

SOUTHEAST TRANSITWAY (SETWAY) STAGING UPDATE

EXECUTIVE SUMMARY

Beginning in 1999, a series of Light Rail Transit (LRT) functional planning studies and land use plans for Southeast LRT were completed and approved by Council. These studies set the alignment for the future LRT and guided subsequent land use reviews and right of way purchases.

A pre-design study was initiated in fall 2011 that included reviewing:

- the need for LRT in Southeast Calgary
- cost estimates and possible staging
- the ability for The City to develop a convertible busway
- timelines for staging according to ridership and cost effectiveness
- passenger comfort, transit oriented development (TOD) and improved travel speed and reliability

Based on ridership forecasts, capacities of various service options, accessibility objectives and a life cycle cost analysis, a low-floor LRT is needed in the corridor in the long term. In the interim, ridership demand supports a busway within a dedicated corridor.

It is recommended that future funding be used to plan the staging of the transit services in the corridor in greater detail, design all elements of the Southeast Transitway, purchase land for the northern section of the corridor from CP/CN railways and other landowners, and begin construction of a busway in the northern section of the corridor. The preliminary total cost estimated for constructing LRT, purchasing vehicles and building maintenance facilities is \$2.66 billion. The estimated costs for the proposed construction staging are: Stage 1 is \$667 million, Stage 2 is \$1,053 million and Stage 3 is \$940 million.

ADMINISTRATION RECOMMENDATIONS

The SPC on Transportation and Transit recommends that Council:

1. Approve the recommended Ultimate Service Option plan of a low-floor LRT;
2. Approve the recommended Interim Service Option of a staged introduction of a combination of dedicated busway and low-floor LRT;
3. Direct Administration to report to the SPC on Transportation and Transit no later than 2012 December with a recommendation regarding the relative prioritization of the Southeast Transitway (SETWAY) within the Transportation Infrastructure Investment Plan (TIIP); and
4. Direct Administration to continue engagement with key stakeholders and the public to finalize station locations and Transit-Oriented Development (TOD) opportunities.

RECOMMENDATIONS OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED 2012 JULY 18:

That Council:

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1. Approve the recommended Ultimate Service Option plan of a low-floor LRT;
2. Approve the recommended Interim Service Option of a staged introduction of a combination of dedicated busway and low-floor LRT;
3. Direct Administration to report to the SPC on Transportation and Transit no later than 2012 December with a recommendation regarding the relative prioritization of the Southeast Transitway (SETWAY) within the Transportation Infrastructure Investment Plan (TIIP);
4. Direct Administration to continue engagement with key stakeholders and the public to finalize station locations and Transit-Oriented Development (TOD) opportunities; and
5. **Direct the Administration to bring forward a supplemental report, no later than the 2012 September 10 Combined Meeting of Council, detailing the population and land use data on which these ridership forecasts were prepared.**

PREVIOUS COUNCIL DIRECTION / POLICY

At its 2010 July 26 Regular Public Hearing Meeting, Council adopted the recommendations of report LPT2010-58 (Status Update on the Southeast LRT Project) as follows:

- “1. Direct Administration to complete a pre-design study prior to seeking a P3 type of funding mechanism and to fund that study from Calgary’s GreenTRIP Provincial grants, when such funds are available;
2. Prepare an Agreement for signing with the Government of Alberta and Calgary Regional Partnership, under the GreenTRIP funding program to enable construction of an initial phase of the SE LRT that will include the at grade components from 10th Avenue South in the downtown to Douglas Glen, such agreement to be presented to City Council for approval no later than the 2010 November 08 Combined Meeting; and
3. Present financing options to City Council to leverage additional resources that may be needed.”

