



Transit Executive Committee Agenda

Wednesday, May 3, 2023, 1:30 p.m.

Regional Council Chambers

Regional Headquarters Building

605 Rossland Road East, Whitby

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 2097.

Note: This meeting will be held in a hybrid meeting format with electronic and in-person participation. Committee meetings may be [viewed via live stream](#).

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8. Advisory Committee Resolutions	
There are no advisory committee resolutions to be considered	
9. Confidential Matters	
There are no confidential matters to be considered	

10. Other Business

11. Date of Next Meeting

Wednesday, June 7, 2023 at 1:30 PM

12. Adjournment

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The Regional Municipality of Durham

MINUTES

DURHAM REGION TRANSIT EXECUTIVE COMMITTEE

Wednesday, April 5, 2023

A regular meeting of the Durham Region Transit Executive Committee was held on Wednesday, April 5, 2023 in the Council Chambers, Regional Headquarters Building, 605 Rossland Road East, Whitby, Ontario at 1:30 PM. Electronic participation was offered for this meeting.

1. Roll Call

Present: Commissioner Crawford, Chair
Commissioner Schummer, Vice-Chair*
Commissioner Anderson
Commissioner Brenner*
Commissioner Carter*
Commissioner Garrod
Regional Chair Henry
Commissioner Roy attended the meeting at 1:44 PM
Commissioner Wotten
***denotes Commissioners participating electronically**

Also

Present: Commissioner Woo

Absent: None

Present: E. Baxter-Trahair, Chief Administrative Officer
W. Holmes, General Manager, Durham Region Transit
R. Adamsz, Deputy General Manager of Maintenance, Durham Region Transit
L. Huinink, Director - Rapid Transit and Transit Oriented Development
R. Inacio, Systems Support Specialist, Corporate Services – IT
D. Margiotta, Manager, Operations, Conventional East
A. Naeem, Solicitor, Legal Services
C. Norris, Deputy General Manager, Operations, Durham Region Transit
Z. Osime-Fakolade, Program Manager, Community Engagement and Change Management, Durham Region Transit
N. Taylor, Commissioner of Finance
N. Prasad, Assistant Secretary to Council, Corporate Services – Legislative Services
S. Ciani, Committee Clerk, Corporate Services – Legislative Services

2. Declarations of Interest

There were no declarations of interest.

3. Adoption of Minutes

Moved by Commissioner Wotten, Seconded by Commissioner Garrod,
(16) That the minutes of the regular Durham Region Transit Executive
Committee meeting held on Wednesday, March 8, 2023, be adopted.
CARRIED

4. Presentations

4.1 Bill Holmes, General Manager, Durham Region Transit, re: General Manager's Verbal Update

Bill Holmes, General Manager, Durham Region Transit provided a verbal update to the Committee.

B. Holmes advised that Metrolinx will implement several service adjustments effective April 8, 2023 that include the discontinuation of Routes 81 and 88A into the Village of Newcastle. He advised that staff are reaching out to Metrolinx for further details. He further advised that Metrolinx will introduce a new Regional Express Bus Route 94, connecting Durham (at Pickering GO and Town Centre), Toronto, and Peel via Highway 401, and that the route is intended to service six employment areas, including Pearson Airport.

B. Holmes highlighted Transit Operator and Worker Appreciation Day that is celebrated annually on March 18 and thanked Durham's dedicated public transit staff who keep the Region running and contribute to safety and security in our communities.

B. Holmes advised that staff have taken actions to improve the reliability of On Demand and mitigate impacts to customers resulting from the current resource challenges. DRT has assigned a stand-by driver on weekdays, adjusted process for next-day trip confirmations for customers registered with Specialized Services, and used local taxis when appropriate. He further advised that Durham Region Transit (DRT) has expedited the transition of On Demand services to a third-party vendor to increase capacity over the coming months.

B. Holmes responded to questions from the Committee regarding the service adjustments announced by Metrolinx including what the impact would be for Durham residents; whether Durham Transit would take over the routes cancelled by Metrolinx; and whether staff/residents are given advanced notice of service adjustments.

In response to a question from Commissioner Schummer regarding the 2022 revenue collected from the disposal of retired transit buses, B. Holmes advised that he would gather that information and provide it to Commissioner Schummer directly.

5. Delegations

5.1 Carl Pauff, Ajax Resident, re: Durham Region Transit Specialized Services

Carl Pauff, Ajax Resident, participating electronically, appeared before the Committee regarding Durham Regions Transit specialized services.

C. Pauff stated that their family uses DRT's specialized services to transport their special needs son to his day program at Brody Residential & Community Services in the City of Oshawa, but the cancellation or modifications of that service have caused many issues including being late to work, and their son being late or absent for his day program.

C. Pauff expressed his concerns regarding the frequent last minute changes or morning of cancellations and noted the increased lack of consistency with DRT's specialized services.

Staff responded to questions from the Committee regarding whether offering a taxi service would be a possible solution to the ride shortages; the amalgamation of On Demand and specialized services; how to guarantee medical trips such as trips for dialysis treatment; and what types of vehicles would be available to be used for specialized services.

6. Correspondence

There were no correspondence items to be considered.

7. Reports

A) General Manager's Report – April 2023 (2023-DRT-08)

Report #2023-DRT-08 from B. Holmes, General Manager, Durham Region Transit, was received.

Moved by Commissioner Wotten, Seconded by Commissioner Roy,
(17) That Report #2023-DRT-08 of the General Manager, Durham Region Transit, be received for information.

CARRIED

B) Appointment of Members to the Durham Region Transit Advisory Committee (2023-DRT-09)

Report #2023-DRT-09 from B. Holmes, General Manager, Durham Region Transit, was received.

Moved by Commissioner Anderson, Seconded by Commissioner Wotten,
(18) That the Durham Region Transit Executive Committee (TEC) appoint the following nominees to the Transit Advisory Committee (TAC) for the term of this Council:

A) Nominated by Local Municipal Councils:

- i) Town of Ajax: Arshia Ali
- ii) Township of Brock: Monique Bonk
- iii) Municipality of Clarington: Pranay Gunti
- iv) City of Pickering: Azmat Mujeeb
- v) Town of Whitby: Tim Ralph

B) Two (2) members at large to be appointed by the Executive Committee from the applications received but not nominated by local municipalities who use public transit service:

- i) Richard Claxton Oldfield
- ii) Tyler Smale

C) Two (2) members nominated by the Accessibility Advisory Committee:

- i) Wayne Henshall;
- ii) Jim McEwen;

D) Chair of TEC as Chair of TAC:

- i) Commissioner Crawford

E) Durham Region Transit (DRT) General Manager, as a non-voting member:

- i) Bill Holmes.

CARRIED

8. Advisory Committee Resolutions

There were no advisory committee resolutions to be considered.

9. Confidential Matters

There were no confidential matters to be considered.

10. Other Business

There was no other business to be considered.

11. Date of Next Meeting

The next regularly scheduled Durham Region Transit Executive Committee meeting will be held on Wednesday, May 3, 2023 at 1:30 PM in the Council Chambers, Regional Headquarters Building, 605 Rossland Road East, Whitby.

12. Adjournment

Moved by Commissioner Wotten, Seconded by Commissioner Roy,
(19) That the meeting be adjourned.

CARRIED

The meeting adjourned at 2:00 PM

Respectfully submitted,

M. Crawford, Chair

S. Ciani, Committee Clerk



The Regional Municipality of Durham Report

To: Durham Region Transit Executive Committee
From: General Manager, Durham Region Transit
Report: #2023-DRT-10
Date: May 3, 2023

Subject:

General Manager's Report – May 2023

Recommendation:

That the Transit Executive Committee recommends

That this report be received for information.

Report:

1. Purpose

- 1.1 This report is submitted at each Transit Executive Committee (TEC), for information.

2. Background

- 2.1 The General Manager Report provides regular updates on key performance measures and summaries of current activities and transit issues in Attachment #1.

3. Previous Reports and Decisions

- 3.1 Not applicable

4. Financial

- 4.1 The General Manager's Report focuses mainly on performance and service standards. There are no financial impacts associated with TEC's receipt of this report.

