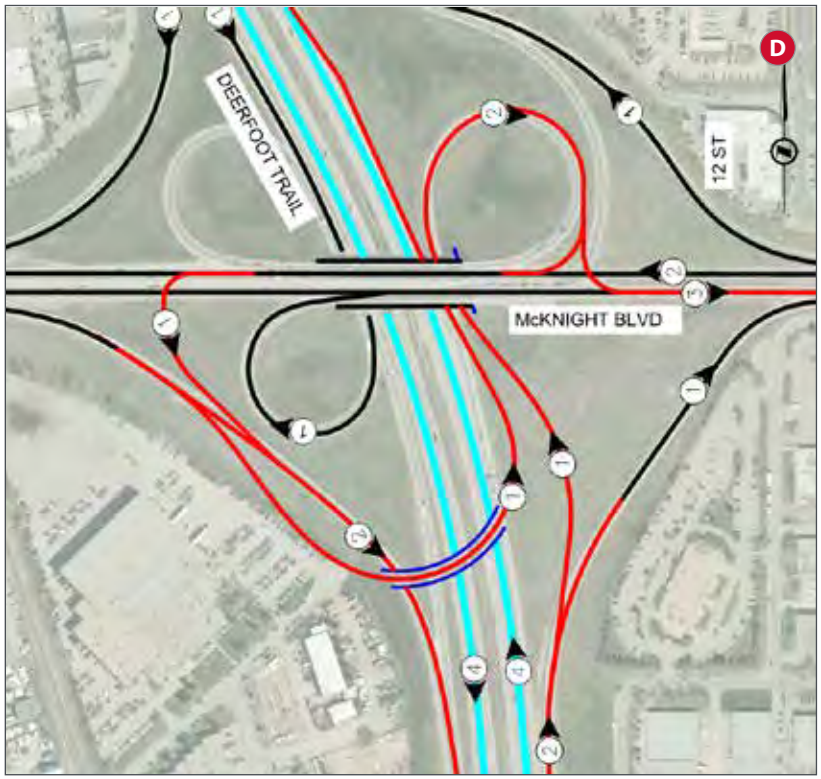
128 Street N.E. Interchange



Airport Trail Interchange



Beddington Trail Interchange



McKnight Boulevard Interchange

Legend:

- Existing Roadway
- Proposed Roadway
- Deerfoot Trail (Modified)
- Collector-Distributor Road

A Phased Approach for Implementation

Recognizing the magnitude of the long-term corridor plan and the complexities that would be associated in delivering the entire set of corridor improvements, a phased approach for implementation is warranted.

Given the large geographic expanse of the corridor many of the improvements forming the long-term corridor plan are independent of other improvements. Additionally, many corridor improvements are related to future deficiencies and are therefore not required in the same time frame as other improvements that address existing deficiencies.

To allow flexibility in the delivery of the long-term corridor plan, a set of implementation priorities have been identified for the major components. These priorities were then transformed into a general strategy to guide Alberta Transportation and The City of Calgary in the overall implementation of the long-term corridor plan over the next 30 years.

Several implementation phases were first identified with a major component of the long-term corridor plan forming the basis for each phase. **These phases were then assigned to three approximate timeframes:**

- **Short-Term – next 10 years**
- **Medium-Term – 11 to 20 years**
- **Long-Term – beyond 20 years**

Implementation priorities were based on qualitative assessments in terms of costs, impacts, geographic location, overall traffic characteristics, compatibility with the existing plans versus a standalone, and the timeframe (existing versus future only) of the identified issues being addressed.

Given the large geographic expanse of the corridor, many of the improvements forming the long-term corridor plan are independent of other improvements.

Based on the contents of the long-term corridor plan, the following major components have been identified, in order of priority:

1. Mainline Widening
2. Glenmore Trail Interchange
3. Anderson Road / Bow Bottom Trail Interchange Area including the Collector Distributor System
4. 16 Avenue N.E. Interchange Improvements
5. 50 Avenue S.E. Connector
6. Memorial Drive to 17 Avenue S.E. Area

Each of these major components therefore represent a major implementation phase. The smaller scale corridor improvements have been included in six priorities based on the qualitative assessment criteria.

Active transportation improvements recommended in the long-term corridor plan have not been individually identified in the implementation strategy, as it is assumed that these components would be implemented in conjunction with the other corridor improvements to take advantage of the complimentary opportunities provided by the relatively larger traffic infrastructure elements.

