

Surrey Rapid Transit Alternatives Analysis

Findings to Date



March 2013

This document identifies the four alternatives that meet the long term needs of Surrey and surrounding communities (King George Boulevard, 152 Street, Fraser Highway and 104 Avenue) based on the work to date of the Surrey Rapid Transit Alternatives Analysis. TransLink will advance these alternatives for consideration in the Regional Transportation Strategy.

Background

Surrey and surrounding communities are among the fastest growing parts of the region. The area is forecast to attract 28 per cent of the region's new jobs and 26 per cent of its new residents over the coming three decades. The expansion of rapid transit would help to address ongoing land use and transportation challenges associated with this growth.

TransLink has been leading a multi-phase analysis to confirm the case and evaluate alternatives for rapid transit service in Surrey and surrounding communities. Initiated in 2010, analysis has been undertaken in partnership with stakeholders including the City of Surrey, City of Langley and Metro Vancouver. Public consultation has occurred throughout the process.

At the outset, the analysis identified the primary project objectives to be addressed by rapid transit in Surrey and surrounding communities as follows:

1. Meet, shift and help shape **travel demand** through improved transit service quality.
2. Shape future **land use** in keeping with the Regional Growth Strategy and municipal plans.
3. Help achieve **mode share** and **emissions** targets.

The analysis employs a Multiple Account Evaluation approach, which provides a qualitative and quantitative evaluation across a wide range of factors or "accounts" to identify the benefits and impacts of each alternative.

Thirteen Alternatives Evaluated

The first phase of analysis identified a range of alternatives using Bus Rapid Transit (BRT), Light Rail Transit (LRT), Rail Rapid Transit (RRT/SkyTrain), or a combination of these technologies and narrowed them down to thirteen most promising ones. Phase 2 of the analysis evaluates the 13 alternatives, as shown in Figure 1.

All rapid transit is assumed to operate at high frequency in a dedicated guideway. BRT and LRT are assumed to operate primarily at street-level. RRT/SkyTrain is assumed to operate primarily on a guideway above the street.

