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## **The 30<sup>TH</sup> Anniversary of the C-Train**

**A Critical Analysis of Calgary's  
Light Rail Transit System**

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**By Steve Lafleur**





## About the Author

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Note to reader: Some words in this document may appear in blue and are underlined. Clicking on these words will direct the reader to relevant sites or documents using your associated web-browser.

## Executive summary

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Up until the last decade or so, Calgary was considered a sprawling city where the vast majority of adults own two cars and live in the suburbs. This stereotype was accurate. Since then, Calgary has developed a new stereotype. Many urban gurus now think of it as a reformed auto-dependant city that has aggressively expanded public transit to curb urban sprawl. This is due to the copious praise the City receives for its CTrain light rail transit system (LRT). Transportation planners from the City routinely appear at conferences where they inspire planners of other mid-sized North American cities to emulate their transit system.

This May 25th, the CTrain will officially turn 30. While this will surely be seen as a celebratory occasion, it is also an appropriate time to evaluate the performance of the system. Is the new Calgary stereotype correct? Is the City now a model for public transportation in mid-sized North American cities? Sadly, the answer is no.

Two false premises are the basis of the new Calgary stereotype. First, it assumes that the CTrain is cost-effective. This notion is based primarily on the capital costs of early CTrain construction, and it does not take into account the staggering costs of recent extensions. The West LRT, currently under construction, ranks among the most expensive LRT lines ever built. It also does not account for a myriad of hidden subsidies. The conservative estimate herein puts the cost per paying rider at roughly \$2.88, though that number will increase as newer, more expensive lines in less-populated areas are built.

Second, it assumes that the CTrain is actually getting people out of their cars — it is not. Despite the City's Draconian efforts to curb downtown parking, more people drive downtown than in any other Canadian city.

Calgarians travel further to work than do residents of any Canadian city with a population over one million, save Edmonton. Calgary spends \$1,152 per capita on roads and transit, which is 25 per cent more than its closest rival, Edmonton spends.

That the CTrain is a tool to combat rampant urban sprawl in Calgary has no basis in reality. Since 1968, CTrain developments have been a cornerstone of Calgary's urban-planning strategy. Some past and present Calgary Transit officials have recognized that rather than curtailing sprawl, the CTrain has actually helped drive urban sprawl. By extending rail transit far into the suburbs, the City has made it more convenient for families to locate further away from the core. This does not mean that they rely on the CTrain for regular commuting, but it is an amenity for the children. Moreover, since parking is artificially restricted downtown, many commuters use the heavily subsidized (now free) park-and-ride lots at CTrain stations rather than drive downtown. However, this is not getting them out of their cars; it is little more than a glorified shuttle service.

By focusing its transit strategy on the CTrain, the City has foregone the superior option of introducing a faster, cheaper and more flexible alternative — bus rapid transit (BRT). The independent U.S. Government Accountability Office recognizes BRT as a superior alternative to LRT. While Calgary has created some BRT lines, it has primarily done so as a temporary measure until the heavily indebted City can afford to spend well over \$1-billion to build the proposed Southeast LRT line, among others. Rather than treating BRT as a temporary measure, the City would be wise to focus future transit spending on BRT. This would allow the City to service more of the city with rapid transit at a lower cost.

## Background

Calgary is among the fastest-growing cities in North America. The Calgary region is set to increase from roughly 1.3-million to over 1.5-million residents by 2019. The City will need to continue expanding public transit if it is serious about reducing urban sprawl without creating major traffic congestion. There is no room to expand downtown roads, and the immense parking deficit downtown is unlikely to be reversed. Regardless of where the majority of the growth in the city takes place, it is important to ensure that the residents maintain a high level of mobility. Mass transit will be a big part of this equation.

Since 1981, Calgary's transit plans have been primarily focused on building LRT lines. The City is currently building an extension to its LRT, and it plans to create at least one additional line over the next decade. The City has a staggering \$3-billion debt, so a BRT route is temporarily replacing the proposed \$1.2-billion Southeast LRT line. To his credit, Mayor Naheed Nenshi pointed out that another LRT line is not feasible now.<sup>1</sup> However, the Mayor previously expressed his support for building this LRT<sup>2</sup>. It would be a mistake. Light rail transit is far more expensive and less flexible than bus rapid transit — something even Nenshi has pointed out.<sup>3</sup>

BRT should not be thought of as a temporary solution. In a mid-density city like Calgary, BRT is the most cost-effective method of rapid transit. The City could move far more people at a far lower cost by embracing an aggressive expansion of the current BRT system. While some refer to Calgary's CTrain as the most cost-effective North American LRT system, this paper will argue that the costs are understated and the benefits overstated. Proponents think that LRT combines the advantages of subways and buses. In reality, it combines the disadvantages of the two.



**“...it is important to ensure that the residents maintain a high level of mobility. Mass transit will be a big part of this equation.”**

It is slow and expensive and at best has a moderately positive impact on traffic. At worst, it has a moderately negative impact. BRT is the method of rapid transit most suited to Calgary. However, as Nenshi pointed out during his election campaign, the City has made only half-hearted attempts at implementing BRT. He's committed to creating permanent BRT infrastructure, including much-needed cross-town routes.<sup>4</sup>

The 30th Anniversary of the CTrain will take place this year. This provides Calgarians with a great opportunity to reflect on the costs and benefits of the CTrain and to decide whether LRT should continue to be the mode of choice for transit expansion. This paper will demonstrate that BRT, not LRT, should be the focus of future transit expansions.

# What is rapid transit?

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Rapid transit is any transportation system that provides express service between a limited number of stops. The goal is to move as many people from one part of a city to another rather than to a specific locale. Rapid transit typically stops at major employment and recreation centres, but those travelling elsewhere normally rely on another mode of transit to reach their final destinations. For most, this is a local bus, walking or driving from the stop.

There are many different types of RT. The most common are LRT, BRT, streetcars and subways. The capacity, speed and cost of these modes vary greatly, so they are typically geared toward different types of cities and neighbourhoods. Subways are generally restricted to the downtown core of major cities, though they often extend into select suburban areas. Streetcars have made a comeback in mid-density, inner-city neighbourhoods of late, though many older streetcar systems are in place in major downtown cores.

For mid-sized cities, the most common RT forms are LRT and BRT. Planners and politicians often view BRT as a temporary solution for transit needs that is eventually supposed to lead to the development of LRT systems. Despite numerous studies by non-partisan bodies such as the U.S. Government Accountability Office that extol the virtues of BRT, the pro-LRT consensus is rarely questioned publicly. Despite far higher capital costs for LRT, its advocates claim that per rider costs over the long run are lower. The data show otherwise.

# History of RT in Calgary


The history of rapid transit in Calgary began in 1968, when the City released its first comprehensive transportation plan.<sup>5</sup> It called for an expansion of the highway system, coupled with heavy rail lines that were to be built within 20 years. By the early 70s, the City began to scale back the proposed roadways and to consider scaling back from heavy rail to smaller scale rapid transit alternatives. The municipal government decided to create an express bus system to pave the way for an eventual light rail system.

