

On Demand Transit Service in Calgary: Pilot Project Update

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Executive Summary

The City of Calgary has introduced two pilot projects to evaluate the use of On Demand transit service. Each of the pilot project zones was selected to test this type of service with Calgarians in different settings. The Carrington/Livingston zone, the first to be implemented, is a developing suburban community that has not previously had public transit service. The service was introduced in 2019 August to connect residents in the primarily residential community to higher-order transit services at North Pointe Terminal and a regional commercial/institutional centre at Country Hills Village Shopping Centre.

The Springbank Hill zone is a developed suburban area that had existing fixed-route service. This zone was implemented in 2020 October in response to an 85% reduction in system-wide ridership due to the COVID-19 pandemic. On Demand was identified in this area to provide a responsive transit service to meet lower demand. On Demand connects residents in these primarily residential communities with higher-order transit services at 69 Street SW LRT Station and regional commercial/institutional centres throughout the zone.

After evaluation of pilot project metrics in early 2022, Administration adopted the following recommendations:

- On Demand service is an ideal complement to the public transit service in Calgary.
- On Demand can work well and provide a responsive service in areas of low ridership, such as:
 - New and developing communities; and
 - Existing communities where ridership has been reduced dramatically.
- On Demand can be delivered by the public sector and private sector.
- Calgary Transit will formalize adoption of On Demand service when key documents are produced or updated, such as RouteAhead and Calgary Transit's Service Design Standards.

The Introduction of On Demand Service in Calgary

On demand transit, also referred to as microtransit or mobility on demand, uses technology to connect transit customers in a service zone with a trip to their destination. On demand transit service is part of an emerging model that uses technology (smartphones, software as a service) to connect customers with transportation services. The Transportation Research Board defines mobility on demand as: “an innovative transportation concept where consumers can access mobility, goods, and services on demand by dispatching or using shared mobility...and public transportation solutions.” (*The Role of Transit, Shared Modes, and Public Policy in the New Mobility Landscape*, Transportation Research Board, 2021) Calgarians have become familiar with this concept using ride-hailing apps (referred to as transportation network companies (TNC) in Calgary), food delivery apps, and goods delivery apps.

Calgary Transit has previous experience using dial-a-ride service which was used in new communities with low demand in the 1980s. Customers would call a central dispatch number where a dispatcher would relay pick-up and drop-off information to a driver over the radio.

Today, Calgary Transit Access (CTA) uses a form of on demand service to provide transportation services for customers with disabilities. CTA provides door-to-door shared ride trips to eligible customers and utilizes different technology and booking rules when compared to the pilot project On Demand zones. CTA customers must book their trips in advance (up to four days prior) rather than at the time the trip is required, they can schedule subscription trips that occur regularly on the same day/time, and daily work assignments

for drivers are created every night rather than in real-time. Despite these differences Calgary Transit has identified potential areas of synergy for these two services in the future.