At its 2011 January 24 Regular Meeting, Council adopted the recommendations in report LPT2011-05 (The GreenTRIP Allocation Proposal (Revised) :

- “1. File the recommendations in reports C2010-69 and LPT2010-58:
2. Receive report LPT2011-05 (including Attachments 1 & 2) for information.
3. Submit a Phase I GreenTRIP application in the amount of \$225.6 Million (\$150.4 Million of Provincial funding), in support of:
 - a) SE LRT/SE BRT (Transitway);
 - b) The purchase of LRV’s;
 - c) 17 Avenue SE BRT and
 - d) TOD land use plan for the SE Transitway
4. Direct Administration to reaffirm Council’s commitment to a SE LRT by way of preparing a report detailing a plan of action to move forward on a SE Transit Way that would be the precursor to a true SE LRT.

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5. Direct Administration to reaffirm Council's commitment to 4 car trains, by preparing a report outlining a detailed plan to identify the number of LRVs needed to run reliable 4 car trains on the LRT lines as soon as practically possible; and
6. Direct that Administration report back to the 2011 March 16 SPC on Land Use, Planning and Transportation with timelines on the above."

At its 2011 May 09 Combined Meeting of Council, report LPT2011-29, (Timeline and Scope for Southeast Transit ways) was received for information. The following time line for delivery of Southeast Transit way was noted:

- "
 - 2011 March-June: Administration prepares the terms of reference for pre-design consulting services.
 - 2011 July: Issue a request for proposals (RFP) for the pre-design services.
 - 2011 October: Select a consultant; start predesign work; input current TOD/land use inventory; conduct public engagement.
 - 2012 Q2: Report to SPC on Land Use, Planning and Transportation on recommended approach (LRT or rail convertible busway), segments/staging, timing and costs. Potential Council approval of funding for segments."...

At its 2011 November 14 Regular Meeting, Council adopted the recommendations of report C2011-89 (Transportation Capital Plan - Supplement to Report LPT2011-78:

- "1. That Council receive this report as an input to the 2012-2014 business plan and budget deliberations in 2011 November;
2. That Council direct Administration, following consultation with the Calgary Regional Partnership, to make an application to the Province's GreenTRIP program to fund a combination of \$500 million for the West LRT project, \$200 million for 50 LRVs and \$12 million for the SETWAY predesign;
3. That Council direct Administration to leverage MSI funding from the West LRT project to fund the matching component of GreenTRIP and other underfunded Transportation projects; and
4. That Council direct Administration to present the results of the TIIP 2013-2022 prioritization process to the SPC on Transportation and Transit no later than 2012 December, with recommendations on application of the available MSI funds.
5. Direct Administration to develop scoping document detailing the work needed to construct the Southeast 17 Corridor Transitway, including what is required for a corporate implementation plan with associated operating budget Impacts, and report back to Council through the SPC on Transportation and Transit no later than 2012 April."

BACKGROUND

Beginning in 1999, a series of LRT functional planning studies and land use plans for Southeast LRT were completed and approved by Council. These studies set the alignment for the future line and guided subsequent land use reviews and right of way purchases.

The Southeast LRT corridor is 26 km long consisting of 18 stations and 11 park and ride lots. This is a new line that does not connect to an existing LRT line. See Attachment 1.

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INVESTIGATION: ALTERNATIVES AND ANALYSIS

A pre-design study was initiated in the fall of 2011 that included a review of ridership estimates, technology options (LRT, bus, streetcar etc.), staging, timing, costs, land requirements, station configuration, and bus to rail convertibility potential.

A summary of the pre-design study findings are outlined below.

Ridership Estimates:

Over the next two decades the population and employment growth for the Southeast corridor will take place primarily in the Seton area at the southernmost end of the Southeast corridor. The employment forecasts indicate that there is expected to be employment growth along segments of the line where there is minimal population, such as the industrial area to the Southeast of Downtown and around the Douglas Glen and Shepard stations. They also suggest that the majority of employment growth between 2019 and 2029 in the Southeast corridor will happen around the Seton and Hospital stations. See Attachment 2 for population and employment information in SE quadrant of the city. Ridership forecasts were derived using outputs from The City of Calgary's Regional Transportation Model as a foundation.

Analysis shows a partial rail rapid transit service in its own dedicated right-of-way is required by 2029, and a full rail rapid transit service is desirable by 2039. This analysis was based on a review of the capacities of various service options, and a life cycle cost analysis. See Attachment 3.