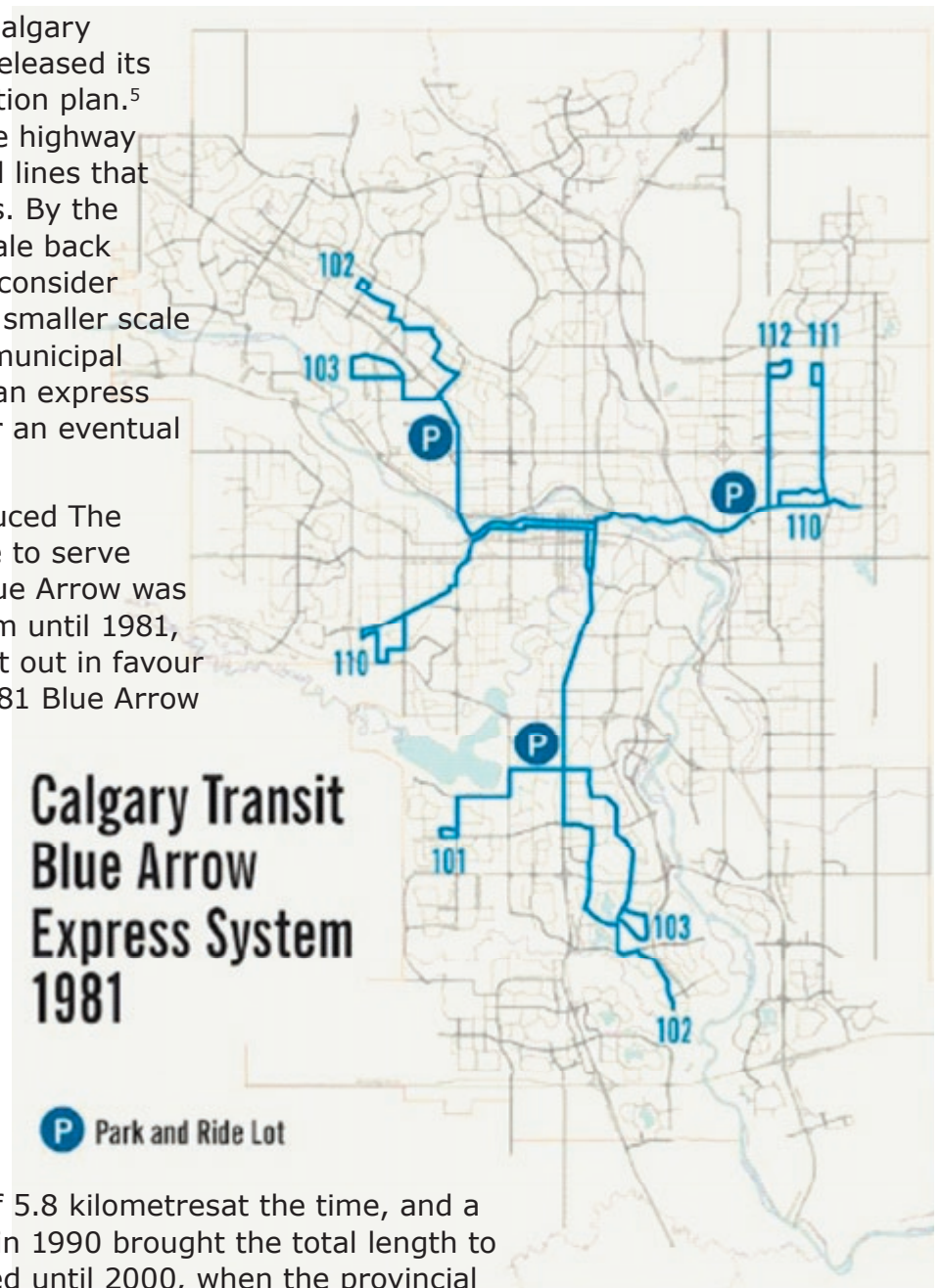
In 1972, Calgary Transit introduced The Blue Arrow express bus service to serve downtown during rush hour. Blue Arrow was the primary rapid transit system until 1981, when the City began to phase it out in favour of the CTrain. At right is the 1981 Blue Arrow service map.<sup>6</sup>

The first CTrain line opened in May of 1981. The 10.9-km line began in the south end of the city at Anderson Road and ran north into downtown. In 1985, the CTrain expanded northeast of the city with a 9.8-km line beginning at 7th Avenue downtown. The final major leg of the current LRT network was completed in 1987.

The Northwest line consisted of 5.8 kilometres at the time, and a 0.8-km extension that opened in 1990 brought the total length to 6.6 kilometres. Expansion halted until 2000, when the provincial government decided to use five cents per litre of the gas tax<sup>7</sup> to fund three additional phases. Expansions since 2001 brought the total CTrain network length to 46 kilometres.

## Calgary Transit Blue Arrow Express System 1981

 Park and Ride Lot



# Challenges facing Calgary Transit

## Calgary CTrain Primary Network

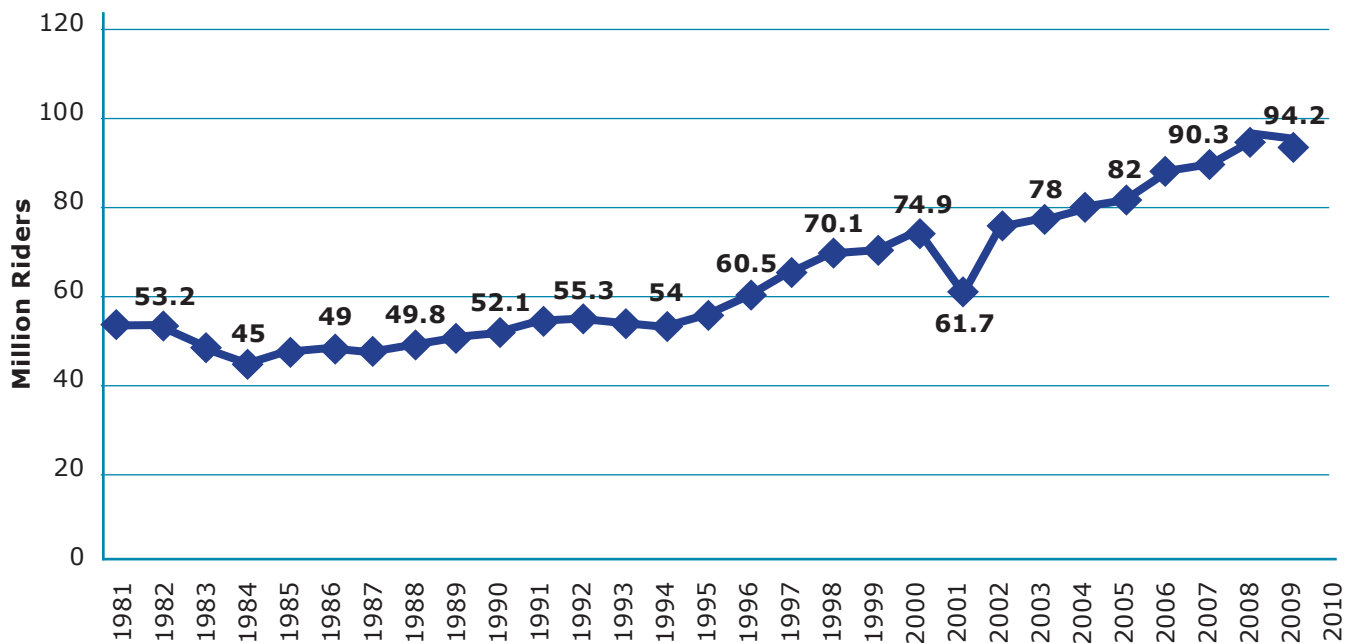


Calgary Transit services a population of roughly 1.1 million, spread out over 848 square kilometres. The earliest weekday route begins at 5:08 a.m., and the last trip of the day ends at roughly 12:20 a.m. The 170 routes carry roughly 95 million passengers per year, and ridership is growing at roughly 2.5 per cent per year.<sup>8</sup> The city is growing at just under 3 per cent per year.<sup>9</sup> The population density is 1,360 people per square kilometre,<sup>10</sup> ranking it among the least-dense cities in North America with a population of over one million.

The city has roughly the same land mass as New York City, which has a population of nearly 8.5 million. This presents both challenges and opportunities for providing transit. Lower density means less congestion, which means faster bus service. On the other hand, it makes it difficult to provide rapid transit without extensive intervention in urban land-use patterns. This challenge is made worse by the fact that nearly 25 per cent of Calgary's population works in its tiny Central Business District (CBD). This is the highest proportion for any major Canadian city.<sup>11</sup> Compounding this problem is that while there are 126,423 jobs located in the CBD, it has only 15,548 residents.<sup>12</sup> The heavy concentration of employment in the CBD requires extensive mass transit, yet the dispersed residential population makes it extremely difficult to provide this transit. Calgary also has the lowest number of parking spaces per CBD employee in the country (.07 parking spaces per employee). The lack of parking downtown and the necessity of shuttling over 100,000 employees into the CBD lead to the adoption of one of the most extensive park and ride networks in Canada. This creates hubs where passengers can connect with rapid transit. Though this makes it easier to provide rapid transit, it still relies on automobiles and feeder buses to get passengers onto rapid transit in the first place. This adds significant costs to the system, some of which are impossible to quantify, while others are simply ignored in cost per rider data provided by light rail proponents.



## Calgary Transit Annual Ridership



## The role of urban planning

Calgary is known to most as a sprawling, automobile-dependant city. When learning about the high ridership levels on the CTrain, many assume that it is a successful remedy to the lack of planning that led to sprawl and chaos. In fact, the CTrain has shaped Calgary's urban landscape — not the other way around. Ever since the inaugural comprehensive plan in 1968, the City has been acquiring land to build the CTrain. The Planning Department had a vision of a "hub and spoke" city where people commute from the suburbs en masse into downtown, and that is what they have achieved. In the most authoritative analysis of the CTrain, former Calgary transit director John Hubbell points out that the City has "encouraged the concentration of employment in the downtown to support a high level of transit service."<sup>13</sup> He also quite clearly points out the unintended consequences of this method of planning:

*[S]uburban development trends have created strong cross-city travel patterns between low density residential development on the west side of the city and industrial areas on the east side, which are difficult to serve efficiently with public transit service. With the limited number of expressway standard, east-west roads, cross-city traffic congestion is a problem for many Calgarians.<sup>14</sup>*

Calgarians travel further to work than do residents of any major Canadian city outside of the Greater Toronto Area,<sup>15</sup> and other than Edmonton,<sup>16</sup> have the highest percentage of automobile trips to the CBD of any Canadian city with a population of one million or more. Given that Calgary spends the most per year per capita on transit of any Canadian city, one cannot help but determine that Calgary's land-use planning and transportation system leaves much to be desired.