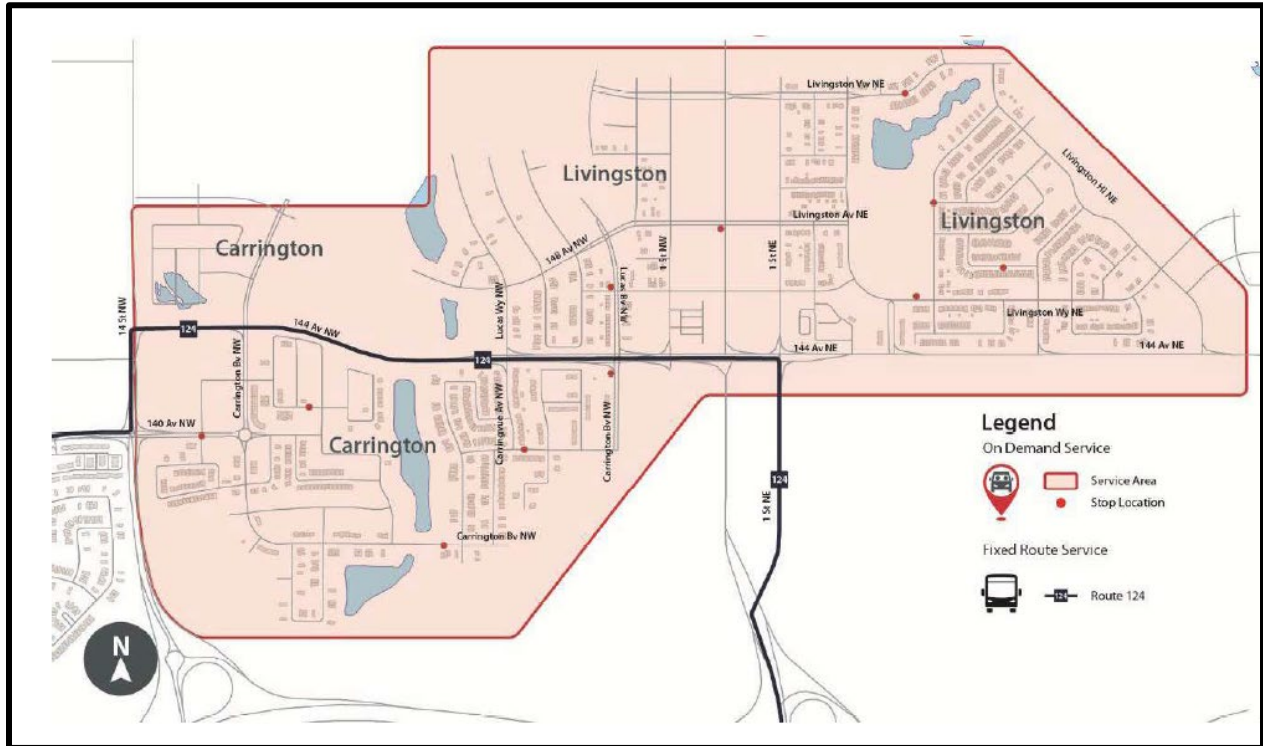
Carrington/Livingston Zone

Background

In August of 2019, following a competitive procurement process on the open market, Calgary Transit launched the first pilot of On Demand service in the developing communities of Carrington and Livingston. Implementation of the pilot project, initially funded through the Council Innovation Fund, provided public transit service in two communities that did not previously have service. The pilot project surpassed its four project charter goals for ridership, customer satisfaction, app downloads and cost-per-ride. The COVID-19 pandemic disrupted ridership in the zone which has been steadily recovering but has not matched the numbers experienced in February and March of 2020.

The Carrington/Livingston On Demand zone has the following characteristics:

- Carrington and Livingston are primarily suburban residential developing communities in north central Calgary that did not previously have transit service.
- Size of the service area is approximately four square kilometres (see map of the zone below).
- This service is contracted to Southland Transportation, a local mobility provider, who delivers and manages the overall operation, workforce, fleet, software, and dispatching.
- On Demand software is provided by Canadian technology firm, RideCo.
- Service began on 2019 August 9, initially for a one-year period and was extended in 2021 August for an additional 12 months.
- On Demand service was provided all day, all week, including weekends. This is different from Calgary Transit's typical staged approach to service in new communities where service is initially provided only on weekday peak periods, then service is gradually added during other time periods as the community grows.
- In the first seven months, this service surpassed the four project goals for ridership, customer satisfaction, app downloads, and cost per ride.



Map of the Carrington/Livingston On Demand zone

Pilot Project Results

On Demand in Carrington/Livingston has shown this type of service is ideal for introducing public transit in developing communities, where population and ridership demand are low, and residents are travelling primarily to a transit hub to connect with the rapid transit network. The service is responsive to changes in demand, such as the experience with the COVID-19 pandemic, but also smaller changes, such as seasonal increases/decreases in ridership due to school calendars and holidays. Although ridership has been impacted during the pandemic due to public health guidelines and work from home/hybrid work situations, customer satisfaction with the service has remained high.

The table below shows key metrics being evaluated as part of the On Demand pilot project. The values below are from 2022 June.

	Stars (out of 5)	Average Wait Time/ Frequency (mins)	Average On-board Time (mins)	Average Failed Searches (%)	Cost/trip (\$)
Actual	4.9	8.2	10.6	3.8	\$11.97
Target	4.5	20	NA	<8	<\$20.00

Stars: customers use an app on their smartphone to book a trip, see their bus as it approaches, and easily provide feedback (stars rating and comments). Customers consistently rate the service in Carrington/Livingston as 4.9 out of 5.0 stars.

Requested Trip Time Delay: this value indicates the average difference between when a customer wanted to travel, and the actual time of the trip they are offered. For example, on average, a customer requesting a trip to travel at 1500, would receive a trip at 1508, eight minutes later than their requested travel time. When compared to fixed-route/fixed-schedule service, this is the equivalent metric of frequency, where a customer may wait 15, 30, 45, 60 minutes for the next bus depending on the level of service in the community.