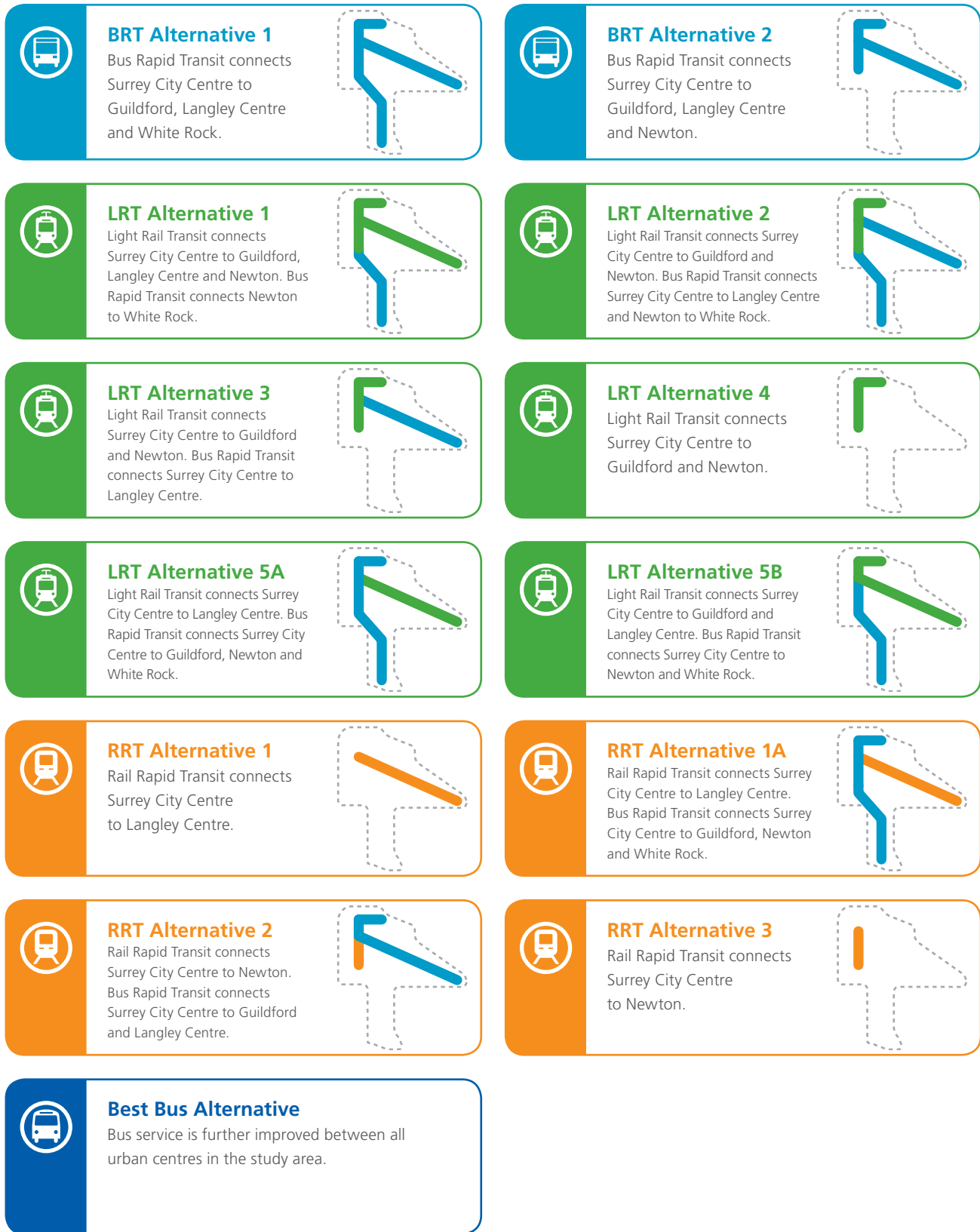


Figure 1 - Surrey Rapid Transit Alternatives
 (Key: BRT lines are blue, LRT lines are green, RRT lines are orange, Best Bus is navy)

Results

TransLink has identified four Surrey rapid transit alternatives, representing a range of options that can all meet the long term needs of Surrey and surrounding communities. These options will be advanced for further consideration as part of the Regional Transportation Strategy.

The regional strategy, consisting of a long-term (30-year) strategy and a medium-term (15-year) implementation plan, will document the preferred multi-modal network for the region and the conditions required to support the various investments. The strategy will also provide the technical analysis and the forum for the regional dialogue required to confirm the preferred alternative from each of the rapid transit alternatives analyses within a multi-modal regional network plan.

The following information focuses on those criteria that helped to differentiate the alternatives and demonstrate performance relative to the transportation needs of Surrey and surrounding communities.

Meeting The Project Objectives

The following are the key findings to date in relation to the project objectives listed above:

- Rapid transit on the full extent of each of the three corridors (King George Boulevard, Fraser Highway and 104 Avenue) generates the most transportation, land use and other benefits.
- On Fraser Highway, BRT meets the forecast 2041 demand but is approaching capacity and requires support of a robust conventional bus network. LRT and RRT provide additional capacity that can accommodate ridership growth well beyond 2041. RRT generates the most quantifiable benefits. Based on linear extrapolation from the forecasts, demand on Fraser Highway would exceed the combined capacity of BRT and parallel conventional bus services by 2051.
- On King George Boulevard, BRT meets the forecast 2041 demand. Transfer-free BRT service between South Surrey and Surrey City Centre generates more transportation benefits relative to service plans that require a transfer at Newton Town Centre. Based on linear extrapolation from the forecasts, demand on King George Boulevard would exceed the capacity of BRT by 2051.
- On 104 Avenue, BRT integrated with Highway 1 Rapid Bus routes to provide direct service to Coquitlam and Langley meets the forecast 2041 demand and generates more transportation benefits than other options. Based on linear extrapolation from the forecasts, demand on 104 Avenue would not reach or exceed BRT capacity in the foreseeable future.