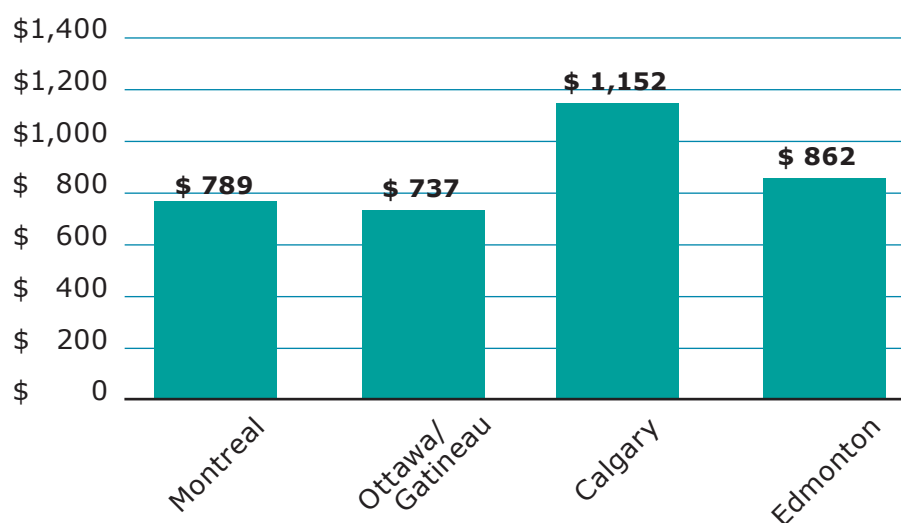
City	Transit Spending Per Capita	Automobile Mode Split to CBD
Calgary	\$454	48%
Montreal	\$404	36%
Toronto	\$403	29%
Vancouver	\$391	42%
Ottawa/Gatineau	\$390	44%
Edmonton	\$354	63%

According to the available data, despite spending the most on transit relative to its population, Calgary also spends the most on roads per capita of any Canadian city. This puts its combined expenditures on roads and transit 25 per cent higher than its closest rival, Edmonton, and 36 per cent higher than Ottawa, the city most comparable to Calgary. In a recent *Calgary Herald* article, Calgary Transit Planning Manager Neil McKendrick hinted at the CTrain's role in driving up road costs: "It should allow Calgary to be a more compact city, but what it's done is it's actually allowed Calgary to

continue to develop outward because it was so easy to get to the LRT and then get other places."<sup>17</sup>

Rather than turning Calgary into a compact, walkable city, the CTrain has actually facilitated urban sprawl. From the standpoint of a transit enthusiast, it seems counter-productive to create a system that pushes development further out toward the automobile-dependent suburbs. After all, many families may locate near a CTrain line so that one spouse or the kids can use the LRT, but this does not mean that everyone in the household is using it.

### Transit and Roads Per Capita



Though the City invests heavily in roads, it also made a conscious effort to restrict the number of parking spots in order to curb auto usage. As noted above, this leads to a massive imbalance of downtown employees to parking spots. This happens in other cities as well but not anywhere near the level of Calgary. Vancouver, which is known for emphasizing mass transit and non-motorized transportation, has 0.35 parking spots per CBD employee, compared with 0.07 in Calgary.

Using Vancouver parking levels as our basis point, the graph below illustrates the CBD parking deficit in major cities for which data is available.

Despite having the largest concentration of employment in any CBD, Calgary has by far the largest parking deficit. It would take more than 35,000 parking spots just to reach Vancouver parking levels. It would require increasing the downtown parking supply fourfold.

Given the long commute to downtown and the lack of parking, it is hard to imagine anyone wanting to locate a business downtown. Downtown Calgary has two things going for it that keep people there (during the day). The first is City Hall and other government offices. They obviously are not price sensitive and are not going anywhere even if downtown is an expensive and inconvenient location. Second, Calgary has the highest concentration of head offices per capita of any city in Canada. Between 2000 and 2009, the city went from 78 head offices to 114.<sup>18</sup>

Corporate head offices usually locate downtown, given their infrastructure require-

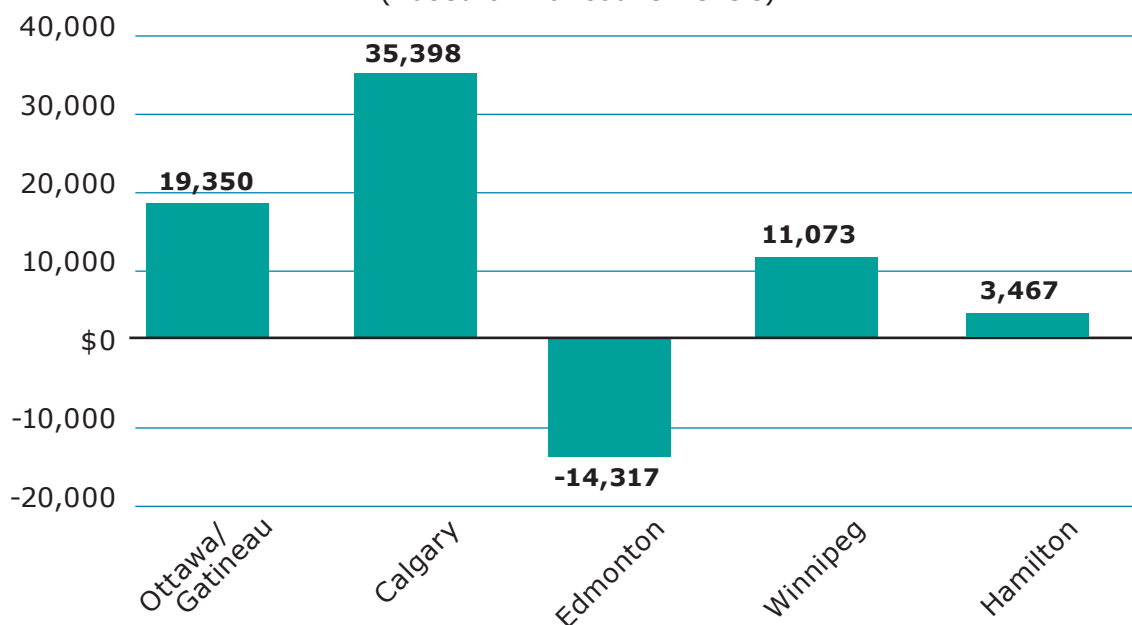
### Head Offices

City	2000	2009	Per Cent Change
Toronto	307	266	-13.4%
Calgary	78	114	46.2%
Montreal	134	108	-19.4%
Vancouver	68	84	23.5%
Edmonton	17	28	64.7%
Ottawa	17	18	5.9%

ments. Because the City of Calgary and the province of Alberta have comparatively low taxes, they are able to attract major employers to the downtown regardless of whether it is an attractive place for employees to commute to. The boom in downtown employment is not so much a vindication of Calgary's planning department as it is an indictment of the anti-business policies in Toronto and Montreal. Additionally, downtown Calgary also benefits from having the headquarters of many resource companies, for which it is the natural location.