5. Relationship to Strategic Plan

5.1 This report aligns with/addresses the following strategic goals and priorities in the Durham Region Strategic Plan:

- a. Service Excellence

6. Conclusion

6.1 For additional information, contact: Bill Holmes, General Manager, at 905-668-7711, extension 3700.

7. Attachments

Attachment #1: General Manager's Report – May 2023

Respectfully submitted,

Original Signed by

Bill Holmes
General Manager, DRT

Recommended for Presentation to Committee

Original Signed by

Elaine C. Baxter-Trahair
Chief Administrative Officer



General Manager's Report
May 3, 2023
TEC
Attachment #1

Performance Measures Dashboard	<u>2</u>
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Performance Measures Dashboard

Safety

Key performance indicator	Description	Latest Measure	Current	Target ¹	Current Variance to Target (per cent)	YTD Status ² (per cent)
Collisions	Number preventable collisions per 100,000 km	March	0.14	0.20	✓ -28.1	✗ 0.5

Ridership

Scheduled						
Ridership (x1,000)	Number passengers	March	877	542	✓ 61.8	✓ 85.5
PRESTO Ridership	Customers paying using PRESTO (per cent)	March	91.7	80.2	✓ 11.5	✓ 9.5
Bus full occurrences	Number operator reported occurrences	March	173	43	NA	NA
Demand Responsive						
Ridership - Specialized	Number customer trips	March	10,265	7,766	✓ 32.2	✓ 54.3
Unaccommodated Rate - Specialized	Trip requests not scheduled (per cent)	March	NA ³	NA ³		
Ridership – On Demand	Number customer trips	March	10,003	14,558	✗ -31.3	✗ -25.0

Service Delivery

Scheduled						
On time performance	On-time departures from all stops (per cent)	Service Period 1 ⁴	73.6	77.1	N/A	N/A
Service availability	Scheduled service delivered (per cent)	Service Period 1 ⁴	98.8	97.6	N/A	N/A

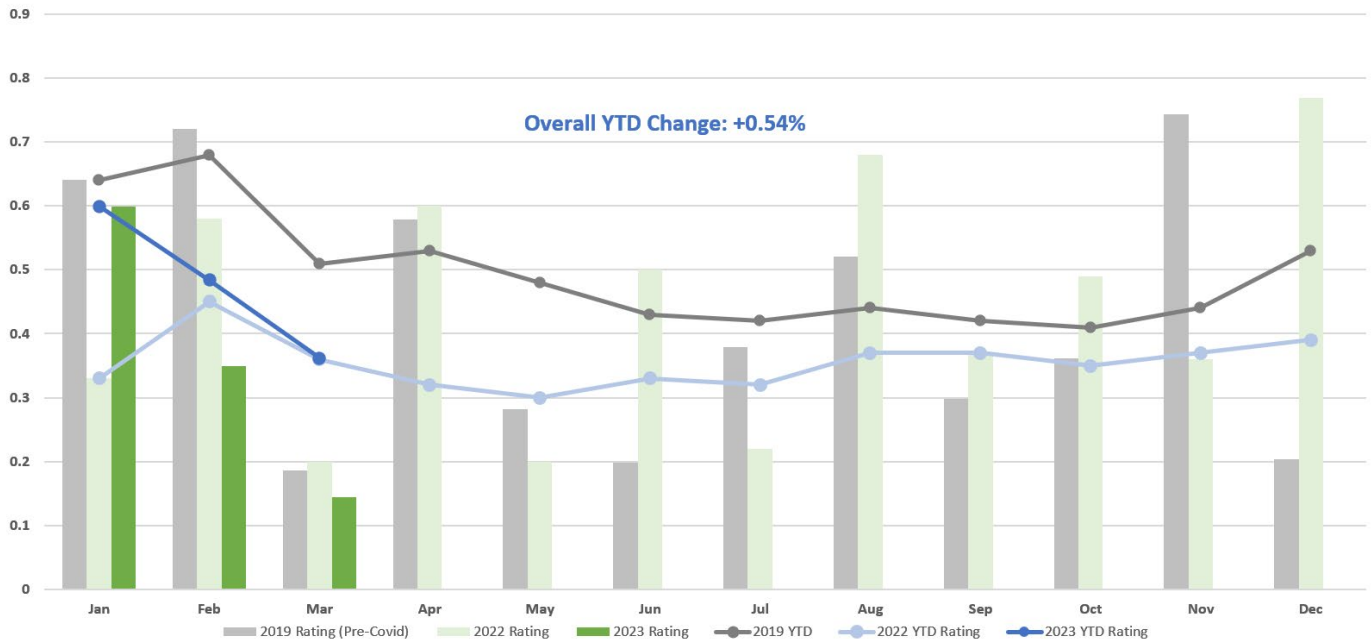
¹Target is 2022 measure for the same period

²Year to Date (YTD) compared to previous year

³Demand response platform currently not reporting unaccommodated rate

⁴January 2, 2023 through April 9, 2023

Preventable collisions rate per 100,000 km



Definition: A preventable collision is one in which the driver failed to do everything reasonable to avoid the collision. The preventable collision rate is the number of preventable collisions per 100,000 kilometres of travel for all Durham Region Transit (DRT) vehicles.

A collision may not be reportable to police based on the Highway Traffic Act, but for DRT purposes all collisions are documented and investigated. DRT's objective is to reduce annual preventable collisions by ten per cent relative to the previous year.

Analysis

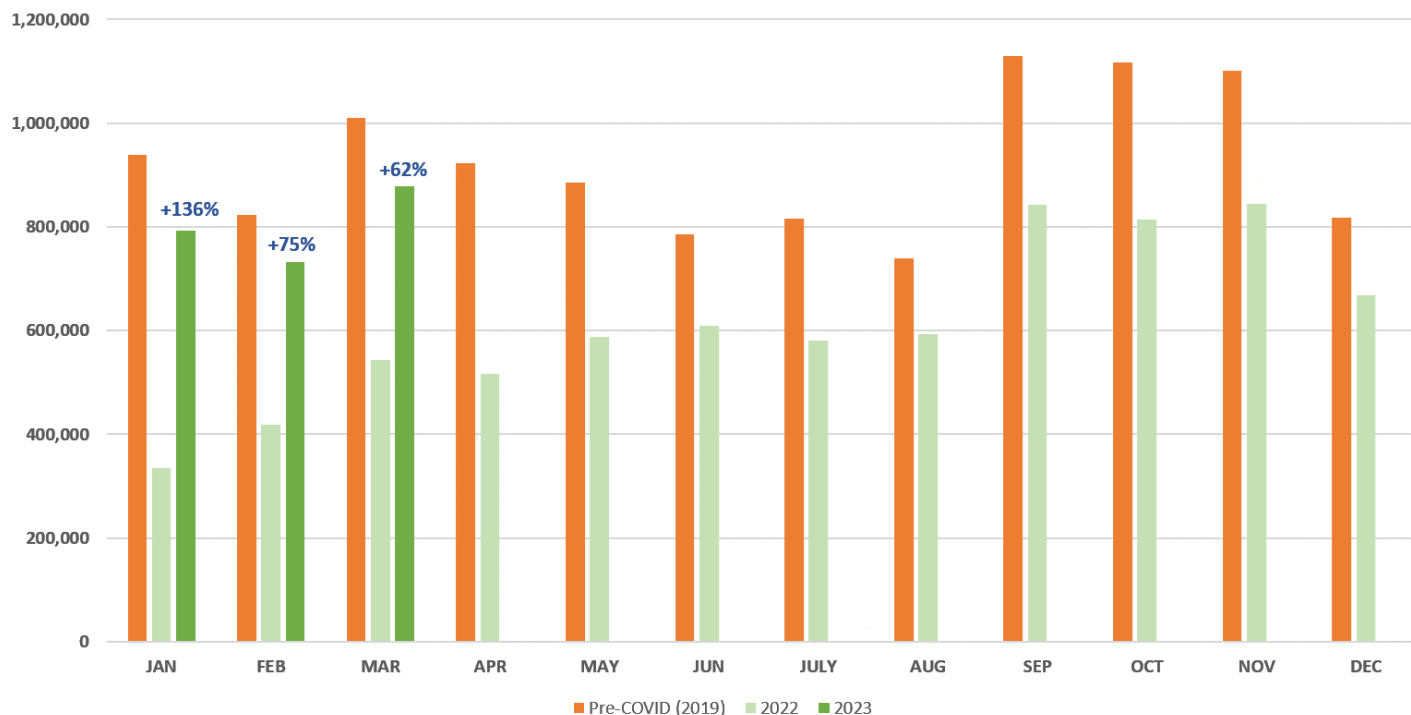
The March preventable collision rate was 0.14 per cent compared to a rate of 0.20 per cent for the same period in 2022. The year to date collision rate is 0.5 per cent higher than 2022 but trending in a positive direction.

Action Plan

In addition to established processes to identify and resolve root causes of collisions, the DRT Safety and Training team has implemented the first multi-year safety plan including specific actions to realize the objective to reduce annual preventable collisions. The plan includes mandatory refresher training for staff involved in a preventable collision prior to returning to service, and cognitive assessment and driving skills screening during the recruitment process.