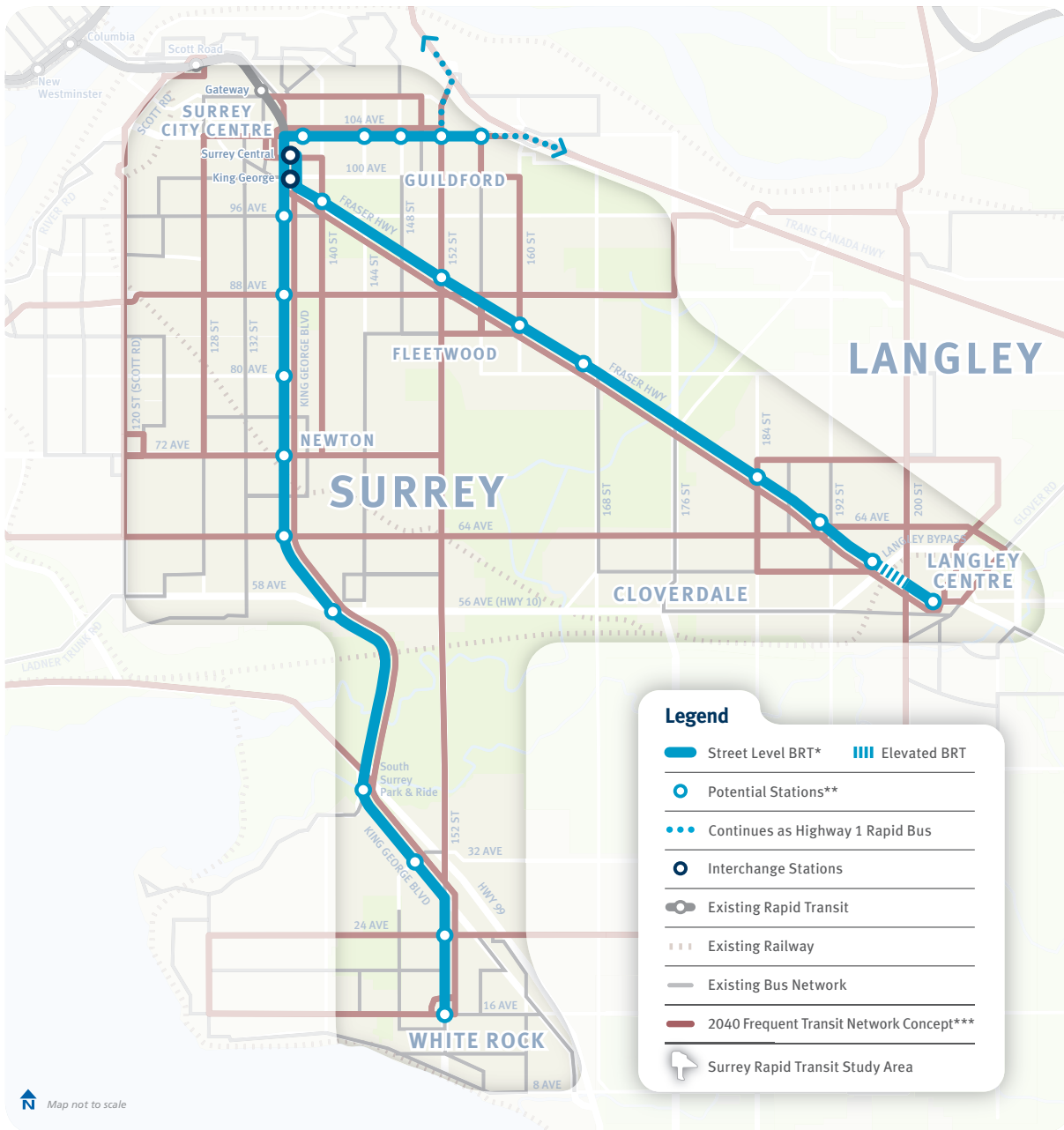
Technical Findings to Date

The technical findings to date identified four alternatives for further consideration in the regional process.

Alternative 1: BRT on Fraser Highway, King George Boulevard, and on 104 Avenue

This is the lowest cost alternative that meets forecast 2041 demand on all three of the corridors. It also provides transfer-free service on King George Boulevard.

Alternative 1 is projected to have 180,000 daily boardings (2041) and generate 13,500 additional daily transit trips in the region¹. It also provides travel time savings, supports land use intensification at stations, and generates other quantifiable benefits.