Average On-board Time: this indicates how long a customer is on the vehicle travelling from their pick-up location to their drop-off location. In Carrington/Livingston the average time a customer is on a vehicle is just under 11 minutes. Comparable metrics for fixed-route service are unavailable.

Average Failed Searches: the percent of overall trip searches that ended in a failed results because there was not enough capacity in the system to provide a ride at the requested time. Comparable metrics for fixed-route service would be a customer attempting to board a bus and not being able to get on because it is full.

Cost/trip: this is the overall cost to provide the service in Carrington/Livingston divided by the number of trips provided. For comparison, the three community shuttle routes in Fall 2021 with the lowest weekly passengers/total operating hour had costs/trip ranging from \$14.51 to \$17.24. The top three performing community shuttle routes in Fall 2021 with the highest weekly passengers/total operating hours had costs/trip ranging from \$1.96 to \$4.68.

Lessons Learned

The metrics above, and the overall experience, confirms On Demand is ideal in Calgary in developing communities and areas with low ridership. This responsive transit system can effectively serve customers in areas of low density, connecting them with the rapid transit network and regional commercial/institutional hubs.

As ridership returns, it is becoming difficult to meet project metrics and provide a responsive service without increasing operating costs by adding additional operators/vehicles. Effective 2022 June 27, new features available in RideCo's technology to improve the efficiency of operations were implemented. Customers were provided with this information by email before the changes were implemented. Administration is closely monitoring these changes before potentially implementing in Springbank Hill.

Customer ratings and acceptance of the service in this zone is very high. Being able to introduce public transit service earlier than usual confirms there is demand for transit service in developing communities. Implementation of this zone with a full span of service (all day weekdays and weekends) makes it financially challenging to transition to fixed-route services with the same span of service. The base operating budget needs to be available to transition to fixed-route in the future when ridership demand is more efficiently served by vehicles on fixed-route/fixed-schedule service.

Utilizing private contractors for this service unlocks a number of benefits including lower operating costs and reduced resources required at Calgary Transit (oversight is similar to contract management rather than the traditional model of overseeing the complete operation from hiring/training/employee supervision/fleet maintenance, etc.).

The responsive nature of On Demand meant changes could be implemented quickly to respond to reductions in ridership or implement new customer information/rules when customers were adjusting to this new type of service.

The dynamic routing of this service combined with smaller vehicle sizes means the fleet can travel on all community streets. This caused some issues with stuck vehicles during the spring snow storms in 2022 as vehicles became stuck in heavy wet snow on less-travelled streets.

The pilot project service operates with minimal redundancies in case of ill operators or fleet maintenance issues. There have been rare instances where this has caused disruptions in service, such as staff absences during the Omicron wave and one instance of a flat tire on a vehicle when that was the only vehicle in service at the time.