Finally, the various technology applications have been allocated to the six phases in accordance with the implementation recommendations identified in the ITS Strategy for Deerfoot Trail.

The exact time frame for implementation and sequence of the various components forming the long-term corridor plan is subject to funding and therefore could change from the implementation strategy recommended at this time.

SHORT-TERM

Phase 1

- Add capacity to Deerfoot Trail in the form of a new buffer separated median High Occupancy Vehicle (HOV) lane in each direction between Barlow Trail and Airport Trail.
- Other minor improvements including grade separating the entrance and exit ramps between Memorial Drive and 17 Avenue S.E. to remove weaving operations along Deerfoot Trail in both directions; providing a direct connection between 11 Street N.E. and Deerfoot Trail northbound which represents an element of the future full interchange; widening the northbound loop ramp from Deerfoot Trail to Anderson Road / Bow Bottom Trail to accommodate two lanes; and creating an early northbound exit ramp to Southland Drive – prior to the interchange at Anderson Road / Bow Bottom Trail to remove weaving operations along Deerfoot Trail between the two interchanges.

Phase 2

- Glenmore Trail Interchange improvements – including Heritage Drive and Blackfoot Trail interchange modifications
- Country Hills Boulevard Interchange improvements
- 128 Avenue N.E. Interchange

MEDIUM-TERM

Phase 3

- Anderson Road / Bow Bottom Trail Interchange improvements including
  - Collector / Distributor System – between Barlow Trail and Southland Drive
  - Southland Drive Interchange reconstruction
  - 11 Street S.E. Interchange modifications (southbound)
  - Heritage Meadows Way Interchange modifications (northbound)
  - 24 Street S.E. Interchange modifications
  - Barlow Trail Interchange modifications

Phase 4

- 16 Avenue N.E. interchange improvements Deerfoot Trail to Barlow Trail
  - 16 Avenue / 19 Street N.E. interchange
  - 16 Avenue / Barlow Trail N.E. interchange reconfiguration
  - New 16 Avenue N.E. overpass structure at Deerfoot Trail