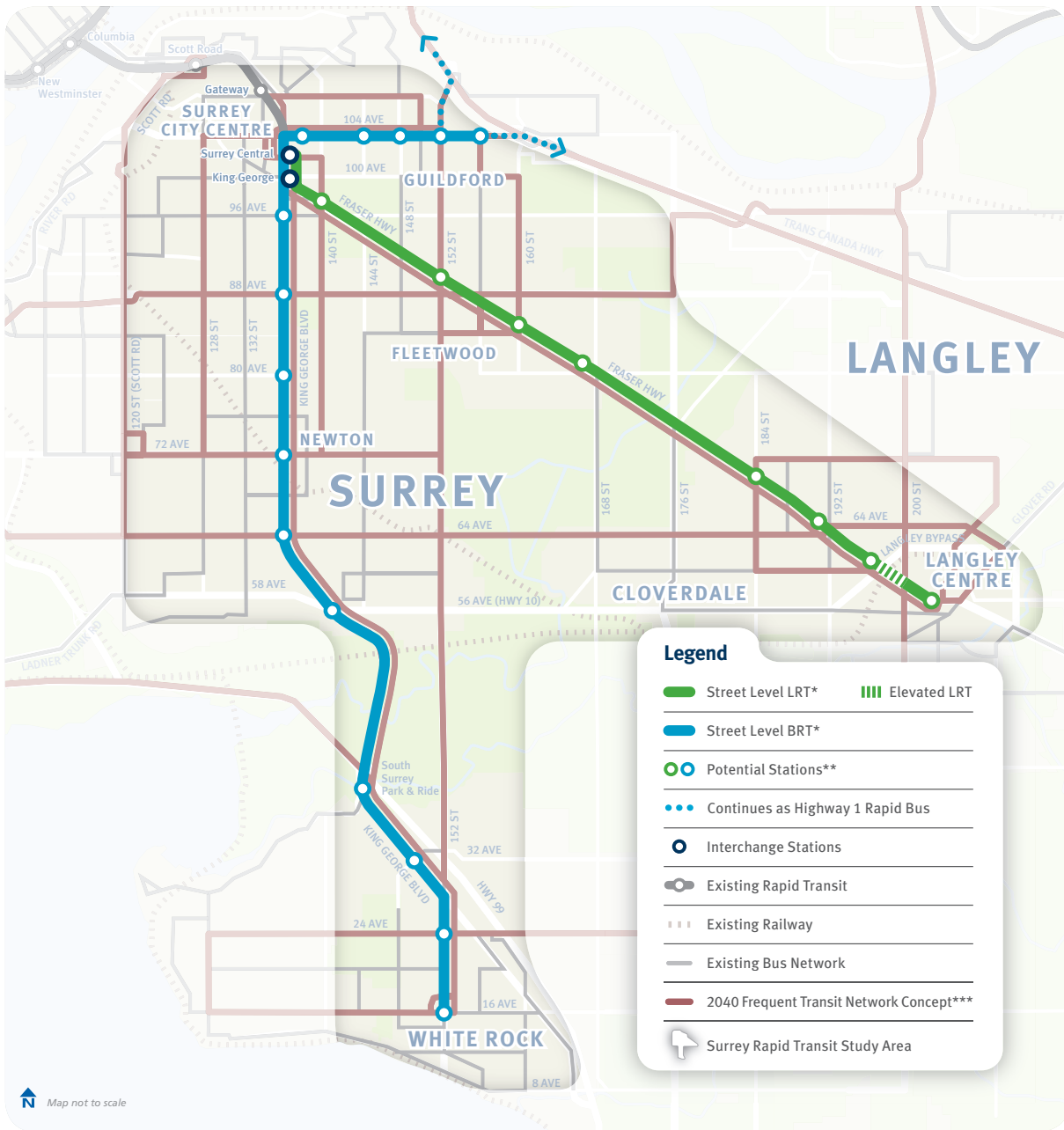


1. For context, without Surrey Rapid Transit there are projected to be 2 million daily transit trips in the region in 2041.