Table 1: Ridership Forecasts

Milestone	Year	Daily Ridership	Annual Ridership
Route 302 (Existing)	2012	3,500	1,076,000
Stage 1A: Busway	2016	13,000	3,997,500
Stage 1B: Busway	2019	15,000	4,613,000
Stage 2: Partial LRT with feeder buses	2029	30,000	9,225,000
Stage 3: Full LRT	2039	70,000	21,525,000

Technology Options:

A number of transit technologies were reviewed to determine their suitability for the Southeast corridor. The technologies were evaluated using travel time, reliability, capacity, capital costs and operating costs.

Four technologies were considered for further evaluation. These included:

- Low Floor Light Rail Transit
- Automated Rapid Rail Transit (ARRT)

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- BRT - Busway (dedicated bus facility)
- BRT - In-Street (similar to existing Route 302)

Among the technologies that were not deemed suitable for the corridor were streetcars, magnetic levitation (maglev), monorail and aerial guideway systems.

Life Cycle Cost Analysis

Nine service options were evaluated in three time periods against the following criteria: Community Well-Being, Cost, Economy, Flexibility, Sustainable Environment, Smart Growth and Mobility, Transit Oriented Development and Financial Capacity. Three horizon periods were required due to the changing nature of demand in the corridor in the different planning year horizons. See Attachment 4.

The results of the life cycle cost analysis indicate that all LRT-based options are less costly than ARRT options, regardless of the staging. Among the LRT and ARRT-based options, a staging scenario in which a partial busway is built by 2019, a partial rail line is built by 2029, and a full rail line is built by 2039 proved the least costly.

Staging Plan

A transit service-staging plan for the Southeast corridor was developed considering segment cost, constructability, and ridership. A three-stage approach to delivery of the ultimate long-range vision of a low-floor LRT system operating in the corridor is recommended. This staging program would take place from 2012 until 2039, when a low-floor LRT will be operating in the entire corridor from Downtown to Seton.

This three-stage approach provides the lowest life cycle cost plan to The City and will result in the maximum benefit from City resources. See Attachment 5.

Stage 1 - Partial Busway - 2012 - 2019

This stage will include the construction and operation of a busway from 4 Street SE located south of Downtown to Douglas Glen station. If funding is not initially available for the complete construction of the busway, then this stage can be split into two sub-stages:

- Stage 1A - from 4 Street south of Downtown to Crossroads station, and Ogden station to Douglas Glen station.
- Stage 1B - Crossroads station to Ogden station (i.e. 4 Street south of Downtown to Douglas Glen station).

Stage 2 - Partial LRT with Feeder Buses 2019 -2029

By the end of Stage 2 the objective is to have a low-floor LRT running uninterrupted from Downtown to Quarry Park station. South of Quarry Park station, the BRT will continue to run in-street.

Stage 3 - Full LRT - 2029 - 2039

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By the end of Stage 3, the objective is to have a low-floor LRT running uninterrupted from Downtown to Seton. Expansion in Stage 3 would likely take place in segments as cash flow permits and ridership warrants.

Transition from Busway to LRT

A scan of other jurisdictions including Ottawa, Seattle, Brisbane, Australia, and Curitiba, Brazil was completed to determine the principles governing the transit service transition period between the various stages. The Southeast Transitway will undergo several periods of transition that will have to be well managed to reduce their impact on customers and on Calgary Transit's operating costs. At these transition points, bus routes will change and passenger travel times will be affected. The following principles for planning service transitions were used:

- Minimize the duration and extent of passenger disruption through traffic planning, replacement of discontinued services with high quality alternatives, and short construction time frames
- Design busway running ways, stations, and structures to accommodate future LRT and an easier busway to LRT conversion
- Design roadway crossings to accommodate future LRT needs to accommodate an easier conversion
- Transitions should occur in anticipation of passenger demand growth, TOD opportunities at stations and in coordination with other transportation investments
- Special attention should be paid to the timeframe of the downtown portion of the Southeast Transitway's transition to LRT given its importance to ridership and its connection to other transit services
- Develop a monitoring program during transition to address operating costs and traffic impacts during transition periods

Construction Costs

The estimated capital costs associated for three stages are shown in Table 2. The vehicle costs and maintenance facility costs were estimated separately. The costs include construction, environmental rehabilitation, utility relocation, property acquisition and public art. Note that there is approximately \$32 Million in throwaway costs when the system is converted from a busway to LRT.

