

## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

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### **EXECUTIVE SUMMARY**

ImagineCalgary outlined a vision of the future of our city which balanced a vibrant culture and robust economy with a healthy environment. A significant part of that vision centred around a high quality public transit system. The Green Line Light Rail Transit (LRT) forms one of the key components of Calgary Transit's future. The long-term vision for the Green Line LRT is Calgary's third light rail line linking north central Calgary through the downtown core to the deep southeast. Once fully constructed the Green Line LRT will include 46 km of low floor LRT and connect 28 stations between 160 Avenue North to Seton in the Southeast. It will introduce fast, frequent and reliable LRT service to tens of thousands of Calgarians, integrating with the Red and Blue LRT lines at a 7 Avenue SW Station, expanding customer access to all of Calgary.

This report closes the visioning and planning phase whereby the alignment and stations are set, the necessary connections to stations have been identified, the Transit Oriented Development concepts are complete, and the framework for City Shaping implementation is understood. The culmination of this work is presented in the Green Line LRT long-term vision (Attachment 1), a holistic guide for future investments towards transforming communities along the Green Line LRT corridor considering people, places, and programs that are connected by reliable transit.

The focus of this report is the recommended alignment and station locations for the Green Line LRT including the recommendation to combine stations resulting in the removal of 9 Avenue N and 72 Avenue N stations, and a final Beltline to Inglewood/Ramsay alignment. This report also includes an attachment on Green Line Urban Integration, the recommended principles that will guide how Green Line LRT infrastructure will be integrated into communities along the line (Attachment 2).

Complimentary reports for City Shaping and Transit Oriented Development implementation were respectively presented at the 2017 June 7 meeting of the SPC on Community Protective Services (CPS2017-0469) and at the 2017 June 14 meeting of the SPC on Planning and Urban Development (PUD2017-0471).

### **ADMINISTRATION RECOMMENDATIONS:**

That the SPC on Transportation and Transit recommends that Council:

1. Approve the recommended alignment and station locations for the Green Line Light Rail Transit (LRT) long-term vision from 160 Avenue N to Seton as per Attachment 1 and 3;
2. Approve the recommended Green Line Urban Integration (GLUI) for the full Green Line LRT from 160 Avenue N to Seton as per Attachment 2;
3. Direct Administration to report back no later than Q1 2018 with a Stage 1: 16 Avenue N to 126 Avenue SE project update including a recommended contracting strategy and future staging approach; and
4. Direct Administration to bring this report forward to the 2017 June 26 Regular Meeting of Council along with the associated reports from the SPC on Community and Protective Services (CPS2017-0469) and the SPC on Planning and Urban Development (PUD2017-0471).

### **PREVIOUS COUNCIL DIRECTION/POLICY**

**GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

At the 2017 April 10 Combined Meeting of Council Report TT2017-0236 (Green Line Program Update) was approved as follows:

“That Council:

1. Receive this report for information;
2. Direct Administration to proceed with additional design and investigation of the underground alignment option in the Beltline to Macleod Trail SE while continuing to evaluate options, not limited to the two surface options from Macleod Trail SE to Inglewood/Ramsay Station, and to continue to collaborate with key area stakeholders to consider various objectives; and
3. Direct Administration to report back with a final Beltline to Inglewood/Ramsay alignment and station locations recommendation no later than 2017 June.”

At the 2017 May 15 Strategic Meeting of Council, Report C2017-0467 (Green Line LRT: Building the Core) was approved as follows:

“ADOPT, AS AMENDED, Moved by Councillor Keating, Seconded by Councillor Stevenson, that Recommendation 1 be adopted, as amended, as follows:

That Council:

1. Proceed with Stage 1 Project based on: 16 Avenue N (Crescent Heights) to 126 Avenue SE (Shepard) subject to Council’s final approval of the alignment, station locations, and transit oriented development concept plans based on the Class 3 capital estimate of \$4.65 Billion construction cost contingent on securing funding as per #2 and #3 below.
2. Prepare the required business case(s) for submission to the Government of Canada to support a request of \$1.53 Billion plus financing to support the Stage 1 Project;
3. Prepare the required business case(s) for submission to the Government of Alberta to support a request of \$1.56 Billion plus financing to support the Stage 1 Project;
4. Request the Mayor to work with administration in the beginning making the case for funding of the rest of the line, beginning as soon as possible;
5. Direct Administration to bring a revised financial strategy, pending confirmation of federal and provincial funding, and including capital, financing and operating cost models, to Council as part of the 2018 Business Plan and Budget deliberations; and
6. Direct that Attachment 2 and Distribution #3 remain confidential pursuant to Sections 24(1)(a), 24(1)(b) and 25(1)(b) of the Freedom of Information and Protection of Privacy Act, until the Green Line construction has been completed.

MOTION ARISING, Moved by Councillor Chu, Seconded by Councillor Keating, that with respect to Report C2017-0467, Council direct Administration to:

1. Develop timeline scenarios for building the remainder of the Green Line showing the construction timelines assuming funding is secured for stations north of 16 Avenue North and south of 126 Ave SE;
2. Seek funding options so that the remainder of the line can be constructed without interruption once the opening day scenario is completed;
3. Continue land acquisition of Centre Street North properties on an opportunity basis and develop funding options, in advance of construction; and

## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

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4. Host open houses to provide residents and businesses who are not part of the opening day scenario with information regarding the completion of the green line including land acquisition.”

### **BACKGROUND**

Functional planning for the Green Line LRT started as two separate studies; the Southeast LRT and the North Central LRT Corridor Study. Conceptual plans for the Southeast LRT were first undertaken in 1983 to establish an alignment and station locations, and were updated in 2012.

In 2011, Administration engaged the communities in the North Central corridor to explore alternative alignments. The North Central LRT Route Planning Study was started in 2012 and in 2015 March, Council approved Centre Street North as the route for the Green Line LRT (4 Street SE/10 Avenue S to 160 Avenue N).

In 2015 December, Council approved the recommendation to amalgamate all Green Line LRT project activities under a single program with the objective of completing the functional planning study for the full corridor and to deliver a phased implementation approach, dependent on funding. Following Council's direction, Administration has brought forward a series of reports with segment updates for the North, Centre City, and Southeast. Advancing the planning, design, and engagement for the various geographical segments towards bringing all segments to a functional level of design establishes the full 46 km alignment and 28 stations.

At the 2017 May 15 Strategic Meeting of Council, Administration presented the recommended first Green Line LRT project for construction. Council directed Administration to proceed with the first construction project, Stage 1: 16 Avenue N to 126 Avenue SE, to prepare the necessary business cases for funding, and to report back with a work plan for future stages of the Green Line.

Functional planning is now complete for the entire 46km alignment and preliminary design and contracting strategies are advancing for the Stage 1 construction project. Construction activities, such as utility relocations, have commenced to begin to clear the right-of-way for the Stage 1 construction project. Start of construction is targeted to begin in 2020 with LRT service starting in 2026. A recommendation on delivery methodology will come back to Council by Q1 2018.

### **INVESTIGATION: ALTERNATIVES AND ANALYSIS**

Administration has concluded the functional planning for the full Green Line LRT corridor from 160 Avenue N to Seton. This program milestone concludes the long-term vision phase, as per Attachment 1, and is key to informing construction stages, planning for future project extensions, and supporting funding requests. The long-term vision also extends beyond the immediate construction of the LRT by providing the certainty of a fixed rail system in order to attract Transit Oriented Development and City Shaping initiatives towards the transformation of the communities along the corridor. The four layer approach used to develop the Green Line LRT long-term vision ensured that consideration of people, places, and programs connected by reliable transit was demonstrated and that a holistic vision was achieved.

The vision for the Green Line LRT is a transit service that improves mobility to existing communities in north and southeast Calgary, connecting people and places, and enhancing the

## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

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quality of life in the city. The Green Line LRT will provide a fast, frequent and reliable community connected service from 160 Avenue N to Seton adding the City's third LRT line and serving an estimated 240,000 Calgarians at full community build out (2076 horizon year). To deliver the Green Line LRT successfully a series of plans were developed to guide all aspects of the implementation. The long-term vision, Attachment 1, is the overarching document and represents the holistic approach undertaken to plan the corridor. It will be used to inform the subsequent implementation documents as outlined in Attachment 5.