Ridership

Scheduled transit



Definition: Ridership is the sum of all passenger trips. A passenger trip is a one-way trip from origin to destination regardless of the number of transfers that may be required. Ridership data is calculated from fare box data and data from PRESTO and demand response.

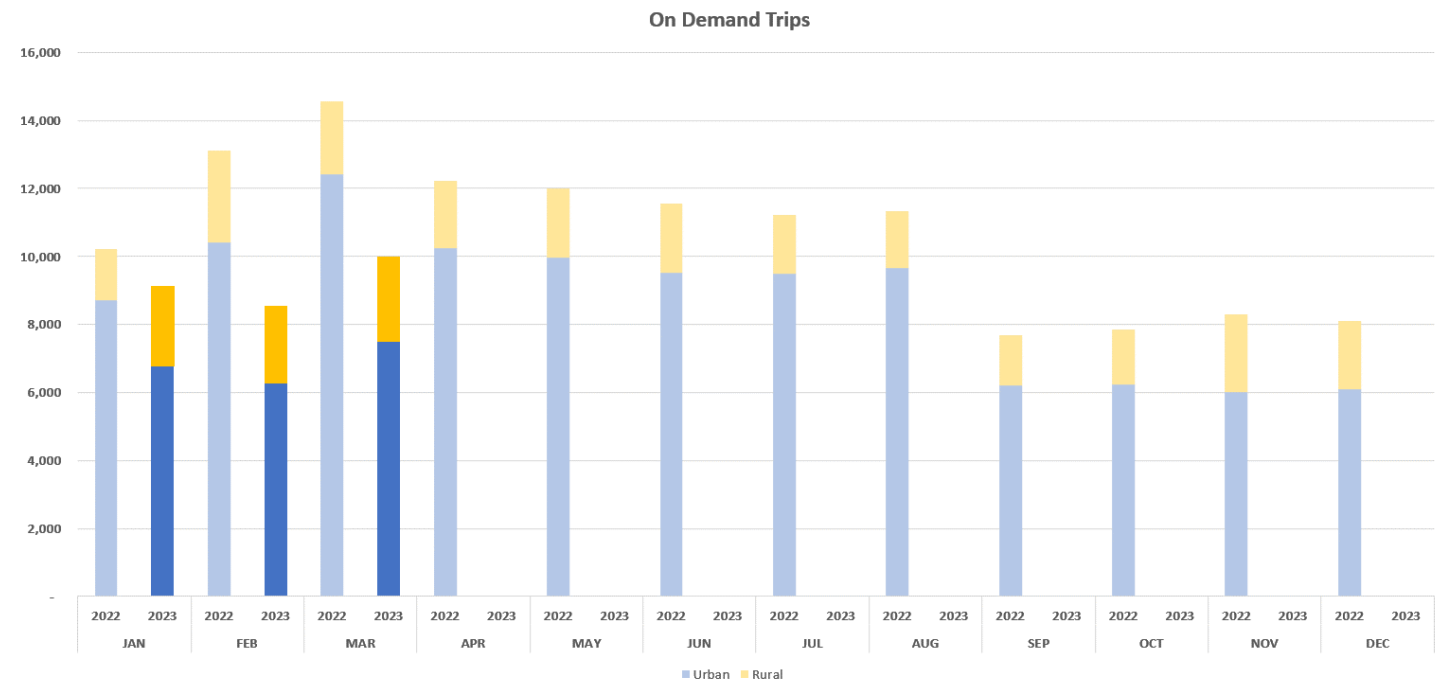
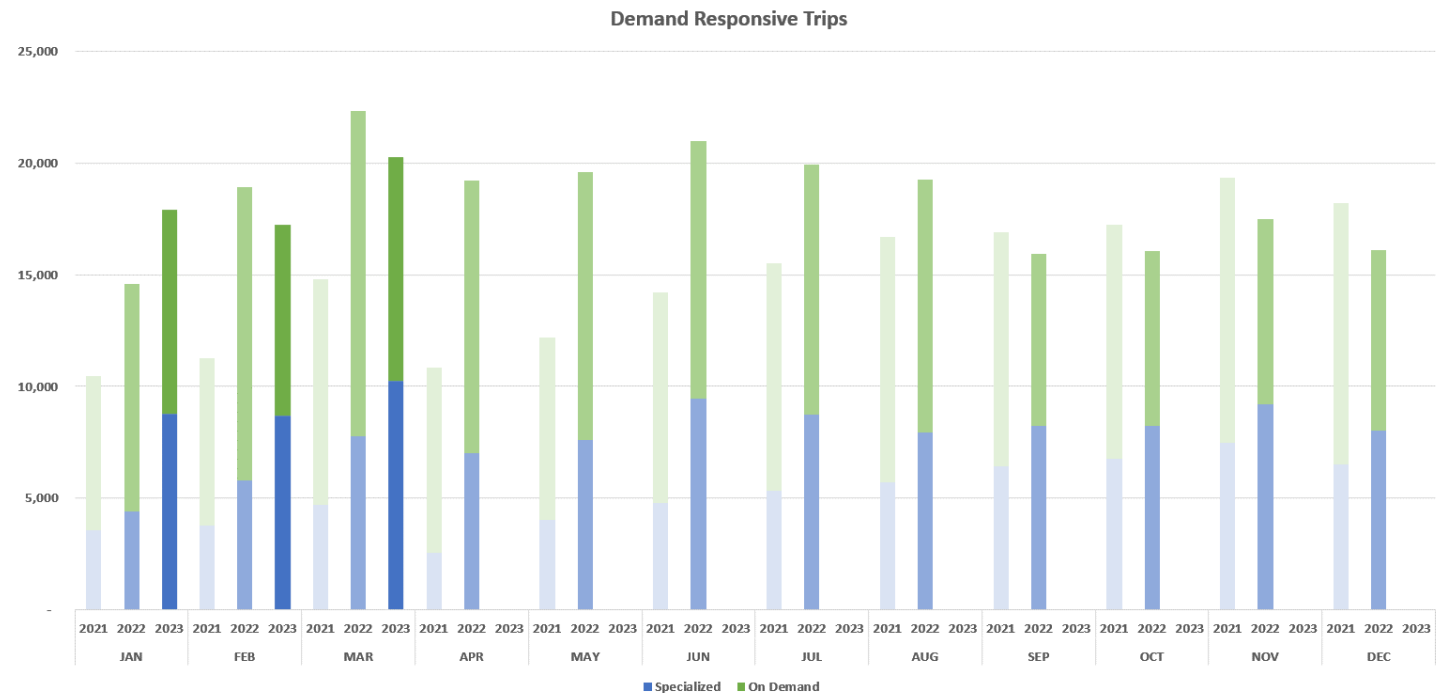
Results

Ridership on scheduled service in March was 62 per cent higher than the same month in 2022, and approximately 88 per cent of pre-pandemic (2019) ridership for the same period.

Action Plan

Service adjustments were implemented on March 3, 2023, including the reallocation of revenue service hours to routes experiencing reliability challenges and to expand access in Seaton and Bowmanville. Ridership recovery continues to improve monthly, with some individual weekdays in March exceeding pre-COVID ridership levels.