### Parking Shortage in CBD

(Based on Vancouver levels)



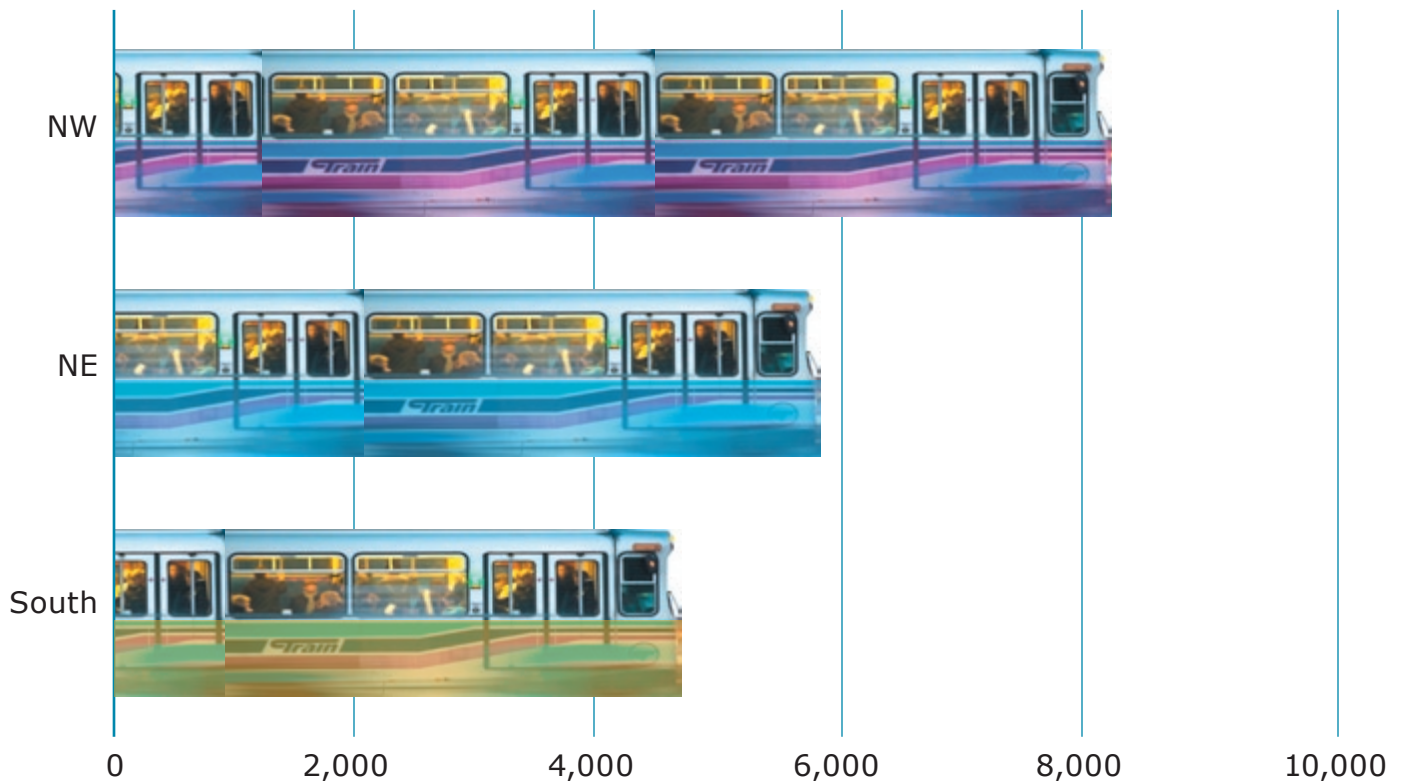
# CTrain ridership

Estimating ridership numbers for the CTrain as opposed to numbers for the entire transit system is tricky. The primary difficulty is that many riders transfer from one train line to another. Calgary Transit provided data on the number of boardings per year, but it noted that it does not publish this data precisely for the reason above. Recent Calgary Transit estimates determined that the CTrain accounts for roughly 50 per cent of Calgary Transit ridership.<sup>19</sup>

Below is a graph of boardings by kilometre per line. As you can see, the Northwest line is by far the most efficient leg of the system. The fact that it travels through the densest areas might explain this greater efficiency. It is also bolstered by the fact that it connects with the Southern Alberta Institute of Technology and the University of Calgary, which have a combined population of over 50,000 full-time students and employees.

## Ridership by CTrain Line

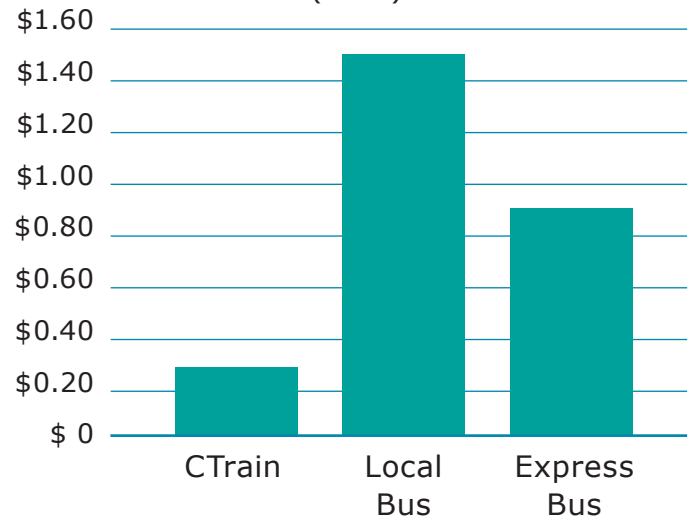
Weekeday Riders Per Kilometer (2006)



# Stated CTrain costs



**Operating Cost Per Rider**  
(2005)



The direct costs of the CTrain consist of operating and capital costs. LRT proponents commonly cite the CTrain as the most cost-effective LRT system in North America. According to Calgary Transit, the cost per hour of CTrain operation in 2005 was \$163.<sup>20</sup> It included operating, maintenance and utility costs. Based on an average of 600 riders per hour, the direct operating cost per rider in 2005 was \$0.27 compared with \$1.50 per bus rider. Keep in mind that this is comparing LRT to non-express buses. A 2002 report on BRT by Calgary Transit found the per rider operating cost of BRT would be \$0.89.<sup>21</sup> Note, none of these figures include capital costs.

The CTrain is credited with having among the lowest per mile construction costs and the lowest capital cost per weekday passenger of any North American LRT system. Calgary Transit commonly uses the table below to demonstrate the remarkable efficiency of its construction. According to this table, CTrain construction was just over a quarter of the cost of its closest competitor, Edmonton. However, it is impor-

tant to keep in mind what they are counting and what they are comparing it to.

The Calgary Transit study (derived from the previously cited GAO study) counts CTrain construction up until 1990, when Calgary was far less dense than it is today. Aside from Edmonton, other North American cities were already heavily urbanized when LRT construction began.

## Capital Cost Comparison of Light Rail Systems

(Costs in 2000 US Dollars)

City	Transit Cost (Year of Expenditure)	Year of Line Opening	Total Cost in 2000 (Million \$US)	Total Length Miles	Cost per Mile 2000 (Million \$US)	Weekday Boardings 2000	\$/Week Day Passenger
Sacramento, CA	\$199.00	1987, 1998	\$262.10	20.6	\$12.70	28,800	\$9,100
Baltimore, MD	\$470.30	1992, 1997	\$536.50	29.4	\$18.20	25,600	\$21,000
St. Louis, MO	\$348.00	1993	\$395.30	19.0	\$20.80	31,700	\$12,500
Salt Lake City, UT	\$312.50	1999	\$320.20	15.0	\$21.40	21,300	\$15,000
Denver, CO	\$292.30	1994, 2000	\$305.40	14.0	\$21.80	29,400	\$10,400
<b>Calgary, AB</b>	<b>\$543 (Cdn)</b>	<b>1981, 87, 90</b>	<b>\$446.20</b>	<b>18.2</b>	<b>\$24.50</b>	<b>187,700</b>	<b>\$2,400</b>
San Diego, CA	\$776.40	1981, 1986	\$1,295.20	46.8	\$27.70	82,600	\$15,700
San Jose, CA	\$725.00	1981, 1999	\$882.60	28.6	\$30.90	31,800	\$27,800
Pittsburgh, PA	\$540.00	1985	\$780.00	25.2	\$31.00	24,100	\$32,400
Edmonton, AB	\$310 (Cdn)	1978-1992	\$319.00	7.6	\$41.70	36,000	\$8,900
Portland, OR	\$1,245.50	1986, 1998	\$1,400.40	32.7	\$42.80	71,100	\$19,700
Dallas, TX	\$840.00	1996, 1997	\$909.60	20.0	\$45.50	38,100	\$23,900
Los Angeles, CA	\$1,675.00	1990, 1995	\$1,934.80	42.0	\$46.10	81,900	\$23,600
N.E. New Jersey	\$992.10	2000	\$992.10	10.0	\$99.20	22,400	\$44,300
Buffalo, NY	\$510.60	1984	\$760.50	6.4	\$118.80	23,800	\$32,000

Source: GAO-01-984 Bus Rapid Transit Shows Promise  
American Public Transit Association Ridership Statistics, Calgary Transit, Edmonton Transit.

# Problems with stated costs

The City of Calgary provides a litany of problems with the cost and ridership estimates. They can be placed into three categories. Broadly, they consist of hidden subsidies, inadequate service and overstated ridership.

## Hidden Subsidies

The most visible subsidy to the CTrain is the network of park and ride lots provided at train stops outside of the downtown core. Until recently, parking at these lots was priced at \$3 per day, though the fee was recently eliminated. Aside from counting the direct cost of building and maintaining the lots, an honest accountant will add in the lost potential revenue, or opportunity cost, of not charging a fee. This is a major implicit subsidy to the system, especially given that parking in downtown Calgary is more expensive than anywhere in North America outside of Manhattan. The median early bird cost for daily parking in Calgary is \$22. Providing \$3 per day park and ride adds \$286,000 to the daily cost of the CTrain system. Even proponents of park and ride point out that cheap or free parking is required to maintain high CTrain ridership levels. For many park and ride users, the CTrain is more of a valet parking service than a method of transit. Not only does park and ride make the CTrain seem more cost effective than it is, but it certainly diminishes the environmental case for the CTrain. If high ridership on the CTrain is a goal in and of itself, free park and ride makes sense. If the goal is to provide low-cost, environmentally friendly transit, it does not.