Alternative 2: LRT on Fraser Highway, and BRT King George Boulevard and on 104 Avenue

This alternative meets forecast 2041 demand on all three corridors and provides transfer-free service on King George Boulevard. It is the lowest lifecycle cost alternative that allows for expanded capacity on Fraser Highway to meet demand beyond 2041.

Alternative 2 is projected to have 180,000 daily boardings (2041) and generate 12,500 additional daily transit trips in the region. It also provides travel time savings, and supports land use intensification at stations, and generates other quantifiable benefits.



Alternative 3: LRT on Fraser Highway, LRT on King George Boulevard south to Newton with BRT continuing to White Rock, and LRT on 104 Avenue

This alternative meets the forecast 2041 demand on all three of the corridors, but requires a transfer at Newton for rapid transit travel south of Newton. It provides the greatest extent of rail transit service (of the identified alternatives) and is the most consistent with the City of Surrey’s urban development aspirations.

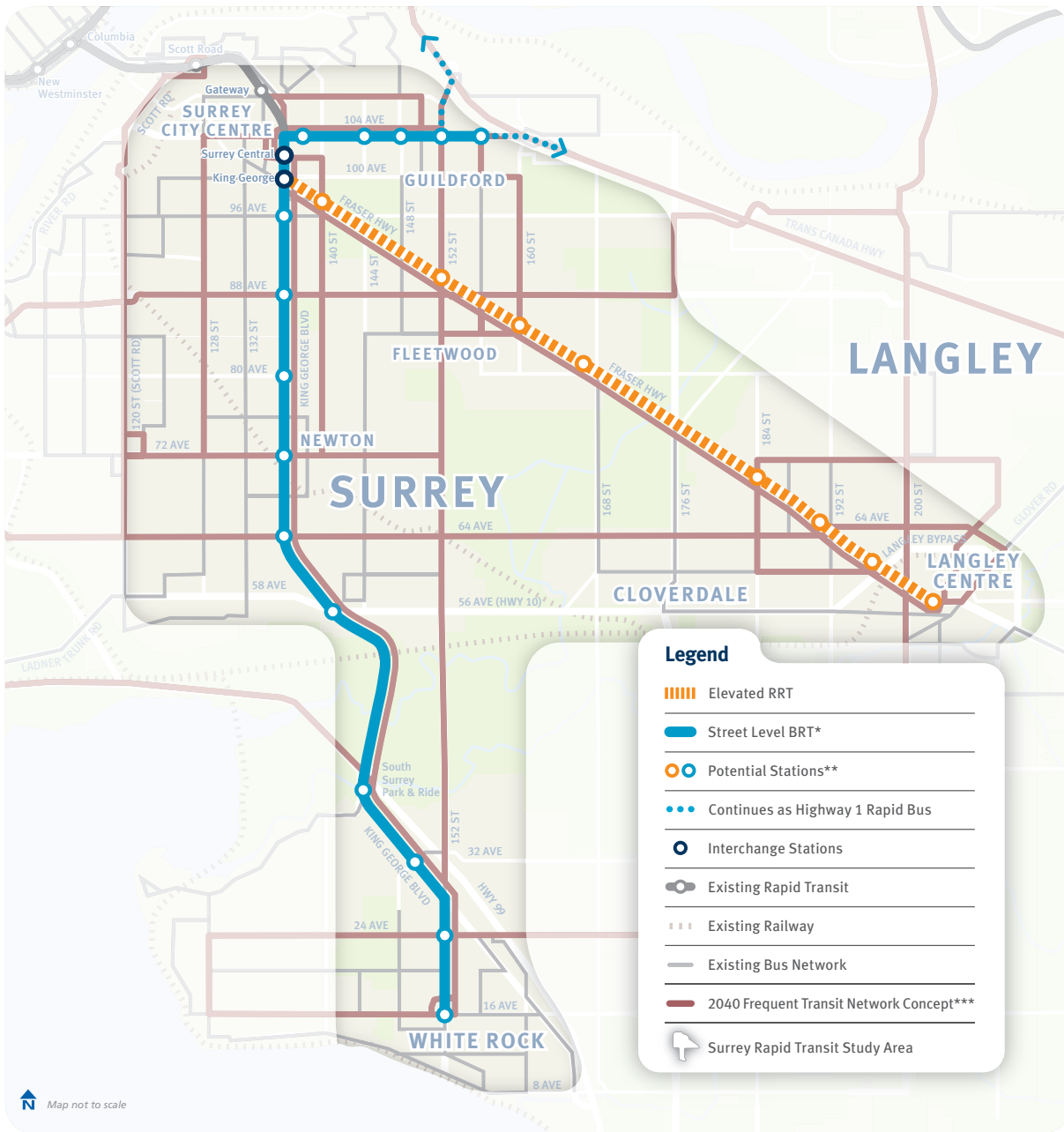
Alternative 3 is projected to have 166,000 daily boardings (2041) and generate 12,000 additional daily transit trips in the region. It also provides travel time savings, supports land use intensification at stations, and generates other quantifiable benefits.