Demand Response Transit

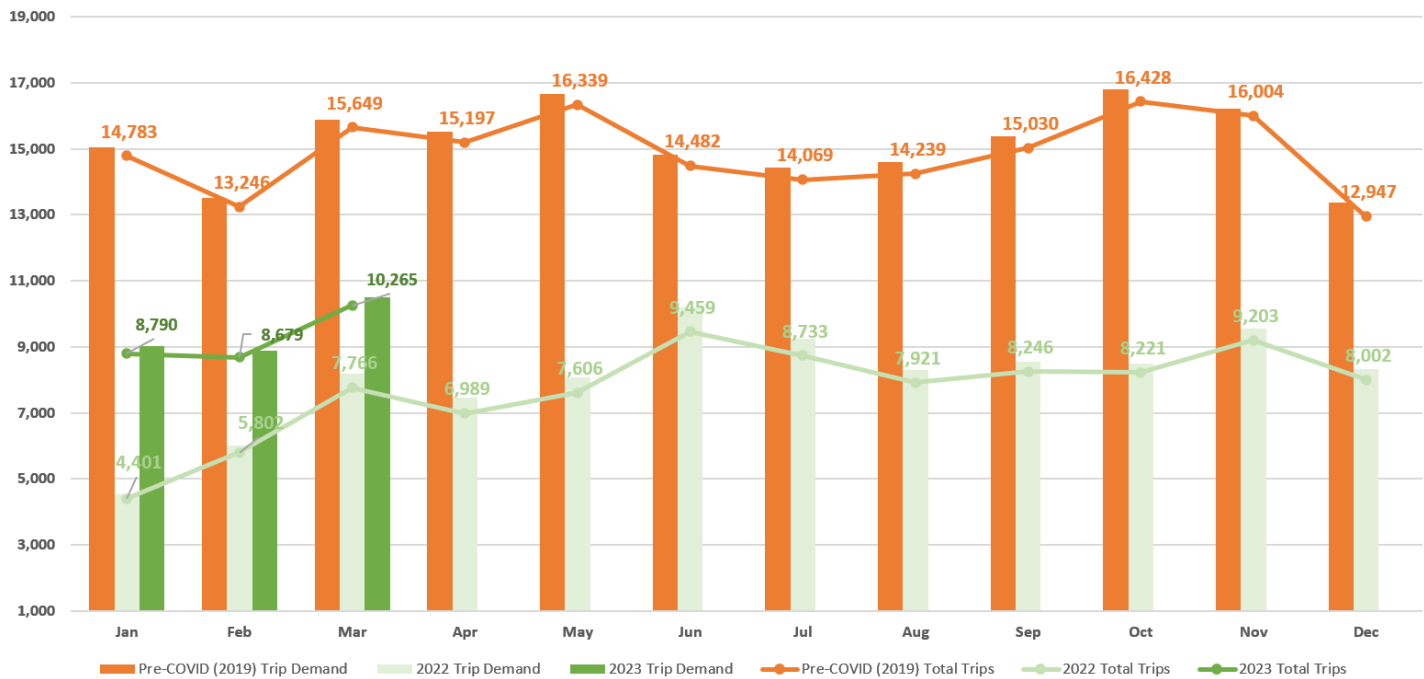


		MAR 2023	YTD 2023
R U R A L	Uxbridge	1,062	2,895
	Brock	387	1,207
	Scugog	1,059	2,944
	Pickering	140	326
	Whitby	15	59
	Oshawa	-	-
	Clarington	2,131	5,900

		MAR 2023	YTD 2023
U	Pickering	928	2,987
R	Ajax	1,089	2,934
B	Whitby	1,859	4,766
A	Oshawa	883	2,277
N	Clarington	449	1,371

Note: Rural Uxbridge and Scugog figures include trip pickups within urban Uxbridge and Port Perry areas.

Specialized Transit Trips



Definitions:

Trips: A trip is considered a one-way passenger trip from origin to destination, regardless of the number of transfers that may be required.

Unaccommodated Rate (Specialized): An unaccommodated Specialized transit trip is one where DRT is unable to schedule a trip for the specific requirement requested by the customer, the customer declined to accept the trip option provided by the booking agent, or DRT did not have available capacity to accommodate the trip request.

Results

In March 2023, On Demand delivered a total of 20,268 trips, including 10,265 trips for customers registered with Specialized Services.

Compared to January 2023, revenue service hours delivered in March by the third party vendor increased by 10 per cent. During the same period, the total number of On Demand trips increased by 15 per cent, including a 16 per cent increase in trips for customers registered with Specialized Services.

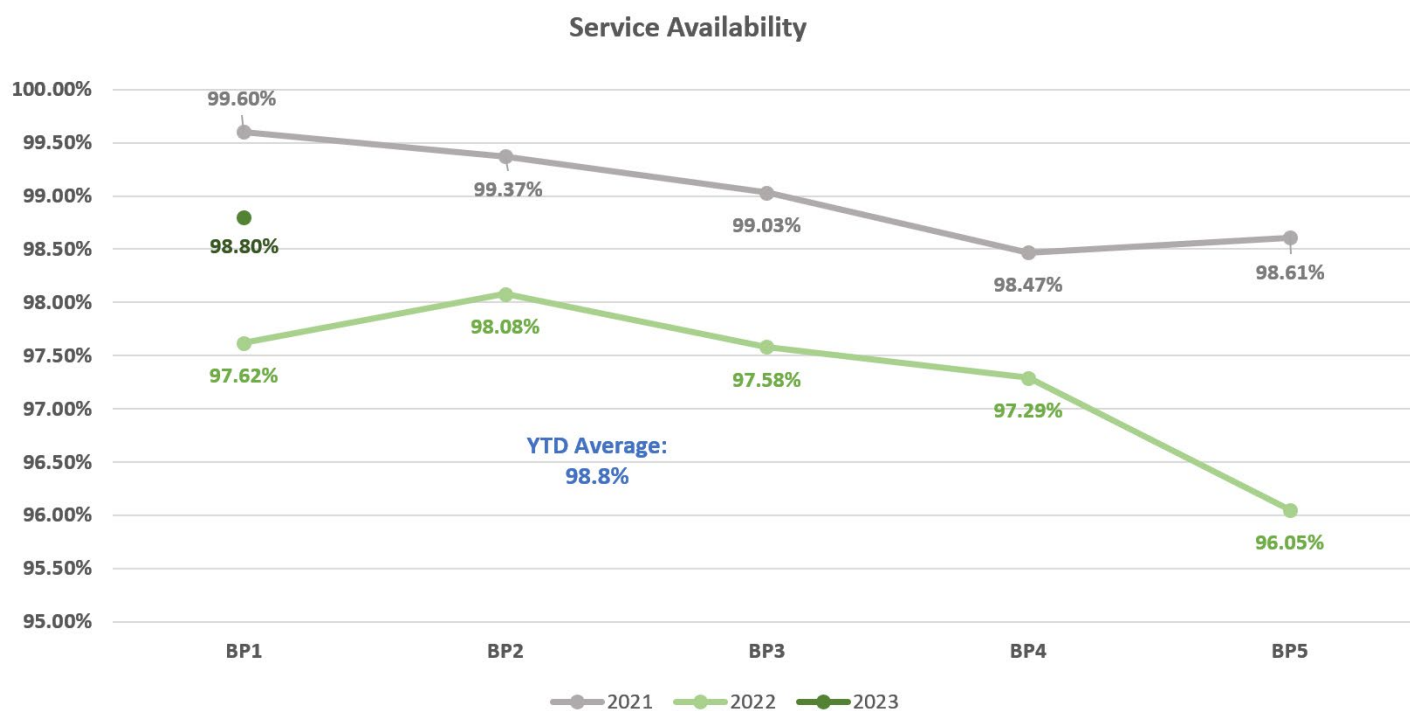
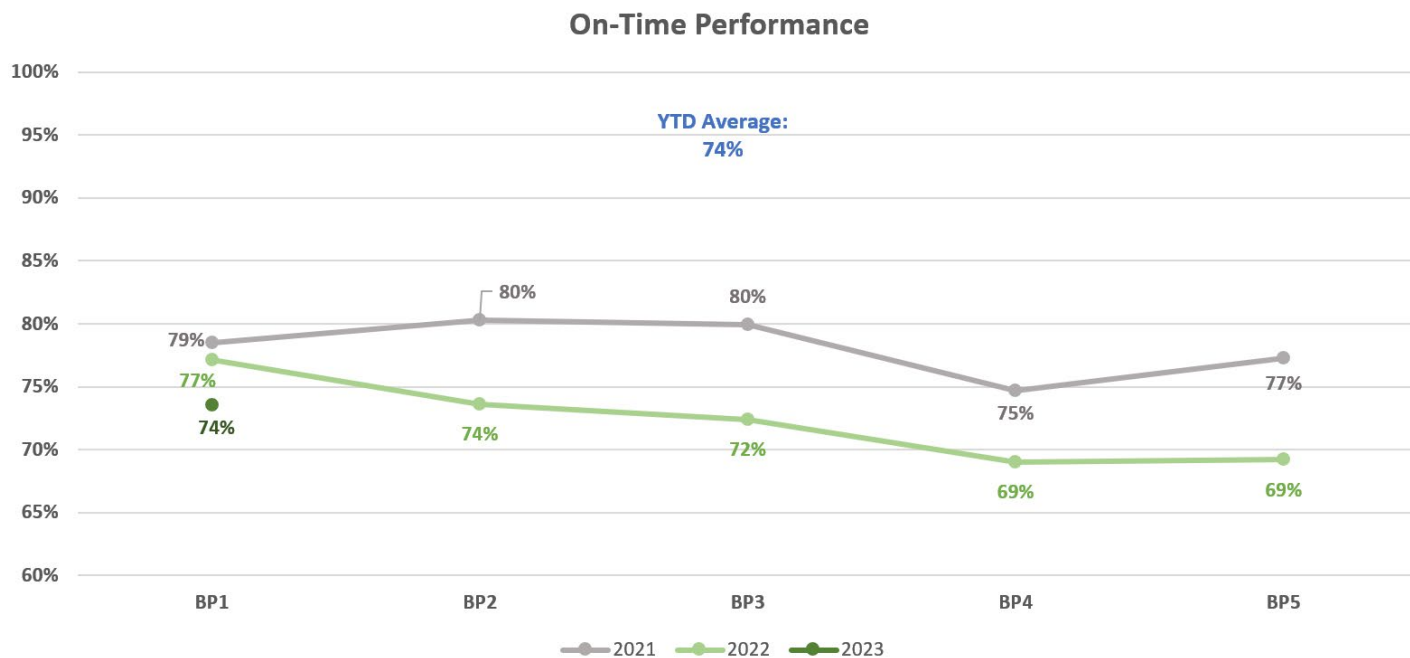
The current On Demand platform is unable to report unaccommodated trips.