Springbank Hill Zone

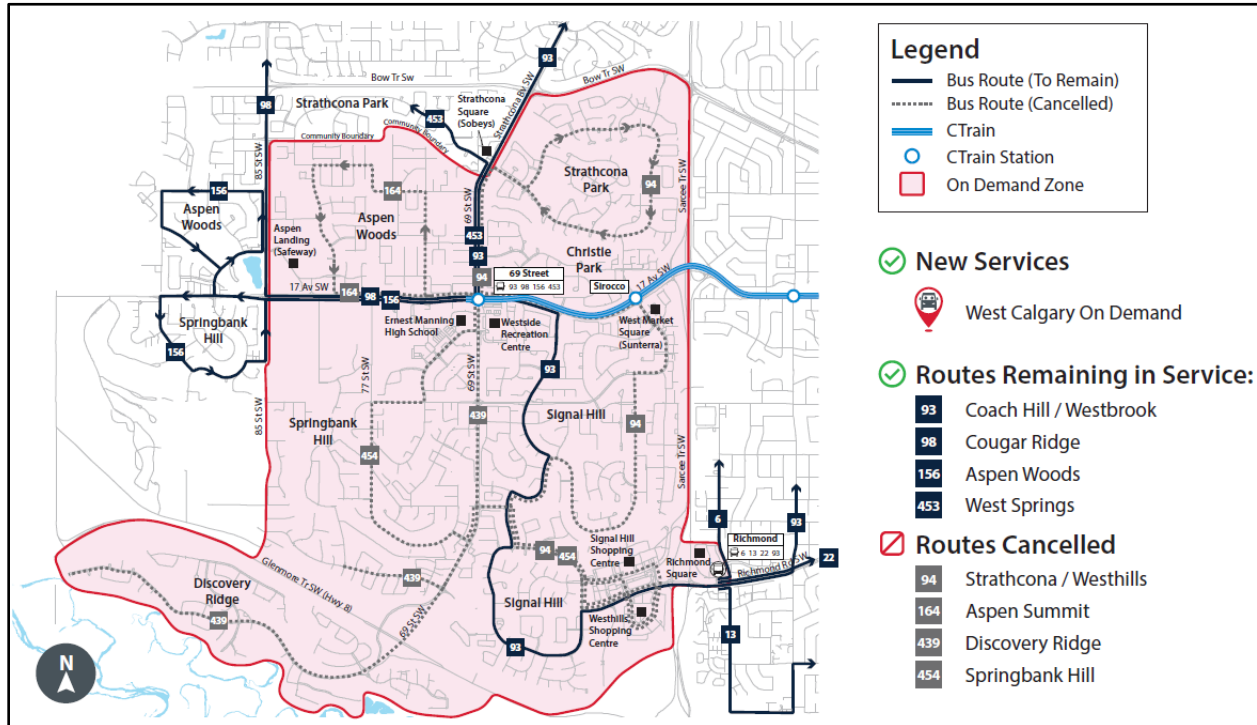
Background

In southwest Calgary, On Demand was introduced in 2020 October for flexibility of service delivery to quickly respond to the COVID-19 pandemic and reduced ridership demand. It was identified that the unpredictability of the conditions of the pandemic would affect travel demand, and fixed-route schedules (that require design months in advance) would be difficult to scale up and down in response to demand. Southwest Calgary had previously been identified as a low-ridership area with under-performing routes which also supported the implementation of On Demand.

The Springbank Hill On Demand zone has the following characteristics:

- This service is operated by Calgary Transit using City labour, fleet (accessible community shuttles), dispatching, operations supervision, and customer relations.
- RideCo provides the technology and mobile app. This approach provides a consistent experience for customers and meets The City's requirements of using the same technology for both pilot project zones.
- This service was launched in 2020 October.
- The service area is primarily developed communities with a number of regional commercial centres, institutions, and two Blue Line LRT stations.
- This service was introduced in response to the COVID-19 pandemic to test a dynamic service in response to reduced ridership demand due to public health guidelines to work from home and reduce travel in the community.
- With the introduction of On Demand the following routes were deleted:
 - Route 94 – Strathcona/Westbrook
 - Route 164 – Aspen Woods
 - Route 439 – Discovery Ridge
 - Route 454 – Springbank Hill
- The following fixed-route service continues in the Springbank Hill On Demand zone:
 - Route 93 – Coach Hill/Westbrook
 - Route 98 – Cougar Ridge
 - Route 156 – Aspen Woods
 - Route 453 – West Springs

- A map of the service area is presented below.
- Size of service area: approximately 17 square kilometres
- On Demand connects the communities to the primary transit network at 69 Street SW and Sirocco Blue Line LRT Stations.



Map of the Springbank Hill On Demand zone

Pilot Project Results

Implementing the On Demand zone in Springbank Hill demonstrated this service can be delivered by Calgary Transit operators using community shuttle buses. Similar to Carrington/Livingston, this zone has a rapid transit connection (Blue Line LRT) and commercial/institutional hubs that are the primary destination of customers. This service is also responsive to changes in ridership demand, and all operations and work rules are governed by the collective agreement with Amalgamated Transit Union (ATU) Local 583.

The table below shows key metrics being evaluated as part of the On Demand pilot project. The values below are from 2022 June.

	Stars (out of 5)	Average Wait Time/Frequency (mins)	Average On-board Time (mins)	Average Failed Searches (%)	Cost/trip (\$)
Actual	4.4	8.8	10.1	4.3	\$17.30
Target	4.5	20	NA	<8	<\$20.00

More information on each of these metrics is provided above in the Carrington/Livingston section.

Lessons Learned

Because On Demand service is completely reliant on technology, any outages will disrupt the service. There were two outages in the span of 10 days in 2021 Fall due to the cellular data network provider experiencing challenges related to the flooding in BC. For the second outage, a new feature introduced by RideCo allowed our service to continue operating temporarily without a functioning cellular data network.