Another major subsidy to the system is the 15 per cent public transit tax credit that the Harper government introduced in 2006. It is difficult to determine how much of this is allocated to Calgary, but given that the city constitutes over 5 per cent of national transit usage per year,<sup>22</sup> it is reasonable to assume that Calgarians are getting \$6.5-million out of the \$130-million total. Given that the CTrain makes up 50 per cent of system ridership, it is fair to count this as an additional \$3.25-million CTrain subsidy.

The final and most difficult subsidy to quantify is the compulsory transit fees for full-time students at institutions of higher learning such as the University of Calgary, the Southern Alberta Institute of Technology and Mount Royal University. These three schools have a total of more than 58,000 full-time students. Adding the Alberta College of Art and Design and St. Mary's University College into the mix brings the total number of mandatory U-Passes to roughly 60,000. The U-Pass program provides students with a transit pass for \$105 per semester. While this might seem like a bargain for students, it is important to consider that a large number of students do not regularly use transit. The number is difficult to gauge, but the University of Calgary estimates that only 45 per cent of students use transit regularly.<sup>23</sup> This leaves 55 per cent paying for a service they are not even using. For the sake of generating a conservative estimate, let us assume that only 40 per cent of U-Pass holders do not use transit regularly (24,000). That adds up to an additional \$5-million subsidy to Calgary Transit, or \$2.5-million to the CTrain (not including summer students).

## Inadequate Service

Riding the CTrain at peak hours often requires flexibility. Not just scheduling flexibility, but actual physical flexibility. The train is often so packed that standing passengers are required to bend and manoeuvre in clever ways to avoid falling over. Stacking people to the roof may reduce the cost per rider, but it does not provide a particularly comfortable ride for passengers, especially those with mobility issues.

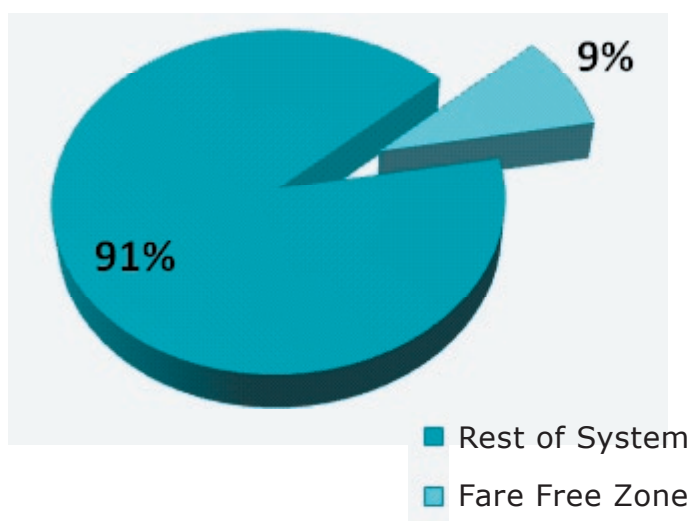
Another major service issue for the CTrain is the lack of law enforcement. Unlike buses, where there is a driver proximate to the passengers, LRT systems require additional security. There has been a good deal of discussion in Council about the need to provide law enforcement on the trains and boost enforcement at stations, but the recommended 110 officers that would replace the 65 current peace officers would add at least \$5-million a year to the price tag of the system. Though plans to add officers to the system were shelved, safety concerns and political pressure will make this switch inevitable, thus adding further costs to the system.

## Overstated Ridership

The CTrain offers free service between 10th Street SW and 3rd Street SE downtown. By the City's estimate, roughly 30,000 of the monthly CTrain trips are between these stops. The free zone is roughly two kilometres long and furnished with wide sidewalks. According to Google Maps, the estimated walking time across the zone is 24 minutes. Given that this LRT service is free, many people who would otherwise walk, hop on the train to save a few minutes. However, many people who currently ride in the free zone would rather walk the few blocks than pay the fare. It is misleading to count non-paying riders in the total ridership numbers.

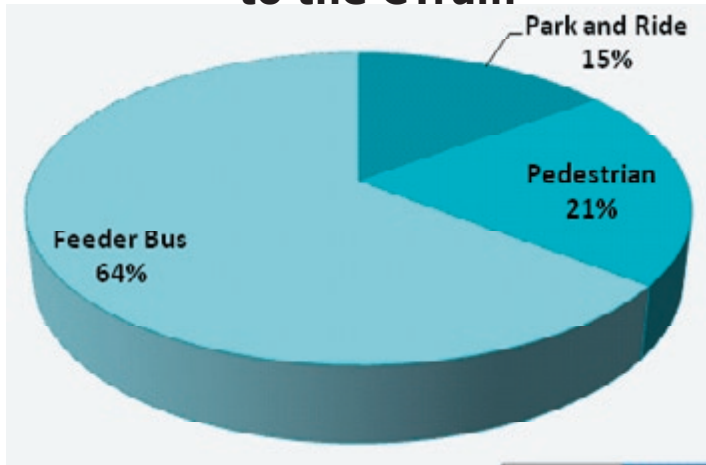
The other misleading aspect of the ridership numbers is that 65 per cent of riders connect to the CTrain via feeder buses and 15 per cent connect via park and ride. Bus riders do not pay extra to connect with the CTrain, so they are counted twice.<sup>24</sup> Many of the park and ride passengers are driving much of the way to work and taking the CTrain to save money on parking. This also inflates the numbers.

### Weekday Ridership

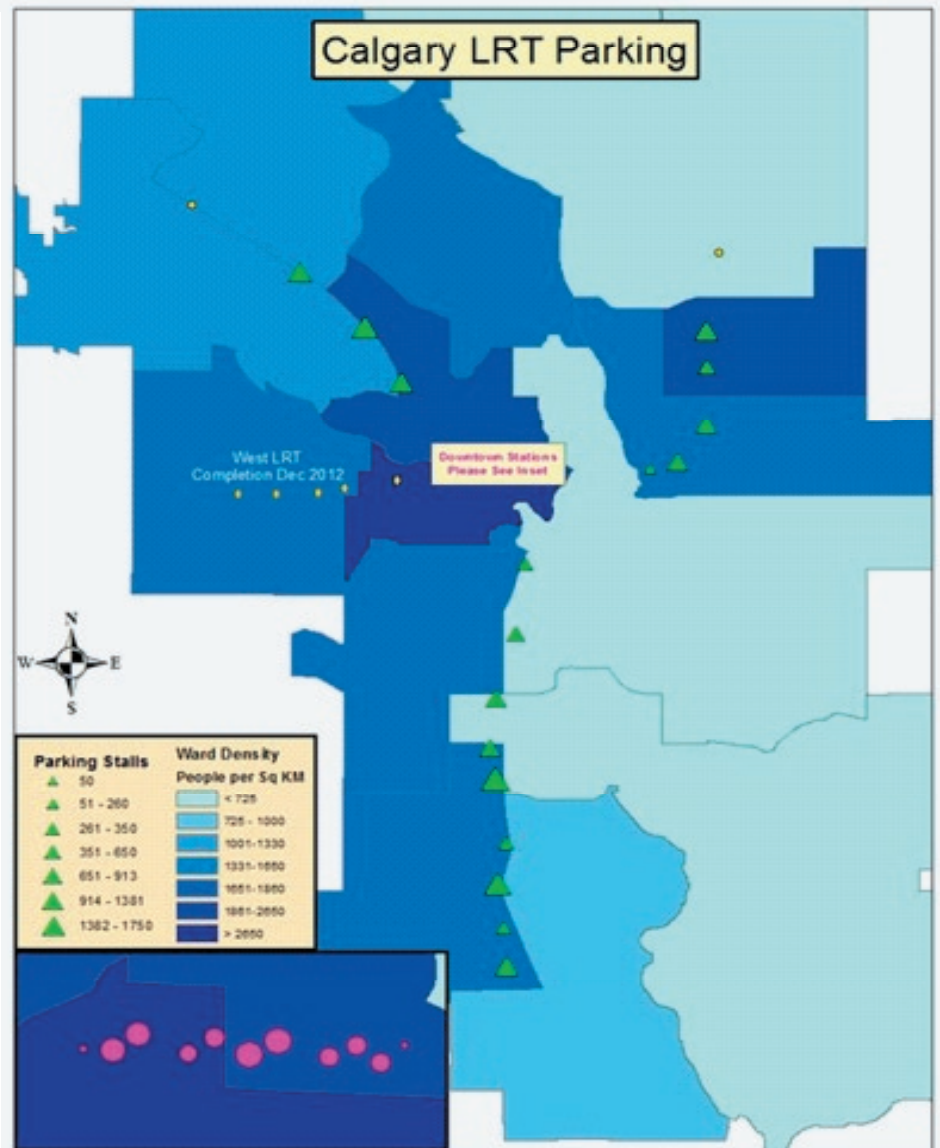




### How Riders Connect to the CTrain



There is also the question of how many of the 37,230 passengers who access the CTrain by foot are actually paying customers. One would assume that a majority of the 22,800 riders in the free zone who access the train are pedestrians. Though there is not any data to confirm it, we can extrapolate that well under 20 per cent of CTrain riders are paying customers that do not use any other mode of transit to access the train. If the goal is to replace personal automobile usage, it is not working. If the goal is to reduce reliance on buses, it still is not working.