Action Plan

Demand for trips currently exceeds capacity, and actions were taken effective March 14, 2022, to improve service reliability. As part of the service model transition program, DRT has expedited the transition of On Demand services to the third party vendor to increase capacity over the coming months.

Service Delivery

On Time Performance and Availability (conventional)



Definition

On Time Performance (OTP) is a measure of the per centage of buses departing a bus stop no more than zero minutes early and five minutes late. The annual OTP target is 80 per cent. OTP is reported for each service period.

Service availability is a measure of the actual service delivered by DRT as a per centage of scheduled revenue service. The service availability target is 99.5 per cent. Service availability is reported for each service period.

Results

OTP for the first quarter of 2023 was approximately 74 per cent; three per cent lower than the same period in 2022 (77 per cent), but a five per cent improvement compared to fall 2022 (69 per cent).

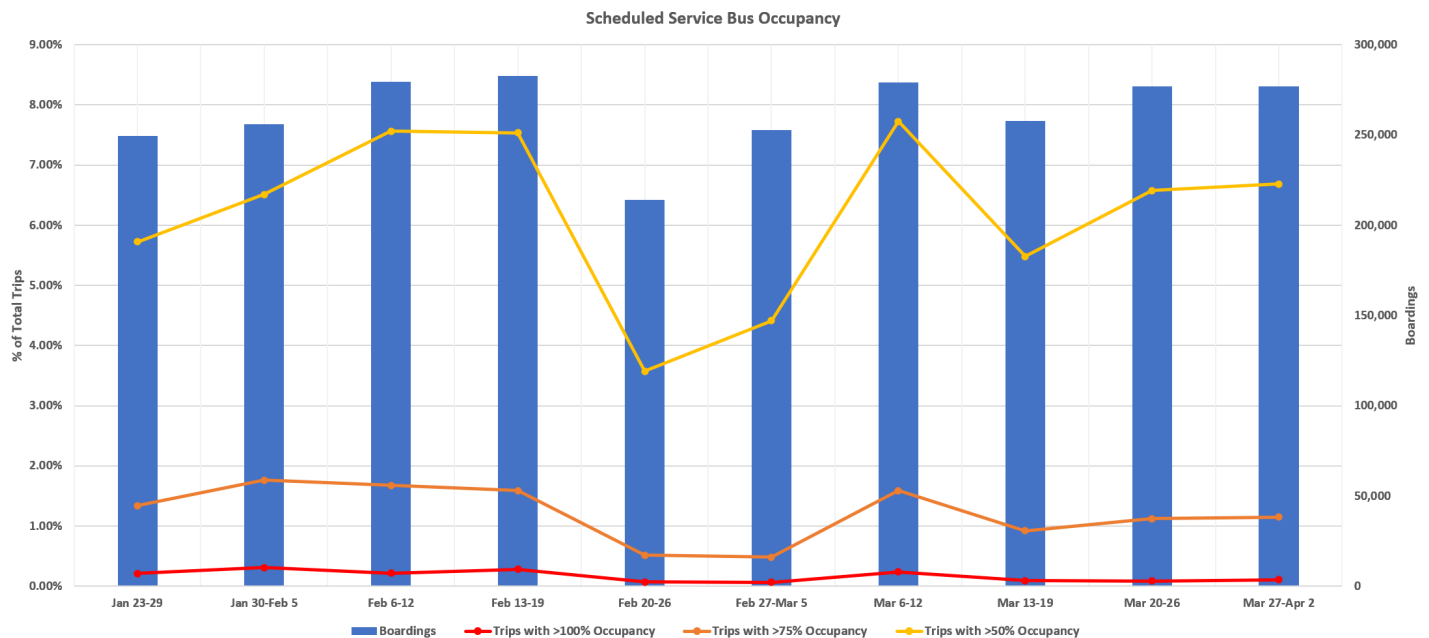
Service availability for the first quarter of 2023 was approximately 98.8 per cent; 1.2 per cent higher than the same period in 2022 (97.6 per cent), and 1.5 per cent higher than fall 2022 (97.3 per cent).

Action Plan

OTP during fall 2022 was significantly impacted by service delays resulting from increasing traffic volumes. Mitigation measures were implemented for Q1 2023 to enhance the reliability of the transit network, including reallocation of service hours to routes experiencing significant delays. These measures had positive impacts to OTP. Staff continue to monitor and evaluate route performance and reliability to prioritize allocation of 2023 growth revenue service hours.

Similar to OTP, mitigation measures implemented to improve network reliability resulted in positive impacts to service availability. When routes or trips are delayed, or where resources are not available to operate schedule trips, operational actions are taken to cancel full or partial trips to regain service, which in turn reduces service availability for customers. When routes or trips are operated as scheduled and within service standards, service availability is maximized.

Scheduled Service Maximum Bus Occupancy



Definition

Maximum bus occupancy is a measure of the maximum number of riders on a scheduled service vehicle at any point of a trip, currently expressed as a per centage of the overall vehicle capacity. The data accounts for the differences in capacity for regular and articulated buses.

Results

In January and March 2023, approximately 92 per cent of all trips were below 50 per cent of maximum occupancy, with approximately two per cent of trips exceeding 75 per cent maximum occupancy. Approximately 0.5 per cent of trips exceeded planned bus capacity.

Bus operators recorded 245 bus full occurrences in March, compared to 46 in March 2022, and 225 in November 2022.

Action Plan

The transit network continues to provide adequate capacity for current customer demand. Where trips are experiencing capacity limits, Transit Control assign additional service to mitigate impacts to customers.

Updates

1. Public Information Centres (PIC's)

With the exception of the three year period during the pandemic, every spring DRT staff hold a series of Public Information Centres (PIC's) across the Region to provide residents and customers an opportunity to see near and mid-term service plans, and to provide their feedback directly to planning and scheduling staff. For 2023, PICs were scheduled in each local area municipality, with a virtual PIC is planned for mid-May to enable residents unable to attend an in-person session the opportunity to provide their feedback.

March 25: Uxbridge Senior Information Centre (Uxbridge Arena/Community Centre, 10:00 am – 2:00 pm)

April 2: Uxbridge Winter Farmers Market (Uxbridge Arena/Community Centre, 10:00 am – 3:00 pm)

April 4: Clarington (Garnet B Rickard Rec Complex, 5:00 pm – 8:00 pm)

April 5: Ajax (Ajax Public Library, 5:00 pm – 8:00 pm)

April 11: Oshawa (Oshawa Centre, 5:00 pm – 8:00 pm)

April 12: Whitby (Brooklin Community Centre/Library, 5:00 pm – 8:00 pm)

April 13: Brock (Fisher's Independent – Beaverton, 5:00 pm – 8:00 pm)

April 19: Pickering (Pickering Public Library)

April 20: Scugog (Medical Associates of Port Perry)

May 15: Virtual PIC

During the nine in-person events, DRT staff engaged directly with 388 customers. Feedback has been resoundingly positive, with many customers noting that 24-hour service in urban areas and the expansion of On Demand service have improved their travel significantly. Several key themes emerged over the first seven PICs.

- Lack of awareness of On Demand by rural residents
- On Demand availability at select times within Clarington and Brock
- Significant interest in Simcoe Street and Highway 2 Rapid Transit Projects based on concerns of current service frequency and crowding on route 901

Image 1: Scheduling Supervisor Michael Binetti with PIC display boards at the Oshawa Centre PIC



Image 2: Planner Jeyamohan Shanmugarajah, Planner Lauren Kubilis, and Scheduler Stephanie Rodgers, with PIC display boards at the Garnet B Pickard Rec Complex in Clarington





Durham Region Transit Report

To: Durham Region Transit Executive Committee
From: General Manager, Durham Region Transit
Report: #2023-DRT-11
Date: May 3, 2023

Subject:

Appointment of members to the Durham Region Transit Advisory Committee

Recommendations:

That the Durham Region Transit Executive Committee (TEC) appoint Andrea Andrus, representing The Participation House (Durham Region) to the Transit Advisory Committee as one of the two members from various community groups representing persons with disabilities in Durham Region.