Calgary Transit provides trip booking through the Call Centre to be able to serve customers who do not have a smartphone. In Springbank Hill approximately 5-7 per cent of trips are booked through the Call Centre, with the remaining trips booked through the app. This highlights the importance of providing multiple methods to access public transit service, even when introducing a new technology-based service.

This zone was implemented as a one-year pilot project, but due to the ongoing pandemic the pilot was extended. Certain aspects of the service should be reviewed and improved when implementing future pilot projects. For example, temporary information signs were installed at bus zones and at major transfer hubs with information on this service when it was unclear as to how long the pilot project would operate. With the information we now know about the length of this service, additional costs should have been put towards customer information signs.

This zone utilizes Calgary Transit's fleet of accessible community shuttle buses. Future On Demand zone fleets should be completely accessible to allow customers with disabilities to access the system. An advantage of On Demand is it allows customers with mobility devices to identify themselves to the booking system, which will then ensure an accessible vehicle is dispatched, and a wheelchair accessible spot is available on that vehicle. Different vehicle types/sizes can also be used depending on ridership demand to provide improved responsiveness and/or lower operating costs.

Customer satisfaction is lower in the Springbank Hill zone (4.4 out of 5.0 stars) compared to Carrington/Livingston (4.9 out of 5.0 stars). This seems to be due to a number of factors including:

- Calgary Transit customers in this zone previously had, and were used to, fixed-route service and had to adapt to a new type of service during a pandemic;
- Delivering this service is very different from what Calgary Transit operators are used to in their experience with fixed-route service, whereas the Southland operators have previous experience with this type of service; and
- Customer expectations are based on ride-hailing apps, and more could be done to explain this is a shared-ride public transit service, not a door-to-door taxi service.

Greenhouse Gas Emissions Comparison

Case studies of On Demand service indicate an opportunity exists to reduce vehicle depreciation (wear and tear), reduce route distance (the sum total of all kilometres driven to provide the service), and reduce greenhouse gas emissions. The chart below shows a comparison of the fixed-route service provided in Springbank Hill in 2020 September, after fixed-route service had already been reduced in response to the pandemic, compared to On Demand service in 2022 June. This is a simple estimation based on the reduction of kilometres driven to provide the service. There is approximately a 30 per cent reduction in greenhouse gas

emissions. Additional efficiencies could be gained through using smaller and more fuel efficient vehicles (as long as overall system capacity can be maintained) or using electric vehicles.

	Fixed-route (2020 Sep.)	On Demand (2022 June)	Change from fixed-route to On Demand
Average Weekly Route Distance	9,820 kms	6,932 kms	-29%
Estimated Fuel Consumption	2,580 litres	1,822 litres	-29%
Estimated Emissions	5,890 kgs	4,159 kgs	-29%
Average Weekly Service Hours	540 hours	379 hours	-30%

Note: the chart above is an estimate base on average weekly route distance of fixed-route service and On Demand in the Springbank Hill zone. Data for fixed-route are taken from route 94, 164, 439, and 454 only as these were the routes that were replaced by On Demand.

Next Steps for On Demand

Based on the findings of the two pilot projects, including customer feedback, and analysis of the costs of providing the service, the following are the recommended next steps for the On Demand service:

- Continue to develop the request for proposals (RFP) for the additional four to six areas of On Demand service to be implemented in 2023, as directed by Council (CD2022-0675)
- Continue to operate On Demand service in Carrington/Livingston and Springbank Hill by working with Supply Management, Southland and RideCo to extend the existing contracts until a supplier is selected through the RFP process to provide service in the additional four to six communities.
- Utilize lessons learned through these pilot projects to inform the procurement process and implementation of future services.
- Investigate synergies between On Demand service and Calgary Transit Access service to determine how these services can be used together to serve Calgarians with disabilities.

Conclusion

The typical measures of success of transit improvement initiatives are ridership, coverage, cost, and customer service attributes such as reliability, speed, safety/security, ease of use, informative, cleanliness.

A key motivation for the introduction of On Demand service was a new attribute that relates to cost: adaptability or responsiveness. The COVID-19 pandemic brought to the forefront the value of responsiveness in service provision. Being able to quickly respond to changing demand as it plummeted in early 2020, and as it recovers through 2022 and beyond, has been an excellent feature of the service, in addition to providing financially efficient public transit services.