Alternative 4: RRT on Fraser Highway, and BRT on King George Boulevard and on 104 Avenue

This alternative meets forecast 2041 demand on all three of the corridors and provides transfer-free service on King George Boulevard as well as from the Fraser Highway corridor to the Expo Line. Capacity on Fraser Highway can be expanded to meet growth in demand well beyond 2041.

Alternative 4 is projected to have 200,000 daily boardings (2041) and generate 24,500 additional daily transit trips in the region. It has the highest ridership and provides the greatest travel time savings. It also generates the most quantifiable transportation benefits at the highest lifecycle cost.



The BRT components of these alternatives may be converted to LRT or RRT as demand warrants and funding allows. Complementary local actions would accelerate achieving levels of demand commensurate with the City of Surrey's vision for LRT on all three corridors.

A comprehensive set of quantitative and qualitative criteria have been considered through the analysis's multiple account evaluation. Some quantifiable attributes are summarized in the table below.

Trade-Offs and Considerations

Three alternatives (Alternatives 1, 2 and 4) provide BRT on 104 Avenue and King George Boulevard but differ in terms of technology on Fraser Highway. A fourth alternative (Alternative 3) provides a greater extent of LRT and is more consistent with the City of Surrey's urban development aspirations. As these four alternatives are advanced to the Regional Transportation Strategy, the following trade-offs and considerations will need to be weighed in the selection of a preferred alternative.

CAPACITY AND EXPANDABILITY:

BRT combined with robust conventional bus service meets forecast demand on Fraser Highway during the appraisal period, but in 2041 would be near capacity (only 9 per cent spare capacity under base case assumptions) and has limited ability to be expanded further. Under aggressive growth and

demand scenarios, BRT would be unable to provide sufficient capacity to meet forecast demand in the corridor by 2041. LRT and RRT provide higher capacity (each has 45 per cent spare capacity under the base case assumptions) and have potential for further capacity expansion in the event that future demand is greater than forecast. BRT infrastructure could be converted to LRT or RRT when demand warrants and funding allows, albeit at increased costs and with impacts to transit and road users during the conversion.

Significant forecast growth underpins the base case transit demand forecasts during the appraisal period. Population and employment within Surrey and surrounding communities is forecast to almost double over the course of the appraisal period, and both the magnitude and distribution of that growth and therefore associated transit demand are subject to uncertainty.

The potential need for capacity and expandability on Fraser Highway and in the rest of Surrey beyond the 30-year appraisal period will be considered in the Regional Transportation Strategy where the benefits and costs of investment in additional capacity can be weighed against other investment needs in the region.

TRANSIT TRIPS

All alternatives attract new transit trips through improvements in speed, reliability and high peak frequencies of service. BRT

KEY ATTRIBUTES OF THE IDENTIFIED ALTERNATIVES

	Alternative 1 BRT	Alternative 2 LRT/BRT	Alternative 3 LRT	Alternative 4 RRT/BRT
Capital Cost (2010\$)	\$0.9 billion	\$1.68 billion	\$2.18 billion	\$2.22 billion
Lifecycle cost (PV, 2010\$, 6% discount rate)	\$0.82 billion	\$1.28 billion	\$1.63 billion	\$1.67 billion
New weekday transit trips (2041)	13,500	12,500	12,000	24,500
Regional transit mode share (2041 AM Peak, base case =16.4%)	16.5%	16.5%	16.5%	16.6%
Travel time (2041 AM Peak, Surrey Central to Langley Centre, base case = 54 min)	30 min	29 min	29 min	22 min

and LRT (Alternatives 1, 2, and 3) are at street-level and attract similar numbers of trips as a result of similar improvements in speed and reliability, whereas RRT (Alternative 4) attracts the most trips as a result of its greater speed and reliability improvements due to grade separation and through-service with the Expo Line.