LONG-TERM

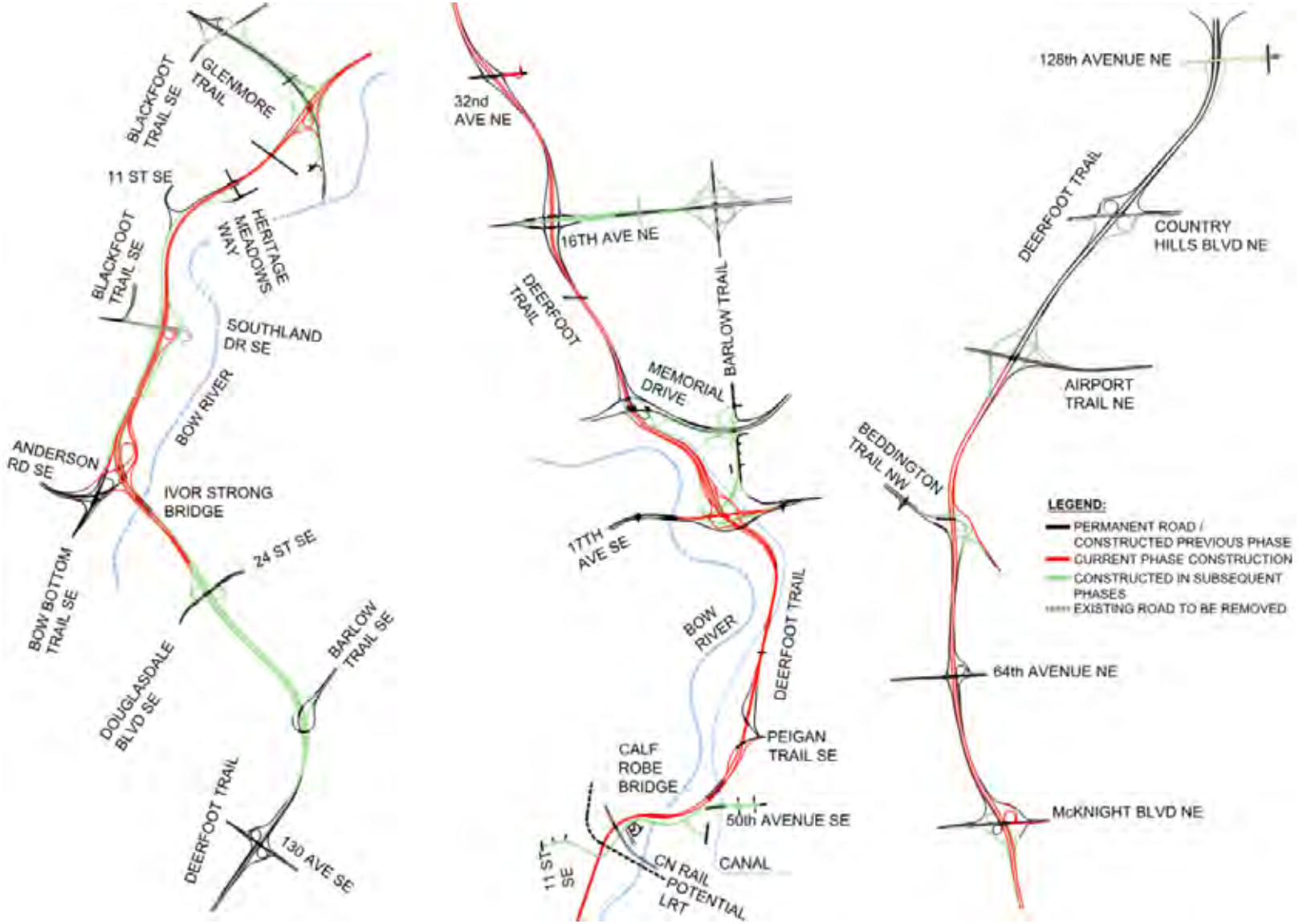
Phase 5

- 50 Avenue S.E. Connector
- Beddington Trail Interchange completion
- McKnight Boulevard Interchange improvements
- Airport Trail Interchange improvements