As a result of the Green Line LRT connecting through various communities with varying contexts, Administration identified the need to better illustrate how the physical Green Line LRT infrastructure would integrate into its environment i.e. fit, enhance, and transform the various communities along the line. The outcome was the creation of the Green Line LRT Urban Integration (GLUI), Attachment 2, which is to be used as a framework for integrating the Green Line LRT. It is intended to help visualize and communicate how the Green Line LRT will fit within the communities. Council's approval of the GLUI is key to acknowledging the context sensitivity of how the LRT infrastructure will inform the surrounding land use, complements the Municipal Development Plan (MDP), and establishes the guiding principles for future design development.

The other implementation documents, included in Attachment 5, form The City's commitment to deliver a complete Green Line LRT program with benefits to Calgarians; one that is inextricably linked by the layered approach and that leverages the efforts of each. Foundational to the long-term vision is setting the alignment and stations from which all the other objectives and initiatives can occur. The following is a summary of the final recommendations.

### **Final Alignment and Station Locations: 160 Avenue N to Seton**

Over the last 18 months, Administration has brought the three geographical segments of the 46 km alignment and 28 stations into one cohesive long-term vision from which implementation can now occur. The refinements to the alignment and stations were influenced by the integrated approach to transportation, land use planning, City Shaping objectives, and public engagement. The alignment and station location recommendations included in Attachment 1 and 3 build upon the functional studies previously completed and reflect the evolution of integrated transportation and planning.

The remaining alignment sections that require Council's approval and that will establish the full Green Line LRT corridor from 160 Avenue N to Seton are as follows:

### **Beltline to Inglewood/Ramsay**

In 2017 April, Council approved the underground alignment on 12 Ave S west of Macleod Trail SE. Administration was directed to investigate alignment options east of Macleod Trail SE to connect the Beltline to Inglewood/Ramsay station.

Key considerations for the Beltline to Inglewood/Ramsay alignment recommendation is coordination with the various planning initiatives in these communities as well as discussions with the communities. Initiatives in the area include, Calgary Municipal Land Corporation's (CMLC) Rivers District Masterplan, the potential new events centre site in Victoria Park, 17 Ave

## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

SE connection to Stampede grounds, Calgary Stampede's long term vision, the 9 Avenue SE bridge replacement project, the 25 Avenue S LRT Grade Separation Study, and the Inglewood and Ramsay Area Redevelopment Plans (ARP).

Through discussion with all stakeholders, Administration developed two additional alignment options to connect the Beltline to Inglewood/Ramsay station. They were shared at public engagement events in-person, and online, in early 2017 May. The new alignment options addressed some of the technical constraints and stakeholder concern with respect to the previous alignment options. The four alignment options reviewed were:

- Option 1 – North of the Victoria Park Transit Centre
- Option 2 – MacDonald Avenue
- Option 3 [new] – Staged around the Victoria Park Transit Centre
- Option 4 [new] – Transition to 10 Avenue SE

The opportunities and challenges of Options 1 and 2 were presented in the report to Council TT2017-0236. A summary of the opportunities and challenges of Options 3 and 4 are presented below, and included in Attachment 6:

### Opportunities with 'Option 3 – Staged around the Victoria Park Transit Centre':

- Provides flexibility in the longer term to adapt the Green Line LRT alignment when the Victoria Park Transit Centre is relocated. There is an opportunity for comprehensive station development with adjacent lands.
- Improves LRT operations in the short and long term, compared to 'Option 1 – North of the Victoria Park Transit Centre'.
- In the long term, the station location supports redevelopment in the cultural and entertainment district.
- Connects with previously approved Green Line LRT alignment at the Elbow River and minimizes impacts in the community of Ramsay.