# Estimating the cost of the CTrain

The first thing to point out is that the \$2,400 capital cost per weekday passenger (\$2,960 in 2009 USD) only counted expansions up to 1990, when the system was only 29 kilometres long. The system is roughly 46 kilometres long now, and the total capital cost to date is roughly \$2-billion. Ridership is now around one-third higher, but the total capital cost is nearly four times as much. This puts the capital cost per weekday rider closer to \$7,400. This still compares favourably with other LRT systems but does not bode well for the future of the system. The most recent expansions added roughly 90,000 riders for \$1.4-billion. That works out to just over \$15,500 per weekday rider, right in the middle of the pack. The downtown corridor was the low-hanging fruit. The city is far denser than it was during the original construction, and the new lines are in less

ideal corridors. Two thousand four hundred dollars per weekday rider is a nice number to brag about at conferences but holds no relevance to the current debate.

There are a few ways to calculate the combined capital and operating costs. The most useful method is to average out the total capital cost per year and combine that figure with the yearly CTrain operating cost. Dividing this by the number of annual riders would give us a relevant metric by which to judge the system's success. We also need to factor in the opportunity cost of the park and ride system, the U-Pass subsidies and the 15 per cent public transit tax credit. The hypothetical cost per rider including the recommended increase in police presence is also included below.

## 2008 (Actual)

Cost	Cost Per Unit	Annual Units	Annual Cost
Operating	\$ 0.27/rider	47,650,000	\$ 12,865,500.00
Park and Ride	\$ 19.00/user	1,566,000	\$ 29,754,000.00
Capital	\$ 2,000,000,000.00		\$ 74,074,074.07
Transit Tax Credit	\$ 3,250,000.00		\$ 3,250,000.00
U-Pass			\$ 5,040,000.00
<b>Total</b>			<b>\$ 124,983,574.07</b>
Cost Per Rider			\$ 2.62
<b>Cost Per Paying Rider</b>			<b>\$ 2.88</b>

## 2008 (With Recommended Police Increase)

Cost	Cost Per Unit	Annual Units	Annual Cost
Operating	\$ 0.27/rider	47,650,000	\$ 12,865,500.00
Park and Ride	\$ 19.00/user	1,566,000	\$ 29,754,000.00
Capital	\$ 2,000,000,000.00		\$ 74,074,074.07
Transit Tax Credit	\$ 3,250,000.00		\$ 3,250,000.00
Inreased Police			\$ 5,000,000.00
U-Pass			\$ 5,040,000.00
<b>Total</b>			<b>\$ 129,983,574.07</b>
Cost Per Rider			\$ 2.73
<b>Cost Per Paying Rider</b>			<b>\$ 3.00</b>

These figures do not capture the full cost to Calgarians of the CTrain and the land-use planning decisions that have accommodated its expansion. Bad planning creates traffic congestion, which costs people time and money. Driving up daily parking rates to \$22 is a substantial cost to non-transit users, and this is directly attributable to the parking strategy built around the CTrain.

Worst of all, focusing the bus system on shuttling people to the LRT to get them downtown resulted in poor east-west mobility and made the city far more automobile dependant than necessary. It disproportionately hurts the suburban poor, the very people Calgary Transit should be most concerned with helping.

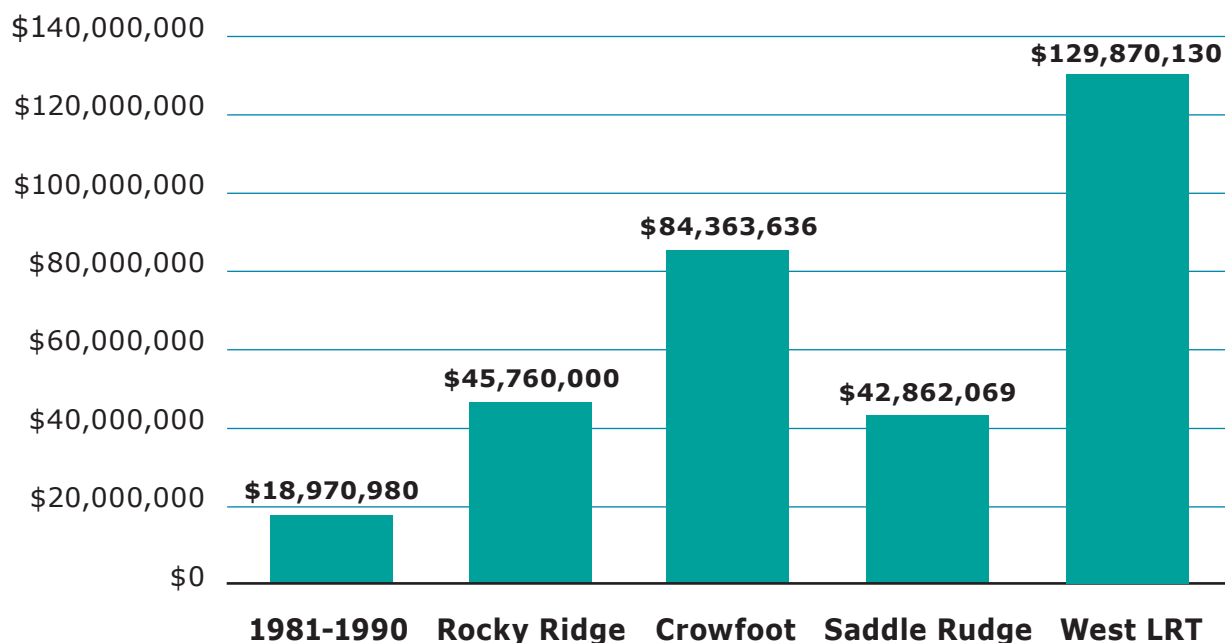
# LRT expansions

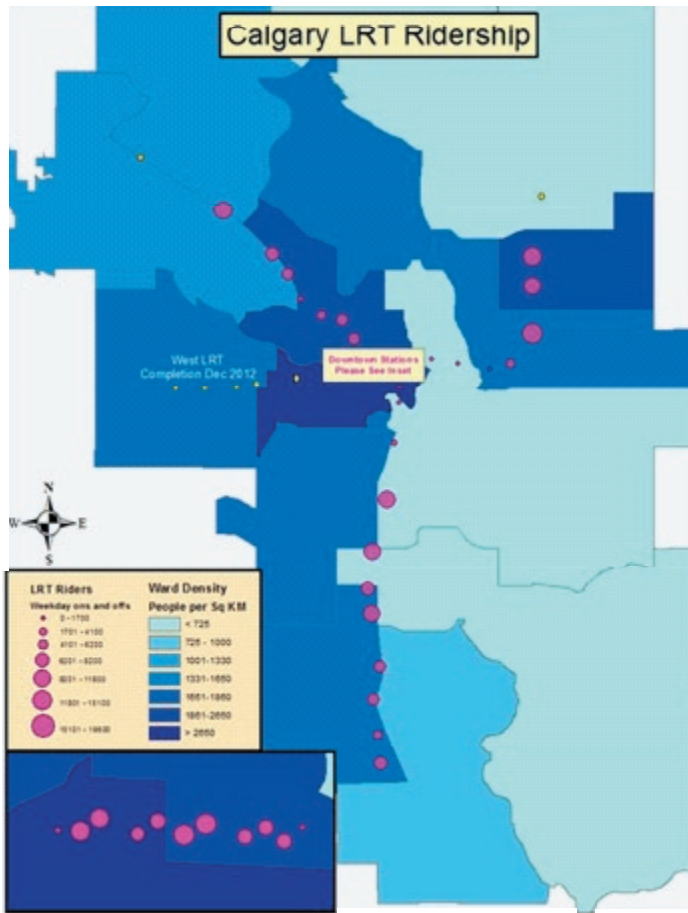
In addition to the West LRT line currently under construction, there are several other proposed routes. The most commonly mentioned extension is the Southeast extension, which was a hot political issue during the recent mayoral race. One thing worth noting before discussing these lines is that each of them is likely to be less cost-effective than the existing system. The existing route goes through the most heavily trafficked corridor, so it is essentially the low-hanging fruit. Expanding into sparser areas will make even less economic sense.