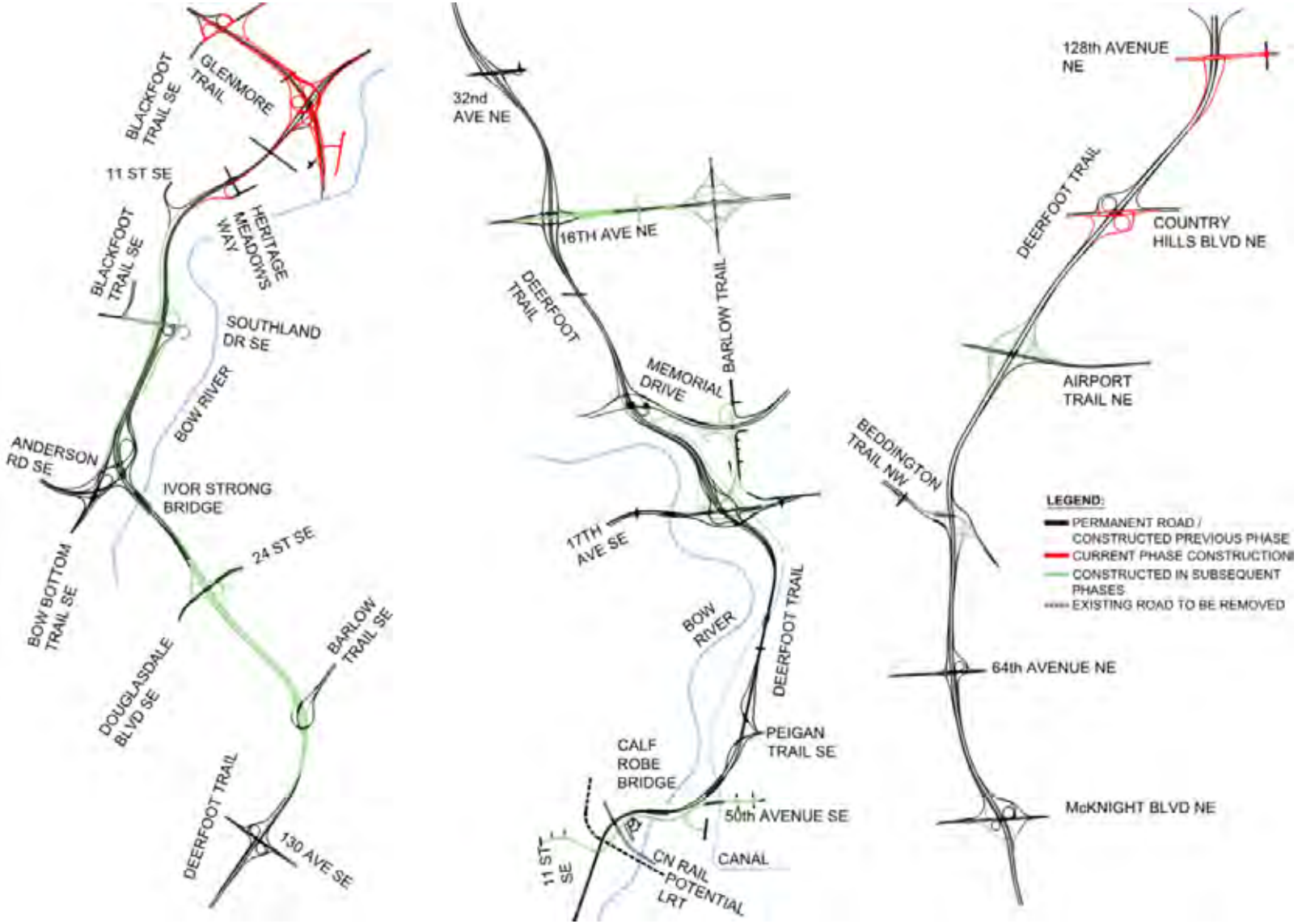
Phase 6

- Memorial Drive Interchange improvements
  - Construct new Southbound to Eastbound ramp
  - Remove existing at-grade intersections
- 17 Avenue S.E. Interchange
  - Reconfigure interchange to align Blackfoot Trail to Barlow Trail
  - Reconfigure Memorial Drive / Barlow Trail interchange