Report:

1. Purpose

- 1.1 The purpose of this report is to obtain approval from TEC for nominations received from stakeholder groups, as set out in the [Terms of Reference](#) for representation on TAC.

2. Background

- 2.1 As per its [Terms of Reference](#), TAC is comprised of 17 members in total (16 voting and one non-voting), including a representative from each area municipality.
- 2.2 Further to the original due date of October 27, 2022, a fully completed application was received from an individual representing The Participation House Project.

3. Previous Reports and Decisions

3.1 2023-DRT-09 Appointment of Members to the DRT Advisory Committee

4. Financial

4.1 There are no financial impacts associated with this report.

5. Staff Recommendations

5.1 Staff recommend that TEC appoint to the representative of The Participation House Project (Durham Region), Andrea Andrus, to the Transit Advisory Committee.

6. Relationship to Strategic Plan

6.1 This report aligns with/addresses the following strategic goals and priorities in the Durham Region Strategic Plan:

- a. Community Vitality: To foster an exceptional quality of life with services that contribute to strong neighbourhoods, vibrant and diverse communities, and influence our safety and well-being.
- b. Service Excellence: To provide exceptional value to Durham taxpayers through responsive, effective and fiscally sustainable service delivery.

7. Conclusion

It is recommended that the Transit Executive Committee appoint the individual to the Transit Advisory Committee as set out in this report.

Respectfully submitted,

Original signed by

William Holmes

General Manager, DRT

Recommended for Presentation to Committee

Original signed by

Elaine C. Baxter-Trahair

Chief Administrative Officer

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 3702



Durham Region Transit Report

To: Durham Region Transit Executive Committee
From: General Manager, Durham Region Transit
Report: #2023-DRT-12
Date: May 03, 2023

Subject:

E-Mission Zero – Highlights Electric Transit Buses

Recommendations:

That the Transit Executive Committee recommends

That this report be received for information.

Report:

1. Purpose

- 1.1 The report provides general information on electric transit buses, including key highlights and operational and technical data.
- 1.2 The report also provides a summary of the Canada Infrastructure Bank's (CIB's) credit agreement and overview of the Infrastructure Canada – Zero Emissions Transit Fund (ZETF) funding program

2. Background

- 2.1 In March 2021, Council approved the [Corporate Climate Action Plan \(CCAP\)](#) with targets to reduce corporate GHG emissions by 100 per cent by 2045. This includes the transition of corporate fleets, such as public transit vehicles, to low carbon alternatives. Furthermore, the 2022 Annual Corporate Climate Change

Action Plan reported that Transit accounted for 10 per cent of the Region's total corporate GHG emissions in 2020.

- 2.2 In August 2021 the Region launched the E-Mission Durham program focused on a cleaner, low-carbon future by supporting and empowering Durham residents in making the transition to lower and zero emission vehicles. As part of these efforts, DRT's E-Mission Zero program aims to adopt zero emission vehicles in its fleet to help reduce overall GHG emissions from the transportation sector in Durham.
- 2.3 DRT's E-Mission Zero strategy includes a suite of emission-reducing initiatives intended to deliver a more sustainable network of vehicles, infrastructure and facilities over the next 25 years.
- 2.4 In June 2022, Council approved the [DRT E-Mission Zero Fleet Electrification](#) Plan to transition the Transit fleet vehicles to zero emission technologies by 2037, with the procurement of only electric buses starting in 2024
- 2.5 The CIB has developed a [Zero Emission Buses Initiative](#), a \$1.5 billion dollar program, with the objective of accelerating zero emission bus (ZEB) adoption across Canada, offering low interest debt financing to cover a portion of the capital costs associated with electric buses.
- 2.6 The CIB program is offered in coordination with Infrastructure Canada's Zero Emission Transit Fund (ZETF) grant program to bridge the funding gap for buses and charging infrastructure
- 2.7 In March 2023, Durham Region executed a credit agreement with the CIB for low-interest financing for up to \$62 million, to support the purchase of 98 electric buses

3. Previous Reports and Decisions

- 3.1 On June 29, 2022, Regional Council received report #2022-F-17 E-Mission Zero - DRT Fleet Electrification Plan and referred to Durham Region Transit's long-term servicing and financing strategy to be presented in advance of the 2023 Business Plans and Budget.
- 3.2 On March 1, 2023, Regional Council approved report #2023-F-5 Transit Service and Financing Strategy.

4. Electric Bus Highlights

- 4.1 On an battery electric bus (BEB), the traditional internal combustion engine (ICE) and transmission is replaced with an electric motor, powertrain system controllers and batteries.
- **Cost:** The purchase price of a 12-metre electric transit bus currently ranges between \$1.4 million to \$1.6 million, or approximately twice the cost of an equivalent ICE diesel bus. The capital cost of electric transit buses is expected to reduce over time as battery technology improves and their costs decline.
 - **Range:** BEB's currently operate up to 350 kilometers on a full charge. However, range is affected by a variety of factors, including battery size and bus duty cycle
 - **Efficiency:** BEB's are two and a half to five times more efficient than an equivalent ICE diesel bus, resulting in a lower operating cost per kilometer.
 - **Factors impacting range and fuel economy:** Range and efficiency of BEB's are affected by many variables including road conditions, driver behaviours, vehicle speed, frequency of stops/starts, topography, weight, weather, on-board systems such as Heating Ventilation and Air Conditioning (HVAC) and auxiliary heating units, and more
 - **Charge time:** BEB's require between three to four hours to fully charge, depending on the battery size and charging equipment. BEB's can be charged using a plug-in charger or overhead pantograph charger that vary in function and power output (between 150kW to 450kW)
 - **When considering life cycle carbon emissions,** BEB's buses are currently the cleanest buses available. Each battery electric bus is estimated to avoid approximately 70-100 tonnes of carbon emissions annually.
 - **Maintenance costs:** BEB's contain few mechanical parts, which have been shown to reduce maintenance costs by approximately 20 to 30 percent compared to an equivalent ICE diesel bus.
 - **Noise:** BEB's deliver a quieter ride for customers, with noise levels measured at 5db(A) to 14 db(A) at low speeds compared to an equivalent ICE diesel bus.
 - **Annual operating data and savings (estimated based on 60,000km's and 2023 rates):**
 - Maintenance and servicing savings per BEB¹: \$21,000

¹ Average maintenance costs of \$1.02/km for diesel buses and \$0.67/km for electric buses

- Diesel fuel avoidance per BEB²: 28,800 liters or \$47,800
- Electricity costs per BEB³: \$11,600
- Net fuel savings per BEB: \$36,200

- 4.2 Although annual savings are expected, significant upfront capital investments are required to purchase the buses and install the electrical infrastructure and charging equipment required to power the fleet.
- 4.3 Key challenges reported by agencies operating BEB's have included limited range on a single charge, charging time and impact on range and efficiency due to cold temperatures.
- 4.4 Detailed technical specifications for electric buses from Canadian BEB manufacturers (Nova Bus and New Flyer) are attached to this report.

5. Financing and Funding

Canada Infrastructure Bank

- 5.1 Durham Region has executed a credit agreement with the Canada Infrastructure Bank (CIB) for low-interest financing for up to \$62 million, which will be available to be drawn upon until December 31, 2027
- 5.2 The credit facility size was determined using CIB's financial model that calculates a baseline of forecasted operating savings for electric buses compared to diesel buses over the full life cycle of the buses, based on a set of mutually agreed upon parameters by both parties (ie. annual mileage, fuel economy, electricity prices and maintenance costs).
- 5.3 The financing is offered at an interest rate of 1% interest annually, charged only on the money drawn from the credit facility.
- 5.4 The parties agreed on a multi-year Zero Emission Bus (ZEB) implementation schedule (98 electric buses deployed between 2024-2026), which ensures the financing is available for multiple draws over the implementation period.
- 5.5 The repayment term is 12 years for each draw down on the credit facility, based on the lifecycle of the ZEBs. The credit term is scheduled to end in Jan 31, 2039.