URBAN DEVELOPMENT AND DESIGN

All alternatives would have a similar positive effect on urban development, by supporting municipally planned growth in station areas. The analysis and a subsequent peer review have found no evidence of significant difference in urban development outcomes based on the choice of rapid transit technology.

The analysis has found that street-level rapid transit of BRT and LRT (Alternatives 1, 2 and 3) would provide greater potential to improve urban design, whereas the elevated guideway and stations of RRT (Alternative 4) would have a negative visual impact on the Fraser Highway corridor.

ACCEPTABILITY

Given the current levels of design and information available, all four alternatives are acceptable according to market research. BRT, LRT and RRT all receive a similarly high acceptability rating. Evaluation of potential funding implications for taxpayers or users has not been assessed. Public engagement will continue to be a part of the Regional Transportation Strategy to allow ongoing input on the acceptability of the alternatives in the context of other regional needs and funding requirements.

TIMING AND PHASING

The analysis has considered fully-built alternatives along all three of the corridors and has not assessed timing and phasing in detail. BRT technology has greater potential for phasing, including the ability to begin operating service and generating partial benefits independent from the construction of the rapid transit guideway. LRT and RRT transit are less flexible though all alternatives could be constructed in phases. Consideration of phasing warrants further review through the Regional Transportation Strategy in the context of affordability.

AFFORDABILITY

There is a large range of capital and lifecycle costs across the alternatives, with capital costs ranging from \$900 million to \$2.22 billion for Alternatives 1 and 4, respectively. Affordability can only be assessed by considering regional investment needs relative to available funding. Such an assessment cannot be done within a single rapid transit alternatives analysis and will be considered as part of the Regional Transportation Strategy.

Stakeholder Perspectives

The analysis has been undertaken in close partnership with stakeholders, including the cities of Surrey and Langley, who broadly support the technical findings to date. However, consensus has not been reached on all interpretations of the findings. Concerns identified by some stakeholders include the sufficiency of BRT capacity over the medium-to-long term, and the ability of BRT to support local urban development goals.

Stakeholder perspectives on these recommendations will be solicited following completion of the analysis through staff participation in the Regional Transportation Strategy. In addition, partner agencies may provide additional comments through their governing bodies.

Next Steps

Major decisions on system investment are best made as part of a comprehensive regional planning process that considers the associated policy measures that are needed to pay for and to ensure optimal performance of any investments. Decisions on system investment, including rapid transit, also require a dialogue that provides policy-makers from all parts of the region with a forum to make tradeoffs between various regional investment needs in light of funding opportunities and constraints. Ultimately, a decision on a preferred rapid transit network will be made as part of the overall decision on a regional multi-modal system plan.

This decision-making needs to trade-off and balance limited resources across competing regional needs. To do so, decision criteria would include: performance, affordability, deliverability and strategic fit from a whole system perspective. Policy-makers have the role of determining priorities and balancing between:

- Modes
- State of good repair vs. expansion
- Sub-areas geographically across the region
- Shaping vs. Serving land use and travel demand
- Equity/fairness vs. high performance
- Desire to invest vs. willingness to pay

The decision on the preferred network will be considered through the Regional Transportation Strategy so that decision-makers can discuss the tradeoffs between the various regional investment needs in light of funding opportunities and constraints. The Surrey Rapid Transit Alternatives Analysis evaluation and technical findings to date provide the input necessary for that regional dialogue.

TransLink will facilitate a regional discussion with the public, stakeholders and elected officials to examine the trade-offs of each option, along with the other regional transportation priorities, and to determine the path forward.