### Challenges with 'Option 3 - Staged around the Victoria Park Transit Centre':

- There would be no Green Line LRT station to serve Victoria Park and Stampede Park until the Victoria Park Transit Centre is relocated in the long term.
- Impacts to Victoria Park Transit Centre operations, including site layout, site access/egress, and access to bus storage and maintenance areas.
- Additional cost associated with realigning track and infrastructure after the relocation of the Victoria Park Transit Centre.
- Green Line LRT alignment will require a portion of the developable land area of the Victoria Park Transit Centre lands. Large developable parcels would still remain, and there is opportunity to develop above the station/tracks.
- Impact to local access/circulation where LRT runs at surface and crosses 12 Ave SE. Stakeholder concerns regarding portal location on 12 Ave SE.

### Opportunities with 'Option 4 - Transition to 10 Avenue S':

- LRT alignment is grade-separated providing improved LRT and traffic operations.

### **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

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- LRT run time is improved compared to previous alignment around Victoria Park Transit Centre with tight radius.
- No long term impact to the road network.
- Minimal disruption to existing residential communities.
- Minimal impact to Victoria Park Transit Centre operations.
- Large contiguous development parcel remains after relocation of Victoria Park Transit Centre.
- Aligns with initial master planning concepts for the future vision of Victoria Park, including maintaining access and circulation within the study area.
- Provides a multimodal transit station for transfers from future LRT, regional commuter rail, and high speed rail.
- The station location provides access for East Village within walking distance to a Green Line LRT station.

#### **Challenges with the 'Option 4 - Transition to 10 Ave S':**

- Acquisition of land and the risk of potential schedule impacts. Additionally, there is uncertainty with respect to the costs associated with acquiring these lands.
- Requirement to work closely with area landowners to coordinate an outcome that supports various interests and maintains flexibility for future redevelopment.
- Tunnel will be constructed under private parcels.
- Tunnel construction will be complex and requires additional oversight in the design and construction.

The two new alignment options were introduced to the public in late 2017 May. Approximately 140 people attended the information sessions with additional feedback provided online. Overall the response was positive with the highest level of stakeholder support for Option 4. Administration also undertook meetings with area property owners to discuss the new options.

Administration has concluded the evaluation of the options, based on a number of considerations including; constructability, cost estimates, bus and LRT operations, LRT travel times and transit customer experience, special events operations, community impacts, development opportunities, traffic impacts stakeholder sentiment, and risks.

Administration recommends 'Option 4 - transition to 10 Avenue S' to connect the Beltline to Inglewood/Ramsay station. The recommendation of the 'transition to 10 Avenue S' sets the final piece of the Green Line LRT alignment, including the station location in Victoria Park. This allows Administration to proceed with the next level of design, stakeholder engagement, and to initiate land acquisition.

#### **Station Refinements in Crescent Heights/Tuxedo Park**

The North Central LRT Corridor study previously contemplated two stations located at 9 Avenue N and 16 Avenue N. Through technical design refinement the final placement of the underground stations were evaluated. Considerations included ridership, cost, geometric design, station entrance locations at surface, and station catchment areas.

## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

Further design of the stations for both 9 Avenue N and 16 Avenue N shifted the stations closer together resulting in overlapping catchment areas.

An underground station located south of 16 Avenue N and including station entrances at surface at 14 Avenue N and north of 16 Avenue N provides access for Crescent Heights and Tuxedo Park, maximizing the ridership catchment area, minimizing station redundancy, optimizes LRT operations, and reduces construction and operating costs. Proposed station adjustments were presented to the public; the rationale was well received with mixed support. It is Administration's recommendation to not include the 9 Avenue station in the functional alignment.

### **24 Avenue N (Tuxedo) to 160 Avenue N (Keystone)**

The north segment of Green Line LRT consists of 9 station locations and 16 km of LRT track, covering the geographical area between 24 Avenue N to 160 Avenue N. The vision and alignment for this segment is built upon the North Central LRT Corridor Study. A previous study evaluated four corridors (Centre Street N, Edmonton Trail NE, Nose Creek, and 4 Street NW) for the placement of the future Green Line LRT, with Centre Street selected as the preferred alignment.

In the course of the current Green Line LRT work, refinements were made to the original corridor study through public consultation, ridership forecasts, station area planning, LRT requirements, and technical constraints resulting in the conclusion of the functional plan for this segment as follows.