² Diesel bus fuel economy of 0.48L/km and 2023 diesel fuel cost of \$1.66/L

³ Electric bus fuel economy of 1.61kwh/km and 2023 electricity cost of 0.12\$/kwh

- 5.6 The CIB's investment will contribute a portion towards the difference between the capital acquisition cost of a traditional ICE diesel bus and a BEB, with repayment of the loan based on the operating savings realized by DRT. The CIB and DRT share in the risk of the actual cost savings being less than forecast
- 5.7 DRT will be required to budget for the operating costs of the allotted number of diesel buses through the term of this agreement.

Infrastructure Canada – Zero Emissions Transit Fund

- 5.8 Infrastructure Canada launched the \$2.75 billion Zero Emission Transit Fund (ZETF) in 2021. A five-year national program through 2026, ZETF provides grant funding to public transit and school bus operators across Canada towards the purchase of zero emission public transit and school buses and associated infrastructure. The fund is part of the Federal government's commitment to help purchase 5,000 zero emission buses over the next five years.
- 5.9 With the support of the Finance department, DRT has submitted an application to Infrastructure Canada for capital grants to support the electrification program, including the construction of the new transit facility – 2400 Thornton N.
- 5.10 The maximum grant contribution from Infrastructure Canada is up to fifty per cent (50 per cent) of the total eligible costs.

6. Relationship to Strategic Plan

- 6.1 This report aligns with/addresses the following strategic goals and priorities in the Durham Region Strategic Plan:
 - A. Environmental Sustainability
 - a. Goal 1.1 - Accelerate the adoption of green technologies and clean energy solutions through strategic partnerships and investment
 - b. Goal 1.4 - Demonstrate leadership in sustainability and addressing climate change
 - B. Economic Prosperity
 - a. Goal 3.4 - Capitalize on Durham's strengths in key economic sectors to attract high-quality jobs

7. Conclusion

The transition to a zero-emission transit fleet is crucial to the Region achieving its emission targets specified in the Corporate Climate Action Plan, and provides an

opportunity for DRT to modernize its transit operations and infrastructure. While some data has been generated by the industry, BEB's are a young technology in North America and DRT will experience many key learnings over the first few years of implementing the new technologies.

8. Attachments

Attachment #1: Nova Bus LFSe+_Specifications

Attachment #2: Xcelsior Charge NG_Specifications

Respectfully submitted,

Original Signed By:

Bill Holmes
General Manger, DRT

Recommended for Presentation to the Committee

Original Signed By:

Elaine C. Baxter-Trahair
Chief Administrative Officer



LFSe⁺

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electric vehicle the industry
has been looking for.

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Attachment #1: Nova Bus LFSe+_Specifications

Highlights

Measurements

Length	40' (12.19m)
Width	102" (2.59m)
Height	10' 8" (3.30m)
Interior height	93 inches excluding rear axle, 74 inches over rear axle
Wheelbase	244 inches (Front to rear axle)

Propulsion

Motor	BAE Systems HDS200
Rated power	200 kW
Rated torque	5200 N-m

Seating capacity

Seating capacity	Up to 41 passengers
Loading capacity	Up to 59 passengers (6 batteries configuration) Up to 68 passengers (4 batteries configuration)

Body features

Structure	Stainless steel
Outside shell	Fiberglass and thermoplastic skirt panels

Turning radius

Turning radius	40' 10" (12.45m)
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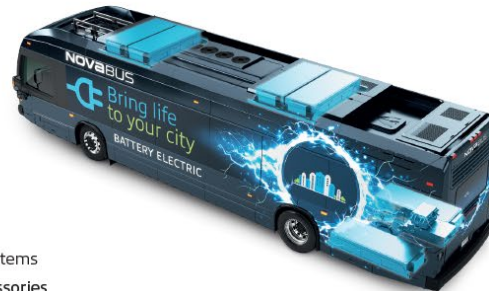
Main components

Flooring	Maintenance-free composite floor
HVAC	Mobile Climate Control Eco 136e electric
Cooling system	Nova eCooling system
Axles	ZF RL-82A (Front), ZF AV-133 (Rear)
Brakes	Regenerative braking with ABS all-wheel disc brakes
Electrical system	Volvo multiplex system (VBEA)

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March 2021

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To deliver on our promise to provide the most efficient and reliable long-range electric-powered buses, we have equipped our new LFSe+ model with BAE Systems' innovative electric technology.



Key features

- + Proven HDS200 motor from BAE Systems
- + Zero emissions with all electric accessories
- + Modular battery options capable of storing up to 564 kWh of onboard energy

Dual charging options



Overhead



Plug-in

	Overhead	Plug-in
Charging system	SAE J3105	CCS type 1, J1772
Charging power (maximum)	450 kW	150 kW
On-route charging	6 minutes for a 35 kWh boost	n/a
Depot charging	Less than 3.25 hours for a full charge using either the overhead or plug-in charging option at the depot.	

NOVABUS / LFSe+

Powered by BAE Systems

In June 2018, the electric vehicle of the LFS platform became the first electric bus to receive a passing score for a full test at Altoona.

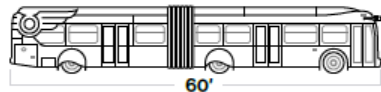
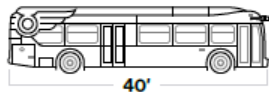
Nova Bus has earned the highest reputation for overcoming the challenges of modern city transportation by manufacturing robust products that have become known as the industry workhorses: the LFS range of buses.





Xcelsior CHARGE NG™ is New Flyer's next generation battery-electric, zero-emission bus. It is lighter, simpler, has longer range with better energy recovery and is smart city capable – making it the most advanced electric bus on the market.

Available in 3 Lengths



Three distinct technology advancements to deliver a high-performance bus.



High-Energy Batteries

Next generation high-energy batteries.



Battery Packaging

Advanced protective battery packaging designed for easy installation and streamlined maintenance.

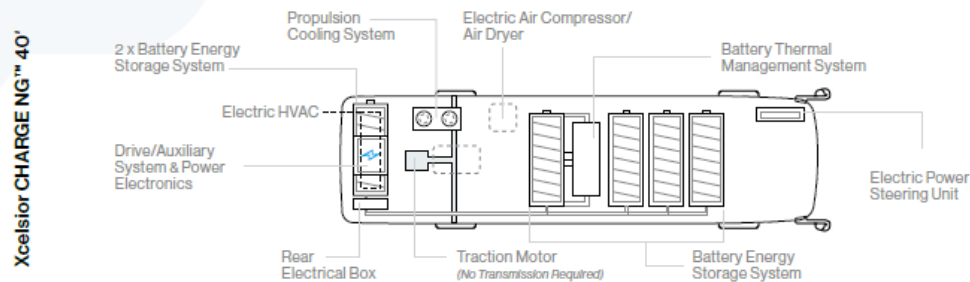


Traction Propulsion System

A new lightweight electric traction propulsion system with up to 90% energy recovery.

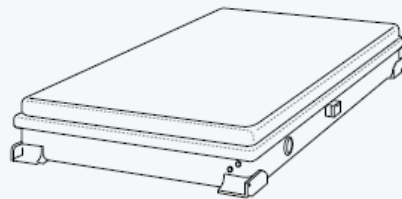
How it works.

The Xcelsior CHARGE NG™ uses an electric motor powered by energy stored in rechargeable batteries.



Technology advancements.

1 More efficient and streamlined battery enclosure.



A standardized waterproof battery enclosure is mounted on the rooftop and in the propulsion compartment using a "plug and play" approach, lending simplicity and efficiency in design, install, maintenance and manufacturing.

Rooftop application uses a modular approach with a simplified mounting system comprised of two rails running the length of the bus.

The same standardized battery enclosure is also mounted in the propulsion compartment on a rack. With this approach, the same battery enclosure can be mounted in any position on the bus.

Simpler

- ✓ One simple and standardized approach for better quality, consistency, and accuracy.
- ✓ If a battery needs to be replaced, the module can be removed and replaced with a new/backup module. The module needing troubleshooting can be serviced in the shop while the bus with the new/backup module onboard returns to service.
- ✓ With every battery having the same enclosure, service manuals are the same for every single bus model and length.
- ✓ Service parts are reduced by 90% going from 250 to less than 50 parts.

Waterproof

- ✓ With an ingress protection rating of IP67, the battery enclosure is 100% waterproof if submerged in water, which greatly reduces the likelihood of water leaking into the battery enclosure.
- ✓ With an ingress protection rating of IP69 for dust, high temperatures, and high-pressure washing, there is 100% protection from intrusion of dust or water particles. This is ideal for demanding operating conditions, and situations where sanitization and rigorous cleaning is undertaken.

More Efficient

- ✓ Modules are better insulated resulting in better management of battery temperature for optimal performance.