Table 2 - Capital Costs (\$Millions) (2012 \$)

Stage	Description	Construction Cost	Vehicle Cost	Maintenance Facility	Total
Stage 1A	Partial Busway	\$299	\$34	\$125	\$458
Stage 1 B	Partial Busway	\$206	\$3		\$209
Stage 2	Partial LRT and feeder buses, including 2 st tunnel	\$813	\$100	\$140	\$1,053
Stage 3	Full LRT	\$668	\$272		\$940
Total		\$1,986	\$409	\$265	\$2,660

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It is assumed that the current operations control centre (OCC) for the CTrain network cannot accommodate the needs of the future Southeast Transitway (or the future North-Central line) as is and would need to be upgraded. OCC costs have not been included in the cost of the Southeast Transitway.

Future Work:

Future work on the Southeast Transitway Pre-Design Study will include:

1. Continued engagement with key stakeholders and the public
2. Confirmation of the North-Central LRT alignment in Downtown and linkage to the Southeast Transitway
3. Evaluation of TOD potential at stations
4. Refinement of ridership estimates
5. Confirmation of station configurations and amenities
6. Development of bus service strategies
7. Development of detailed cross sections and alignment plans
8. Traffic analysis at busway/LRT and road crossing intersections
9. Further evaluation of environmental conditions and utility relocation requirements
10. Identification of future maintenance facility locations
11. Development of detailed staging plan including transition periods
12. Identification of operations control centre modifications

Stakeholder Engagement, Research, and Communication

Internal stakeholder engagement was conducted from August 2011 – May 2012. Engagement included three internal workshops, aldermanic briefings, and discussions with major landowners such as CP and CN Rail.

Public information sessions were held in January 2012 over three days in three different communities in the Southeast corridor. In total, 210 people attended these events. There was support from the public for a busway in the SE corridor (87%), and support for this facility as a good precursor to an LRT line (83%) that would help build the demand for transit service.

Strategic Alignment

North Central (NC) LRT

In 2012 April, Council adopted the recommendations of TT2012-06 which directed Administration to conduct a route planning study as the first phase of a two-phase planning study based on The City's Sustainability Direction principles. This study will identify a route for NC LRT that also addresses station locations, redevelopment opportunities, ridership projections, vehicle and right-of-way technology, and projected capital and operating costs. The NC LRT study will also examine the opportunity to link to the Southeast LRT and determine the potential alignment of the connection through downtown.

Route Ahead

The SETWAY study is in alignment with the Route Ahead strategic framework to guide public transit in Calgary over the next 30 years. The SETWAY study considered the key success factors identified in Route Ahead, which are to:

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- Make transit a convenient and comfortable travel alternative through the development of a Primary Transit Network (frequent, highly connected and well integrated network)
- Link land use decisions to transit
- Integrate transit with civic life
- Incorporate new transit technologies and innovations
- Sustain fleet and infrastructure

Social, Environmental, Economic (External)

Lynnwood Environmental Issues

A segment of the approved alignment is located on the former Imperial Oil refinery site adjacent to the community of Lynnwood. While there are numerous risks involved with construction on this site, it is anticipated that they can be mitigated through the design process and therefore the preliminary design of this segment is recommended to be advanced at an early stage.

Quarry Park Dry Waste (Landfill) Site

The approved alignment between South Hill Station and Quarry Park Station crosses over the former Ogden Dry Waste (landfill) site. A detailed review with the City of Calgary Waste and Recycling Services will be required to discuss the potential environmental issues. Additionally, a detailed geotechnical investigation will be required to identify potential settlement issues and the mitigative measures that should be put in place. This potential remediation or mitigation measures could take several years and it is recommended that this investigation be undertaken well in advance of planned construction.