Short-Term

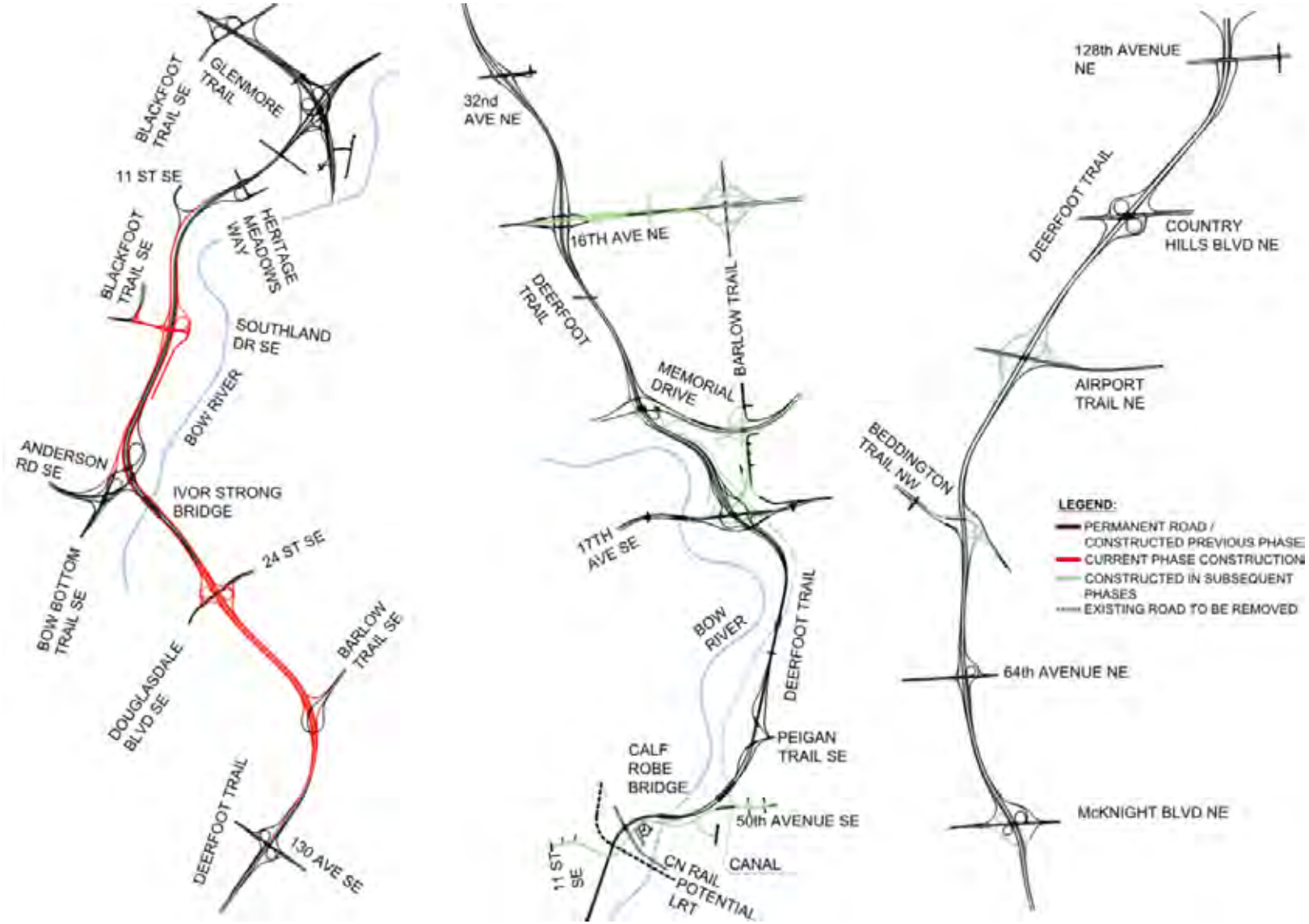


PHASE 1

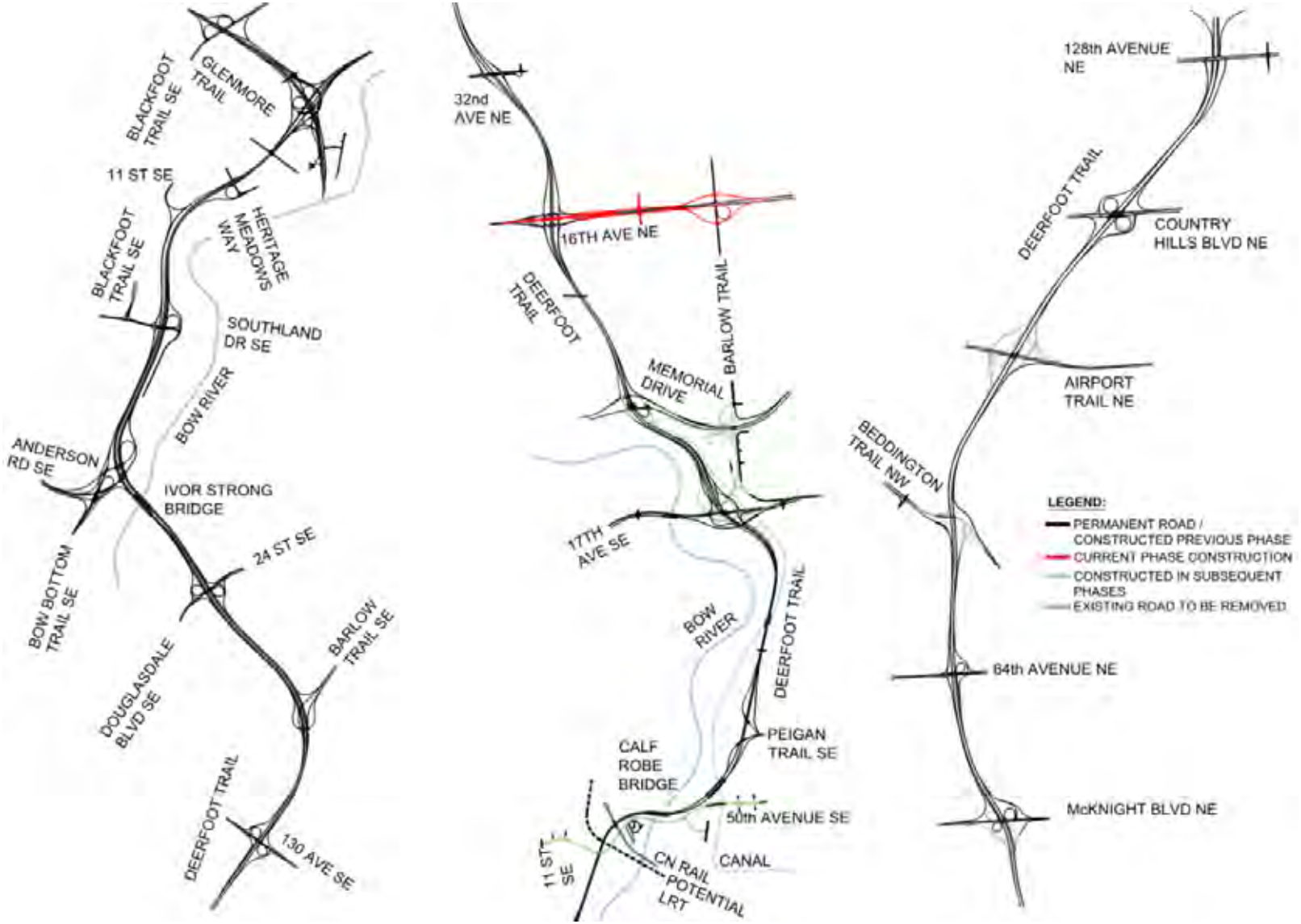

BLACKFOOT TRAIL SE
GLENMORE TRAIL
11 ST SE
BLACKFOOT TRAIL SE
HERITAGE MEADOWS WAY
SOUTHLAND DR SE
BOW RIVER
ANDERSON RD SE
IVOR STRONG BRIDGE
24 ST SE
BOW BOTTOM TRAIL SE
DOUGLASDALE BLVD SE
BARLOW TRAIL SE
DEERFOOT TRAIL
130 AVE SE
32nd AVE NE
16TH AVE NE
DEERFOOT TRAIL
MEMORIAL DRIVE
BARLOW TRAIL
17TH AVE SE
BOW RIVER
DEERFOOT TRAIL
PEIGAN TRAIL SE
CALF ROBE BRIDGE
50th AVENUE SE
CANAL
11 ST SE
CN RAIL POTENTIAL LRT
128th AVENUE NE
DEERFOOT TRAIL
COUNTRY HILLS BLVD NE
AIRPORT TRAIL NE
BEDDINGTON TRAIL NW
LEGEND:
PERMANENT ROAD / CONSTRUCTED PREVIOUS PHASE
CURRENT PHASE CONSTRUCTION
CONSTRUCTED IN SUBSEQUENT PHASES
EXISTING ROAD TO BE REMOVED
64th AVENUE NE
McKNIGHT BLVD NE