Easier to Service

- ✓ The casings are built using a reinforced composite fiber that is non-conductive.
- ✓ Service technicians can simply and safely plug in or unplug the battery module with less exposure to high-voltage electricity.

Lighter

- ✓ The standardized battery enclosure is lighter in weight, increasing the maximum passenger capacity on the bus by 4 additional standees.

2 High-grade Siemens traction system.

ELFA 3 is Siemens' next generation traction system that introduces a more efficient design with compact inverters and embedded drive controllers.

Safer

It's easier and safer to maintain with shorter cable runs and touch-safe high voltage connections.

Smaller

It's smaller and lighter allowing for increased passenger capacity.

More Efficient

- ✓ Minimal rack requiring no covers.
- ✓ Shorter cable runs offer decreased risk of issues or faults, improved electromagnetic compatibility (EMC) and greater power efficiency.
- ✓ Delivers up to 90% energy recuperation.
- ✓ Delivers smooth, quiet, emission-free driving (with no engine noise, no idling, and zero local emissions).
- ✓ Better torque accuracy.

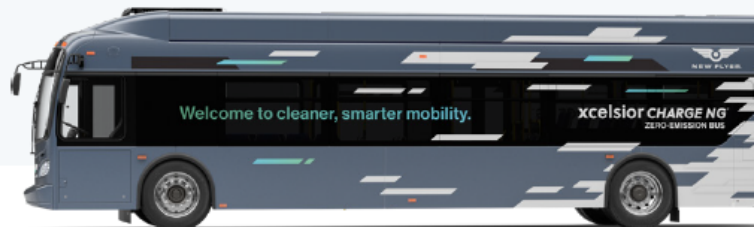
3 Next generation, high-energy batteries.

The batteries are made of world-class energy storage systems (ESS), engineered for safe, robust, and reliable use in transit.

The battery chemistry is Lithium Nickel Manganese Cobalt (NMC), providing the best balance of energy, power, safety, and life.

Extended Range

Range is extended by 13% without compromising quality.



CONNECT 360

Connect 360™ is included on every new Xcelsior CHARGE NG™. Learn more at nfigroup.com/connect.



Additional range capability with improved driver performance.



Decision-making information to optimize charging strategies.



Intelligence on how to preserve battery energy throughout the day.



Reduced operating cost and maximum fleet utilization.

newflyer.com/NG

Connect 360™, operated by NFI Connect™, is a customizable performance dashboard that provides smart analytic reporting to expand insight and intelligence for managing your Xcelsior CHARGE NG™ battery-electric bus.





Six minutes of rapid recharge time with a 450 kW charger equals 1.5 hours of operation.

Rapid charge configuration fully compliant with OppCharge and charging protocols.



Charging.

New Flyer buses are interoperable with charging equipment that supports all heavy-duty electric vehicles. You can customize your Energy Storage Systems (ESS) and charging solutions so you can develop the right ESS and infrastructure solution for your needs.

Xcelsior CHARGE NG™ is interoperable with charging systems available from:



On-Route Charging

The on-route rapid charger provides the means for the Xcelsior CHARGE NG™ to stay in service 24 hours daily. To charge, the bus stops underneath the charger and the pantograph makes contact with the charge bars.

Plug-In Charging

Plug-in chargers are available as a supplement or alternative to on-route rapid chargers and can be used for overnight, mid-day and on-route charging. Depot charging for a full charge requires 3.8 hours for a 520 kWh ESS.

The 40' Xcelsior CHARGE has a range of up to 258 miles (520 kWh)* on a single charge, but with on-route charging, range is unlimited.

* Range per FTA Altoona test protocol - HVAC off.

Length	ESS (kWh)	Range (Miles)
35'	345	182
	435	224
40'	345	178
	435	221
	520	258
60'	520	152
	605	175



Functionality + accessibility.



Kneeling

SmartRider™ enables kneeling to variable heights and minimizes the slope difference between a low-floor ramp and the bus floor.



Self-Leveling

SmartRider™ ramp achieves a 1:6 slope ratio with a self-leveling feature that can withstand up to 1000lbs.



Capacity

Industry-leading passenger carrying capacity with up to 88 total (40 seated and 44 standees).

NFI Infrastructure Solutions™

NFI Infrastructure Solutions™ is a service dedicated to providing safe, reliable, smart and sustainable charging and mobility solutions.

Learn what Infrastructure Solutions can do for you at nfigroup.com/IS

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What our Infrastructure Solutions team provides.

Supports mobility projects from start to finish.

Focuses on energy management optimization.

Provides infrastructure planning and development.

Provides cohesive transition of bus fleets to zero-emission electric technology.

Attachment #2: Xcelsior Charge NG_Specifications

	35' <i>XE35</i>	40' <i>XE40</i>	60' <i>XE60</i>
Measurements			
Length	36' 3" (11.05m) Over bumpers; 36' 6" (10.80m) Over body	41' 0" (12.50m) Over bumpers; 40' 2" (12.24m) Over body	60' 10" (18.54m) Over bumpers; 60' 0" (18.29m) Over body
Width	102" (2.6m)	102" (2.6m)	102" (2.6m)
Roof Height	11' 1" (3.3m) Over charging rails	11' 1" (3.3m) Over charging rails	11' 1" (3.3m) Over charging rails
Step Height	14" (356mm)	14" (356mm)	14" (356mm)
Front Step Height (Kneeled)	10" (254mm)	10" (254mm)	10" (254mm)
Interior Height – Floor to Ceiling	79" (2m) Over front and rear axle; 96" (2.4m) Mid-coach	79" (2m) Over front and rear axle; 96" (2.4m) Mid-coach	79" (2m) Over front and rear axle; 96" (2.4m) Mid-coach
Tire Size	306/70R22.5	306/70R22.5	306/70R22.5
Wheelbase	226.76" (5.8m)	263.76" (7.2m)	229" (5.8m) Front / 293" (7.4m) rear
Propulsion			
Motor	Siemens electric drive system; Standard or optional high gradeability motor	Siemens electric drive system; Standard or optional high gradeability motor	Siemens electric drive system; ZF AVE130 In-wheel motor center drive axle
Rated Power	160 kW	160 kW	320 kW
Rated Torque (*Based on 1:6.67 ratio axle)	1,033 lb-ft	1,033 lb-ft	2,066 lb-ft
Passenger Capacity			
*Based on 4-string (36'/40') & 6-string (60') ESS configurations, with ELFA 3 Siemens Traction System			
Seats	Up to 32*	Up to 40*	Up to 61 (with one exit door)*
Standees	Up to 36*	Up to 44*	Up to 62 (with one exit door)*
Accessibility			
Doors	2	2	2 or 3 (option for up to 6 doors)
Wheelchair Accessibility	32" (813mm) Wide, 1:6 slope; Flip out NFIL ramp, front door	32" (813mm) wide, 1:6 slope; Flip out NFIL ramp, front door	32" (813mm) wide, 1:6 slope; Flip out NFIL ramp, front door
Wheelchair Locations	2 - Front location, rear location also available (other options available)	2 - Front location, rear location also available (other options available)	2 - Front location, rear location also available (other options available)
Approach Angle			
Approach/Departure/Breakover Angles	9°/9°/12°	9°/9°/9°	9°/9°/12° (front) 9° (back)
Turning Radius (Body, with aluminum wheels; *Varies with wheel type)			
Turning Radius	39' (11.9m)*	43.6' (13.3m)*	42' (12.8m)*
Main Components			
Floor	Marine grade plywood floor; Optional composite floor; Composite rear interior step; Tarabus, Altro, RCA floor covering	Marine grade plywood floor; Optional composite floor; Composite rear interior step; Tarabus, Altro, RCA floor covering	Marine grade plywood floor; Optional composite floor; Composite rear interior step; Tarabus, Altro, RCA floor covering
Electrical System	Parker Vansco	Parker Vansco	Parker Vansco
Propulsion Cooling System	Electric cooling fans	Electric cooling fans	Electric cooling fans
HVAC	Thermo King TE16 (rear)	Thermo King TE16 (rear)	Thermo King RLFE (front) TE16 (rear)
Axles	MAN VOK 07 Front disc brakes; MAN HY-1360 Rear disc brakes; Single reduction axle	MAN VOK 07 Front disc brakes; MAN HY-1360 Rear disc brakes; Single reduction axle	MAN VOK 07 Front disc brakes; ZF AWN 132 Center disc brake; MAN HY-1360 Rear disc brakes; Single reduction axle
Energy Storage System			
Long Range (Rapid charging available)	346 kWh, 436 kWh	346 kWh, 436 kWh, 620 kWh	620 kWh, 606 kWh



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