#### **Station Refinements**

In order to better understand LRT station locations and uses, Administration hosted a series of station area workshops where public input was collected to identify key community and neighbourhood mobility patterns. The output of these sessions, in addition to operational and technical requirements, informed the placement of the proposed LRT stations. In certain instances, stations shifted from their original location in the North Central LRT Corridor Study to better integrate with existing community services and amenities. As a result, station catchment areas overlapped in some locations which enabled the opportunity to combine two separate stations into one. This was the case for 64 Avenue N and 72 Avenue N where there was a strong public desire to have a station adjacent to the Thornhill Civic Centre. Shifting the 64 Avenue N station to 68 Avenue NE created very close spacing and overlapping catchment areas to the 72 Avenue N station. In order to minimize redundancy, optimize LRT operations and reduce construction and operating costs, it is Administration's recommendation that the 72 Avenue N station not be included in the north functional alignment.

#### **Centre Street Configuration**

Consistent with the North Central LRT Corridor Study, traffic lane configurations will allow for a single lane of travel in each direction between 16 Avenue N and McKnight Boulevard and two lanes of travel north of McKnight Boulevard. Considerations for complete street principles, including urban realm and street parking will be part of the next phase of design. At present, Administration is working with stakeholders in the Keystone area to ensure LRT operational needs are protected for and incorporated in future area development.

## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

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Further details of the alignment and stations are included in Attachment 1 and 3.

### **Next Steps**

Council's approval of the Green Line LRT long-term vision directs Administration to proceed into the implementation phase of the program. Below is a summary of the program next steps and included in Attachment 4.

### Design

Design for the Council approved Stage 1 project will continue to progress towards the development of procurement documents. This includes continued refinement of the preliminary design, discussions with developers and adjacent land owners, further coordination with other relevant City projects, and continued collaboration between Transportation, Planning and Development, and Community Services as part of the four layer approach.

- **GLUI:** As the design is further refined GLUI volume 1, Attachment 2, will be advanced to include the standards required for infrastructure integration and used for Administration.
- **Green Line LRT Concept of Operations:** Due to the geographical expanse and the numerous communities the Green Line LRT connects to an operational plan is required to provide parameters and targets. The operational plan will be used to communicate transit's integrated service levels, travel times, speeds, connections with other transit services such as the Red and Blue LRT lines or the bus rapid transit network, regional connections, and interfaces with the overall transportation network.
- **Connections to Stations:** As part of the program wide engagement and the functional planning connections to stations by all modes (walking, cycling, bus transfer, kiss and ride and park and ride) have been studied. Missing links and opportunities to increase use of these modes, were identified within an 800m radius at each station, outside of the Centre City. Examples of these links include sidewalks, bus platforms and new traffic signals. Consideration was included for a parallel pathway along the corridor to ensure mobility connections are provided to the stations and connected to the communities adjacent to the Green Line. The objective of the analysis was to measure and determine the highest value links contributing to ridership. Links that are not determined as supporting ridership can be addressed through other city programs and through future development initiatives around station areas.

### Program Schedule

The next critical stage gate milestone is the final funding commitments from the other orders of government. The Green Line LRT program has been managing the schedule using a stage gate approach to monitor progress and to mitigate lost effort. Upon funding commitments being made, Administration will be in a position to confirm the contracting strategy, proceed with the procurement for the Stage 1 project, with an anticipated start of construction in 2020 and an opening day of 2026. Attachment 4 includes the updated schedule and stage gate milestones for the Green Line LRT program.



## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

### **Project Delivery**

Administration is currently evaluating the options for contracting including delivery of detailed design, construction, operations and maintenance. A recommendation is dependent on the confirmation of available funding and resulting project scope.

### **Stage 1 and Future Stages**

As directed by Council at the 2017 May 15 Strategic Meeting of Council, Administration is proceeding with Stage 1: 16 Avenue N to 126 Avenue SE. Administration will also start the development of a work plan for the future stages of the Green Line LRT. The work plan will include the development of timeline scenarios assuming ongoing funding was secured, evaluating funding options with the objective of uninterrupted construction, the development of a land acquisition strategy to improve the construction readiness of future stages, and the creation of a public communication plan. The work plan with associated budget implications and a land acquisition strategy will be presented to Council no later than Q1 2018.