PHASE 2

Medium-Term



PHASE 3


BLACKFOOT TRAIL SE
GLENMORE TRAIL
11 ST SE
BLACKFOOT TRAIL SE
HERITAGE MEADOWS WAY
SOUTHLAND DR SE
BOW RIVER
ANDERSON RD SE
IVOR STRONG BRIDGE
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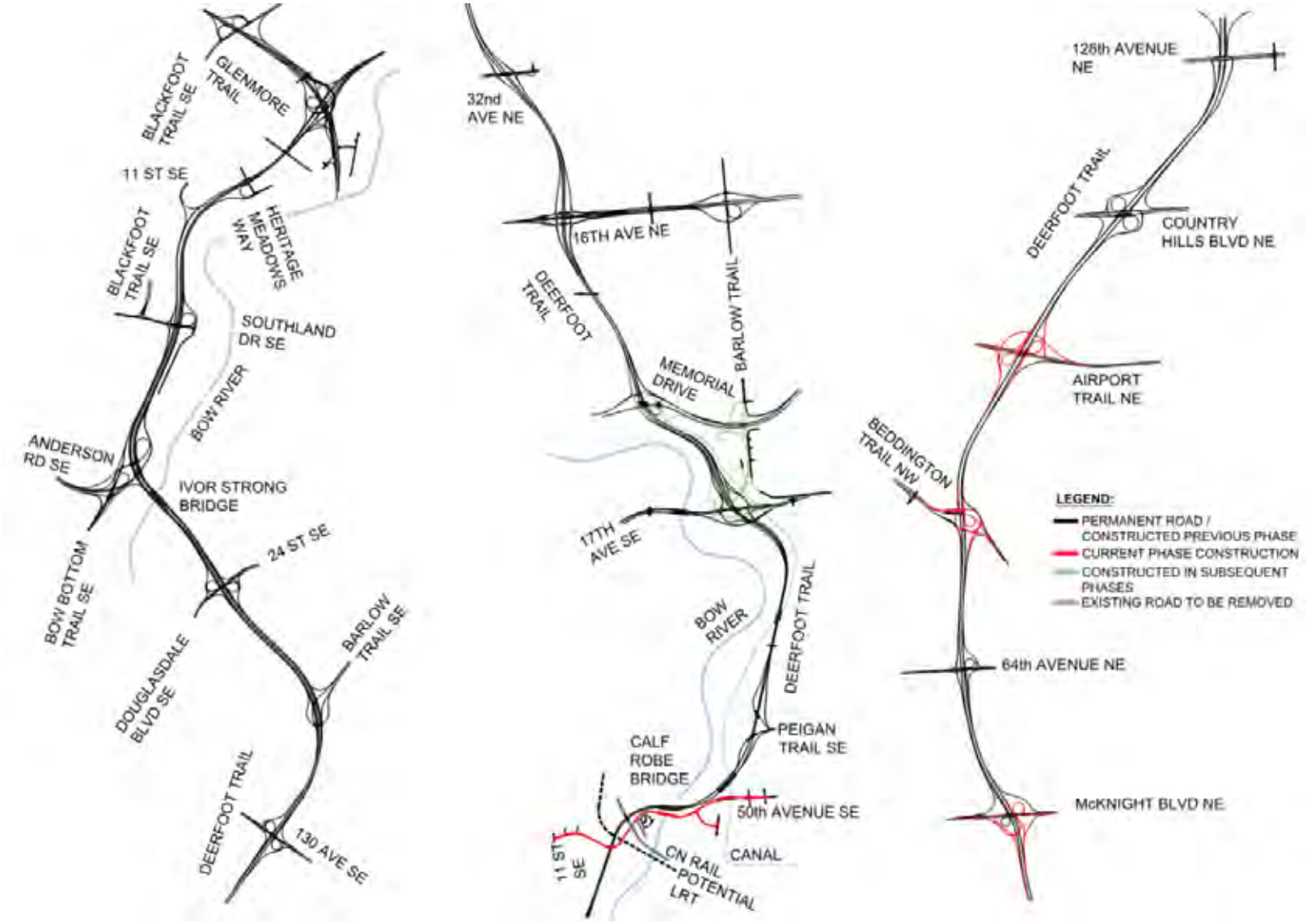
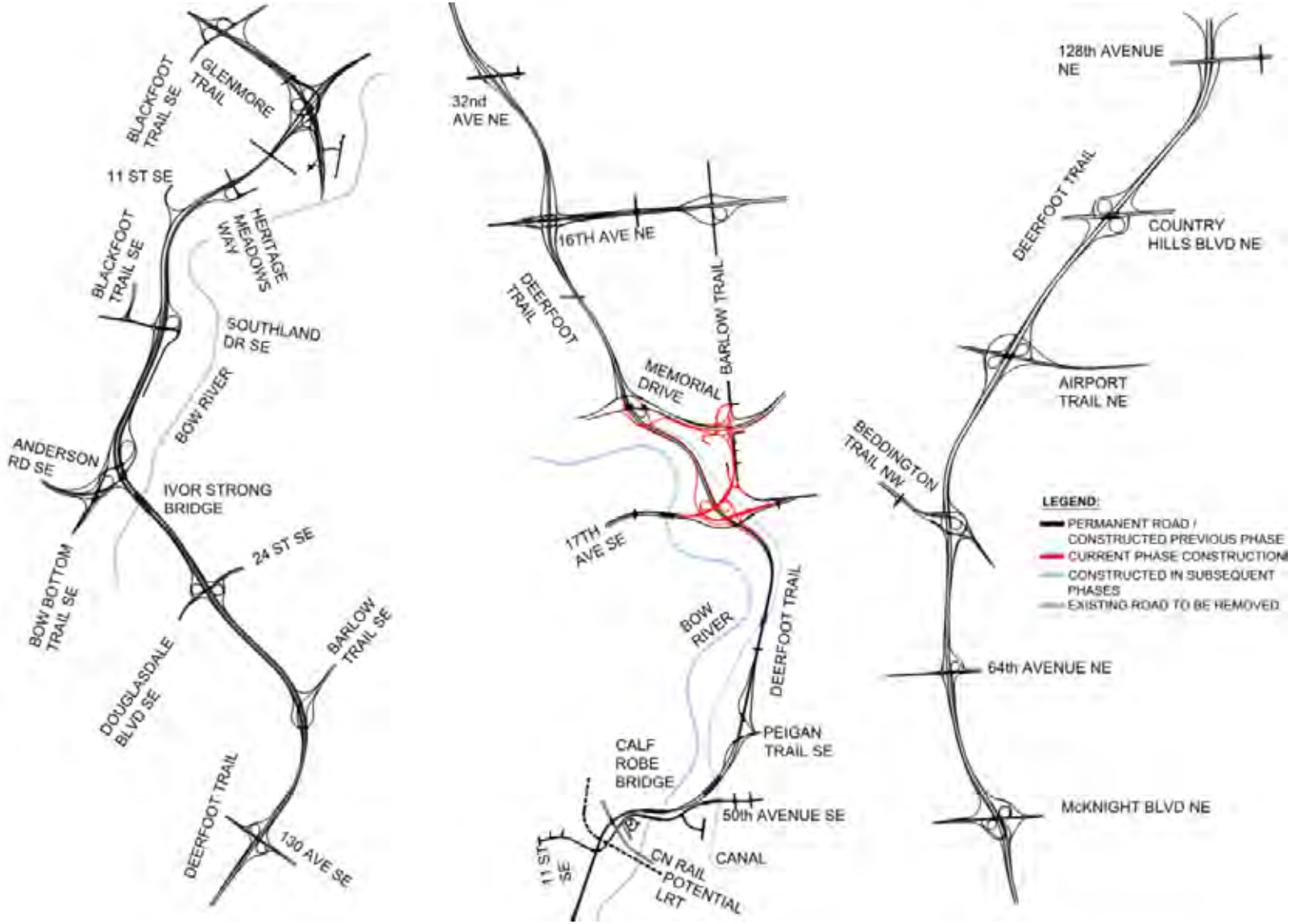
DEERFOOT TRAIL
BARLOW TRAIL
MEMORIAL DRIVE
17TH AVE SE
BOW RIVER
DEERFOOT TRAIL
PEIGAN TRAIL SE
CALF ROBE BRIDGE
50th AVENUE SE
11 ST SE
CN RAIL POTENTIAL LRT
CANAL
128th AVENUE NE
DEERFOOT TRAIL
COUNTRY HILLS BLVD NE
AIRPORT TRAIL NE
BEDDINGTON TRAIL NW
LEGEND:
PERMANENT ROAD / CONSTRUCTED PREVIOUS PHASE
CURRENT PHASE CONSTRUCTION
CONSTRUCTED IN SUBSEQUENT PHASES
EXISTING ROAD TO BE REMOVED
64th AVENUE NE
McKNIGHT BLVD NE