## West LRT

The 7.7-km West LRT line is currently under construction. It broke ground in February 2010 and is scheduled for completion in December of 2012.<sup>25</sup> When Council approved the project in 2007, the estimated price tag was \$700-million.<sup>26</sup> The projected cost has increased to \$1-billion. This translates to just under \$130-million per kilometre or \$209-million per mile — a far cry from the \$24.5-million per mile estimates for the lines built between 1981 and 1990. In fact, this makes it quite possibly the most expensive LRT line ever built.

### Capital Cost Per Kilometer



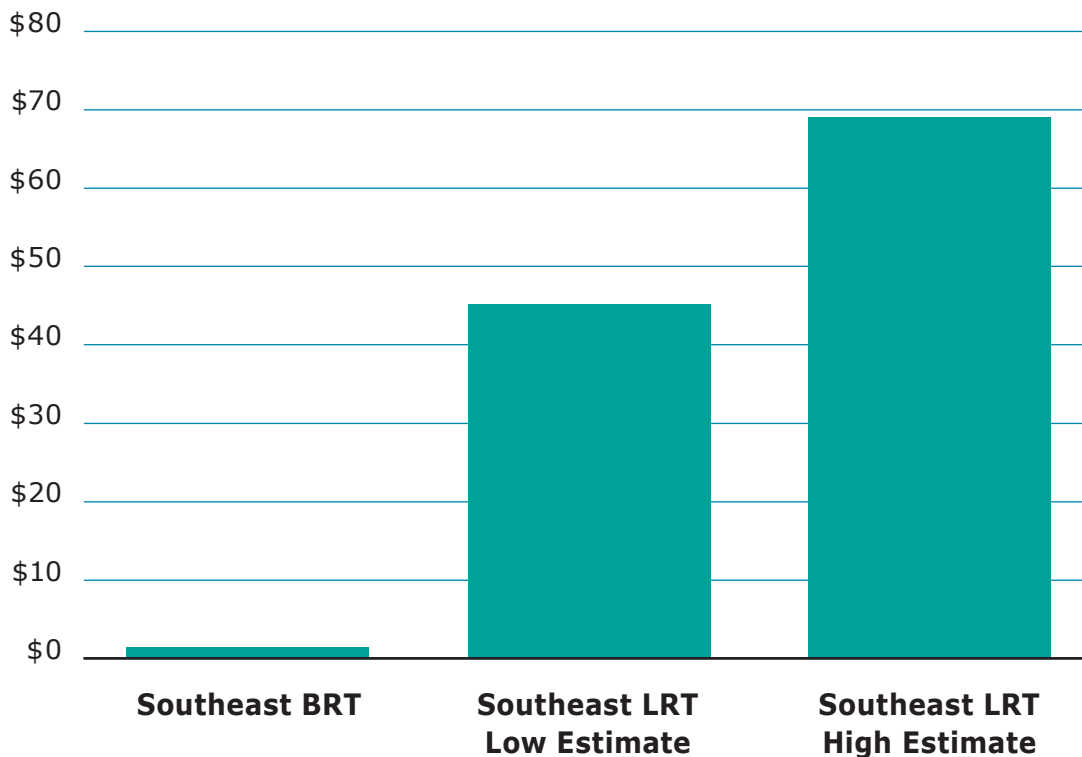


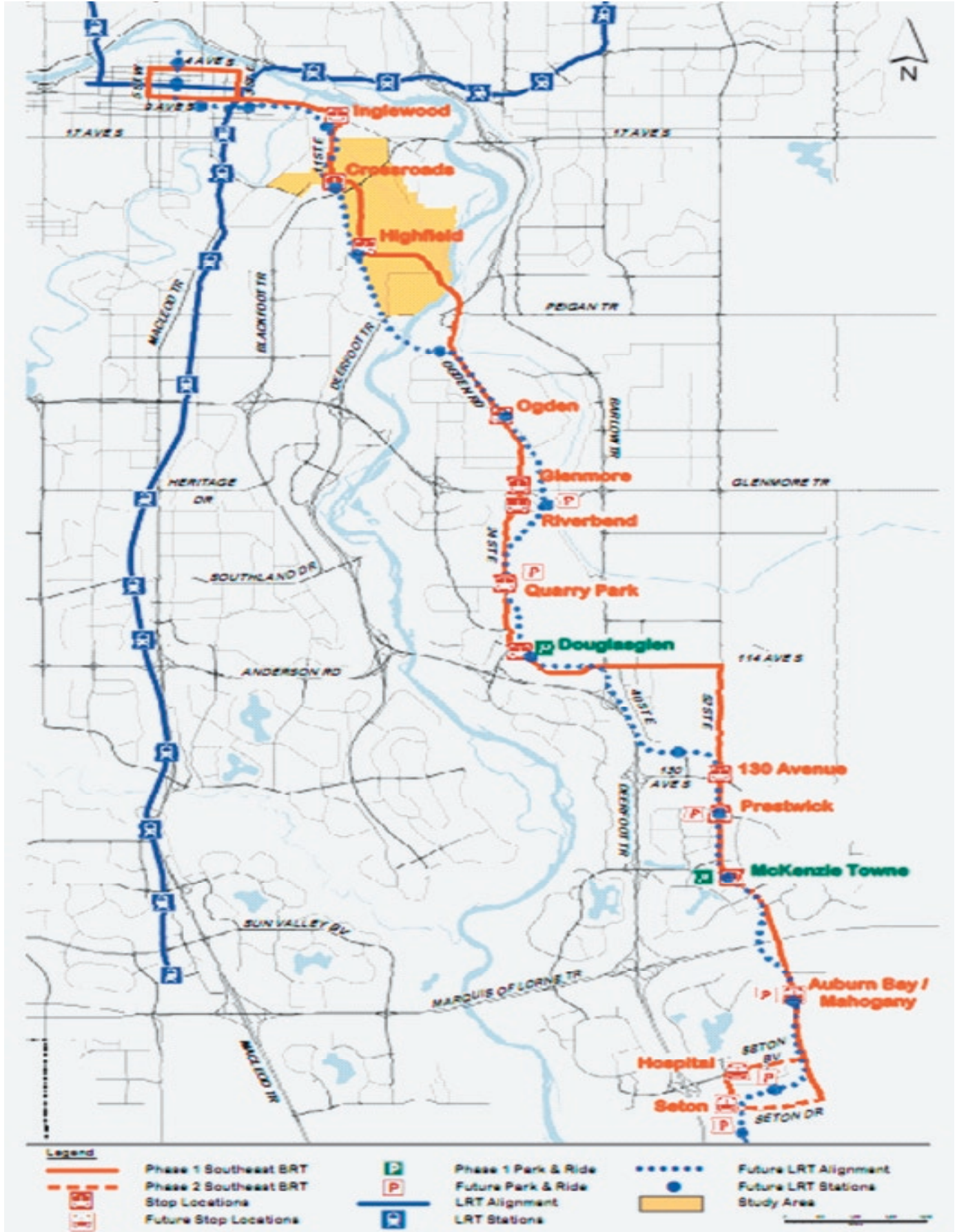
## Southeast LRT

One of Mayor Nenshi’s first actions was to downgrade the priority of the Southeast LRT.<sup>27</sup> The expected cost of the proposed 26-km line is between \$1.2-billion and \$1.8-billion.<sup>28</sup> This works out to between \$46-million and \$69-million per kilometre.

BRT is being used as a temporary measure. The City purchased 14 articulated buses, each of which has a capacity of 110 riders.<sup>29</sup> The route is essentially the same as the proposed LRT line and provides 118 one-way trips per weekday<sup>30</sup> with a one-way travel time of 25 minutes. The cost of the BRT system was \$30-million,<sup>31</sup> including \$6-million to build 1,000 park and ride spaces. This works out to under \$1.2-million per kilometre or around 2 per cent of the median capital cost estimate for the equivalent CTrain line.

### Capital Cost Per Kilometer





# Other advantages of BRT

We have already seen that the cost of providing BRT is a fraction of building LRT lines. However, two other benefits of BRT have yet to be discussed.