Using funding made available to date by the Province of Alberta and the Government of Canada, enabling works projects have advanced. Projects include major utility relocations, Canadian National Railway and Canadian Pacific rail adjustments, building removals, environmental remediation, and transit improvements. Work packages continue to be developed and finalized. The first tenders for the initial enabling works projects are targeted to be released in 2017 June.

### **Stakeholder Engagement, Research and Communication**

Public engagement has been ongoing since the development of the early functional studies for both the north and southeast segment of the corridor. Continued engagement since the end of 2015, once the Green Line LRT was formalized as a single program, has included various stakeholders such as the development industry, City wide business units, and the public. Input from all stakeholders has been critical to the recommendation of alignment and station locations, the development of TOD concepts and City Shaping principles. Also critical to influencing the alignment, station locations, and the integration of the LRT within conceptual and already underway development plans was the coordination with adjacent developers/landowners. The recommendations balance community priorities, are supportable by the market, align with City objectives, and demonstrate the vision that the Green Line LRT is more than a transit line; it is a city shaping opportunity.

A detailed summary of the public engagement and the influence on the Green Line LRT is provided in Attachment 1. The public engagement process was a successful, collaborative endeavour with stakeholders who have expressed support for not only the recommended alignment, stations, and TOD sites, but also for the Green Line LRT as transformational for the communities it serves and connects to.

### **Strategic Alignment**

The Green Line LRT is aligned with the future vision of our city as articulated in imagineCALGARY and is identified as part of the City's RouteAhead 30-year Strategic Plan for Transit in Calgary. The RouteAhead plan is aligned with the policy direction and strategic goals of the Municipal Development Plan (MDP) and Calgary Transportation Plan (CTP), the 2020 Sustainability Direction and Council's Action Plan priorities. RouteAhead was developed in

## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

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coordination with Investing in Mobility to ensure strategic alignment within the Transportation Department capital plans. The identification of priorities in this report are consistent with the Growth Management Framework and the balance of growth between established communities and new green-field communities. Additional details regarding alignment with City strategies is included in Attachment 1.

### **Social, Environmental, Economic (External)**

The Green Line LRT program will result in outcomes which include social, environmental, and economic benefits for generations to come.

#### Social

The Green Line LRT supports mixed-use and mixed income communities to reach community aspirations for vitality, sustainability and affordability. Mixed-use neighbourhoods are the places where people live, work, play, shop and learn. Mixed income communities are financially accessible to all Calgarians. A major benefit of increasing access to rapid transit is the overall lowering of transportation costs, and the fundamental link between cost and affordability of housing, especially lower income households. Consideration for multi-generational communities and the places where residents can transition through all stages of life ensure a long-term, sustainable and resilient plan.

#### Environmental

Investment in transit provides environmental benefits that extend beyond the reduction of greenhouse gases. Improved, higher quality transit service and complete communities attract higher levels of ridership, decreasing the environmental impacts associated with urban travel but also support compact growth which in turn provides health benefits. The Canadian Urban Transit Association (CUTA) has outlined the public health benefits of public transit to include improved urban air quality and increased physical activity, which can lower the risk for many diseases. Reduction in greenhouse gases and social health benefits are therefore realized by maximizing the transit investment. The City of Calgary has committed to reducing greenhouse gases (GHG) from its corporate operations, through energy efficiency and conservation programs and a shift to using lower carbon and renewable energy sources.

#### Economic

Recommendations in this report were strategically conceived by integrating transit and planning. Leveraging the transit investment maximizes the economic return through land use with the intent of providing new and redevelopment opportunities along the corridor. This reduces the fiscal impact of growth, and promotes integrated and sustainable development. The investment in transit provides the opportunity to attract global corporations in innovative industries to promote a diversified economy in Calgary. As a result, more population and activity generates sustained ridership and economic growth thereby creating a multiplier effect of the infrastructure investment.

Investing in Calgary's future also results in economic resiliency through job creation, Gross Domestic Product (GDP) growth, with direct benefits resulting from construction, operations and maintenance, increased property values, savings for households, and productivity gains.