Financial Capacity

Current and Future Operating Budget:

Operating Costs

The estimated operating budget for various Stages is identified in Table 3. Annual passenger revenue assumes that there will be \$0.92 in revenue per boarding:

Table 3 – Projected Operating and Costs and Revenue (\$Millions) (2012 \$)

Milestone	Year	Annual Bus Operating Costs	Annual Rail Operating Costs	Total Annual Operating Costs	Annual passenger revenue
Stage 1A Busway	2016	\$19	\$0	\$19	\$ 3.7
Stage 1B Busway	2019	\$21	\$0	\$21	\$ 4.2
Conversion Period	TBD	\$28	\$0	\$28	--
Stage 2: Partial LRT with feeder buses	2029	\$13	\$25	\$38	\$ 8.5
Stage 3: Full LRT	2039	\$0	\$29	\$29	\$19.8

Current and Future Capital Budget:

The estimated cost to construct Stage 1A and Stage 1B, a partial busway is \$667 million.

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A request for funding of the Southeast Transitway was submitted in December 2011 as part of the City's GreenTRIP application for \$12 million to continue with Southeast Transitway pre-design.

It is recommended that Stage 1A and 1B of the Southeast Transitway be specifically evaluated for prioritization in the upcoming Transportation Infrastructure Investment Plan (TIIP) scheduled for updating in December 2012.

Risk Assessment

The primary areas of risk for this project are property requirements, utility relocations, environmental conditions, Glenmore Trail crossing, LRT connection through downtown and possible linkage to NC LRT.

Property Requirements

In the project area, a majority of the land required for construction has already been acquired through either purchase or dedication as new communities have developed. Approximately 0.9 hectares of industrial and commercial land still needs to be acquired. In addition a 9.5km strip of right of way adjacent to CP/CN is required.

An acquisition plan will be developed as part of the next phase of work. It is estimated that it will take a minimum of 3 - 4 years to assemble all the required land; including time for expropriation if required.

Utilities

There are numerous utility crossings along the corridor including natural gas, telecom, electrical, and city services. A number of these utilities will be need to be relocated and or lowered/raised to accommodate the future LRT.

Glenmore Trail Crossing

The crossing of Glenmore Trail is currently a major cause of delay for the existing Route 302 and induces large variability in travel time reliability. The existing at grade intersection of Glenmore Trail / Ogden Road is planned to be replaced with an interchange. An option for an LRT tunnel at this location could be further investigated if the interchange is not constructed prior to SETWAY being constructed.

Downtown Busway Routing

The staging plan consists of constructing a busway in the northern section of the alignment as far north as 4 Street SE Station. At that point, buses will operate in street. A current area of uncertainty is how buses exiting the busway will circulate and turn around in Downtown. Until the connectivity with NC LRT is known it is not recommended to construct the 2 Street tunnel. The estimated cost for the 2 St. tunnel is \$250 Million. Further work will be undertaken to improve bus operations in the downtown.

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REASON(S) FOR RECOMMENDATION(S):

Population and employment in the southeast sector will continue to grow over the next several years with increased employment opportunities in Seton at the new south health campus area. Transit ridership based on this growth will ultimately support construction of a low-floor LRT. To reduce transit travel times and provide a more attractive transit service to this corridor, the interim plan is for a dedicated busway that can be converted to LRT as funds and growth require.

It is recommended to continue with the pre-design for the corridor to refine property requirements, utility conflicts, environmental risks, ridership demand and cost estimates. This will allow the project to be prioritized in the upcoming Transportation Infrastructure Investment Plan (TIIP).

Additional integration work with the North Central transitway will be undertaken. This integration planning will inform the underground LRT alignment through the downtown.

ATTACHMENT(S)

1. Alignment and Stations
2. Population Forecasts
3. Service Options and Associated Daily Ridership Estimates
4. Nine Service Options (\$2011) Cost Estimate
5. Staging Plan:
 - Stage 1 - Partial Busway - 2012-2019
 - Stage 2 - Partial LRT - 2019-2029
 - Stage 3 - Full LRT - 2029