## Speed

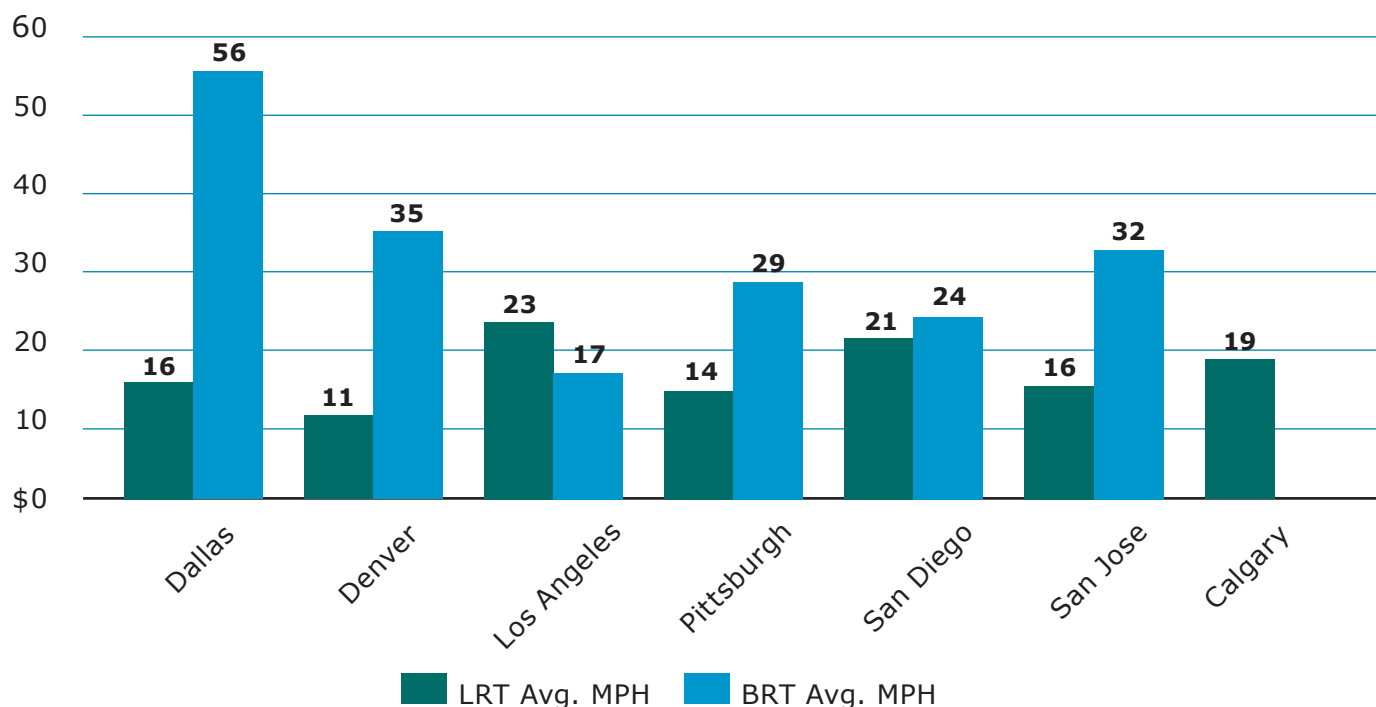
Many types of trains have extremely high top speeds. Because of this, it is easy to assume that rail transit is generally faster than bus transit. In fact, research has demonstrated that LRT has a lower average speed than BRT in most cities. The only counter-example in the GAO research is in Los Angeles.<sup>32</sup> While its LRT system has the highest average speed of the systems listed, the bigger factor is that the buses in LA move far slower than buses anywhere else, since the city has some of the worst traffic congestion in America. Note that every other BRT system listed is far quicker than Calgary's LRT.

## Flexibility

The U.S. Government Accountability Office study cited throughout this report includes a section that elaborates upon the benefits of the flexibility that comes with BRT. These are the main findings:<sup>33</sup> (emphasis added)

**"Bus Rapid Transit can respond to changes in employment, land-use, and community patterns by increasing or decreasing capacity. Bus Rapid Transit routes can also be adjusted and rerouted over time to serve new developments and dispersed employment centers that may have resulted from urban sprawl. For example, an official in San Jose noted that because of development outside of the city center, there are now eight employment centers that need to be considered in its transit analysis. On the other hand, Light Rail lines are fixed and cannot easily**

Comparing Speed of BRT and LRT



**change to adjust to new patterns of housing and employment.** For example, the western portion of the Los Angeles Light Rail Green Line was built in part to provide mass transit service for workers in defense production facilities in Los Angeles. However, by the time the Green Line opened these facilities had been closed. As a result, projected ridership levels were not achieved”.

“Although Bus Rapid Transit sometimes uses rail-style park and ride lots, **Bus Rapid Transit routes can also collect riders in neighbourhoods and then provide rapid long-distance service** by entering a busway or HOV facility. Transit agencies have considerable flexibility to provide long distance service without requiring a transfer between vehicles. This is a significant benefit, because some research has shown that transit riders view transferring as a significant disincentive to using mass transit. In contrast, Light Rail systems frequently require a transfer of some type — **either from a bus or a private automobile. When Light Rail lines are introduced, transit agencies commonly reroute their bus systems to feed the rail line.** This can have the effect of making overall bus operations less efficient when the highest-ridership bus route has been replaced by Light Rail; the short feeder bus routes can be relatively costly.”

“Finally, **bus-based systems’ ability to operate both on and off a busway or bus lane provides Bus Rapid Transit the flexibility to respond to operating problems.** For example, buses can pass disabled vehicles, while Light Rail trains can be delayed behind a stalled train or other vehicles on the tracks. Thus, the impact of a breakdown of a Bus Rapid Transit vehicle is limited, while a disabled Light Rail train may disrupt portions of the system.”

## Why the fixation on rail?

With all of the evidence against the claims supporting LRT expansion, why is LRT still the transit method of choice for Calgary Transit? While it is difficult to give a concrete answer, four factors contribute to this bias.

- **Intergovernmental Transfers:** Given that capital costs are borne almost entirely by higher levels of government, it can make sense from the perspective of local politicians to trade off higher capital costs for lower operating costs, even if the total cost is higher.
- **Indirect Costs:** The papers written by proponents of the CTrain suggest that they do not think of opportunity costs in the way that economists do. It is important to evaluate not only the cost of implementing a policy but also the revenue lost from not using resources efficiently. The primary example here is the park and ride system. As mentioned, these spaces are valued at roughly \$22 per day, but the city is providing them at no cost. No economist in his or her right mind would neglect to consider this opportunity cost.
- **Trendiness:** Much urban thinking nowadays focuses too much on accommodating “creative class” types, without duly accounting for blue collar and service workers. Rail transit is considered trendy, and creative types like things that are trendy. This may make Calgary marginally more appealing to skilled professionals moving to the city, but it does not do much for the average Calgarian.
- **Transit-oriented Development (TOD):** Many light rail proponents think that building LRT lines can lead to the development of communities that rely primarily on public transit. They also think



## Conclusion

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this attracts outside investment into these communities, making them desirable places to live. This is the opposite of the traditional approach of bringing transit to where people already live. TOD in and of itself is not necessarily a bad idea, but its benefits are often over-stated. In fact, in the case of light rail, TOD may be negative. Since TOD raises the housing values in these neighbourhoods — which is claimed to be a benefit — low-income people cannot generally afford to live in these neighbourhoods. Instead, higher income people who are more likely to drive to work and only casually use public transit are those most able to afford to live in these neighbourhoods. Because LRT is so much more expensive to build than bus infrastructure is, there are only so many TOD communities that can be built. This means that we are concentrating our transit capital spending in the neighbourhoods that least require transit.

It is hoped that the 30th anniversary of the CTrain will spur a substantial discussion about the future of transit in Calgary. Knowing what we know now, clearly Calgary Transit ought to have maintained and expanded the Blue Arrow bus service rather than create the CTrain. For the cost of the CTrain, Calgary could have an extensive network of BRT lines running from the suburbs into the downtown core as well as running east-west. This could have been done at a fraction of the cost of the CTrain.

Despite the massive investment Calgary Transit has put into developing the CTrain, completing the network as initially planned would be a costly mistake. The Southeast BRT line the City introduced as a temporary measure should be seen as a model of how to provide low-cost rapid transit in a timely manner. LRT expansions take years to carry out and cost billions of dollars in capital expenses. Rather than biding its time until the province finds another billion dollars to spend on rapid transit, Calgary Transit should plan an aggressive BRT expansion. This should not be restricted to transit between the suburbs and the core but should also include east-west lines between dense employment centres. Not all employment is located downtown.

Most importantly, it is paramount to keep in mind that transit ridership levels are irrelevant to the average person. What matters to people is mobility. Restricting downtown parking to force people onto trains should not be a public policy objective. Rather than pushing people to conform to its transit vision, Calgary Transit should focus on mobility first. Making transit attractive should trump making driving unattractive.

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## FURTHER READING

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