## **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

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### **Financial Capacity**

#### **Current and Future Operating Budget:**

The Green Line LRT will require an investment in operating funding upon commencement of service. The long term vision will substantially expand The City's LRT network, and will require additional staff (LRT drivers, Peace Officers, station cleaners, service designers, track maintainers, etc.), and maintenance and storage facilities. The Stage 1 project operating budgets have been calculated however future stages of the Green Line LRT are not yet known as there are a number of factors to be considered such as the level of service provided, actual ridership and vehicle characteristics. Operation and Maintenance cost estimates will be determined as details of future staging options are developed.

#### **Current and Future Capital Budget:**

To date funding for the Green Line LRT has been a three party partnership between The Government of Canada, The Province of Alberta and The City of Calgary. Initial funding contributions, totalling over \$250 million, towards the Green Line LRT from both The Federal and Provincial Governments, through the Public Transit Infrastructure Fund (PTIF) Phase 1 and GreenTrip, respectively are currently being utilized for enabling works projects.

In order to proceed to construction of Stage 1, The City of Calgary must secure funding from The Government of Canada's PTIF Phase 2 program along with matching funding from the Province of Alberta. These funds will be combined with City of Calgary funds to enable the total construction program. Discussions with the Province of Alberta and the Government of Canada to fund the Stage 1 project are underway and Administration will be developing business cases to be submitted to support the funding of Stage 1.

### **Risk Assessment**

As part of the functional planning for the full corridor, qualitative and quantitative risk assessments including a validation process using Monte Carlo statistical analyses was undertaken. Further, a team of external experts from across North America recently reviewed the project and provided additional suggested risk mitigation measures and flagged risks to be further evaluated.

The following risks are the focus of Administration's ongoing risk management:

#### **Land**

- Land acquisition represents one of the highest risks to the project schedule, budget, and readiness. The full Green Line LRT from 160 Avenue N to Seton SE impacts approximately 438 privately owned properties, 286 of which are located between 25 Avenue N to Beddington Trail N. Mitigating the land acquisition risks for the full construction of the Green Line LRT will require a focused land acquisition strategy and dedicated funding.
- Land impacts for the Green Line LRT continue to be refined as Administration works through the design process. Until preliminary design is complete and discussions occur with property owners will the exact impacts and costs be known. The potential exists for additional property requirements to be identified as the design advances. Administration

### **GREEN LINE LRT ALIGNMENT AND STATIONS: 160 Avenue N to Seton**

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will endeavour to achieve negotiated agreements with all impacted property owners within the timelines that are available.

- Administration is working to acquire the remaining 69 of the identified properties for Stage 1 (26 properties have been acquired to date), with closings expected for construction start.

#### **Environmental Contamination**

- Uncertainty of environmental severity and/or extents that was not foreseen through the preliminary site investigation and that may impact the budget and schedule for the project. To mitigate, Administration has taken additional investigation of high risk sites to confirm contamination, quantify potential amounts and provide better cost estimates.

#### **Escalation and Financing Costs**

- The length of time to construct and finance the project will impact total costs. Escalation costs cannot be accurately determined for future staging options as the timing of construction is not yet known. Similarly, financing costs have been excluded for all staging options, including Stage 1, because of the uncertainty of the terms of the funding from The Province of Alberta and The Government of Canada.

#### **REASON(S) FOR RECOMMENDATION(S):**

The Green Line LRT Long Term Vision: 160 Avenue N to Seton provides the guidance for future investments in extensions when the time is right, provides the guidance for integration, and provides the opportunity to leverage this unprecedented investment to shape the growth of Calgary. The alignment and station location recommendations for the Green Line LRT concludes the long-term vision phase for the program. Recommendations were developed after significant consultation, the evaluation of multiple options, informed by the four layer approach, and validated through risk assessments and value management exercises.

#### **ATTACHMENT(S)**

1. Green Line LRT Long Term Vision: 160 Avenue N to Seton
2. Green Line Urban Integration (GLUI) Volume 1
3. Green Line LRT Alignment – 160 Ave N to Seton
4. Green Line LRT Program Milestones
5. Laying tracks for delivering the Green Line LRT
6. Beltline to Inglewood/Ramsay Station - Alignment Options Evaluation