PHASE 4

Long-Term



PHASE 5


BLACKFOOT TRAIL SE
GLENMORE TRAIL
11 ST SE
BLACKFOOT TRAIL SE
HERITAGE MEADOWS WAY
SOUTHLAND DR SE
BOW RIVER
ANDERSON RD SE
IVOR STRONG BRIDGE
24 ST SE
BOW BOTTOM TRAIL SE
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CN RAIL
POTENTIAL LRT
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128th AVENUE NE
DEERFOOT TRAIL
COUNTRY HILLS BLVD NE
AIRPORT TRAIL NE
BEDDINGTON TRAIL NW
LEGEND:
PERMANENT ROAD / CONSTRUCTED PREVIOUS PHASE
CURRENT PHASE CONSTRUCTION
CONSTRUCTED IN SUBSEQUENT PHASES
EXISTING ROAD TO BE REMOVED
64th AVENUE NE
McKNIGHT BLVD NE

PHASE 6

Next Steps

Deerfoot Trail is part of the provincial highway network and is therefore under the care and control of the Government of Alberta (Alberta Transportation).

The Deerfoot Trail Study was undertaken by The City of Calgary with significant input by Alberta Transportation in recognition of this broader context. Future improvements to the corridor would be led by the Government of Alberta and must meet the needs of both The City and Provincial networks.

The Government of Alberta has included funding in the current capital plan for improvements to Deerfoot Trail. Although no project has been announced, the scope of any improvements undertaken would be based on the recommendations contained in the Deerfoot Trail Study.

Further information on Alberta's Capital Plan is available at www.alberta.ca/capital-plan.aspx.

Future improvements to Deerfoot Trail will meet the needs of both The City and Provincial networks.