



Niagara Region

2022 - 2031 Development Charge Study

Transit Technical Appendix

July 2022 – 22-3702

Table of Contents

1.0	Introduction	1
2.0	Growth Forecasts	3
2.1	Population Growth	3
2.2	A Note on the Horizon Years	5
2.3	Transit Ridership Adjustments Due to COVID-19	6
2.4	Optimus Report	7
3.0	Ten-Year Conventional Fleet Capital Plan and Ridership Forecast for D.C. Application	8
3.1	Existing Conventional Transit	8
3.2	Ridership Forecast	9
3.3	Vehicle Requirements.....	10
3.4	Full Transit Capital Plan (Conventional).....	11
4.0	Ten-Year Specialized Transit Fleet Capital Plan for D.C. Application	13
4.1	Existing Specialized Transit	13
4.2	Ridership Forecast	15
4.3	Vehicle Requirements.....	15
4.4	Full Transit Capital Plan (Specialized Transit)	16
5.0	Apportioning Benefit (Transit Vehicles)	18
5.1	In-Period Benefit to Existing and Growth	18
5.1.1	Conventional Transit Vehicles	18
5.1.2	Specialized Transit Vehicles	23
5.2	Post-Period Benefit.....	28
5.2.1	Conventional Transit.....	28
5.2.2	Specialized Transit	31

6.0	Ten-Year Capital Plan for D.C. Application (Other Capital Items)	32
6.1	Operations Facilities	32
6.2	Service Vehicles	33
6.3	Rebranding of Bus Stops and Vehicles.....	34
6.4	Full Transit Capital Plan (Other Capital Items).....	35
7.0	Apportioning Benefit (Other Capital Items)	37
7.1	Operations Facility.....	37
7.2	Service Vehicles	38
7.3	Rebranding of Bus Stops and Vehicles.....	39
8.0	Summary of Key Values	40

Tables

Table 1: Population Forecasts (2022 - 2041)	3
Table 2: Breakdown of Population Growth by Area and Housing Type	4
Table 3: Population and Ridership Figures by Horizon Year	5
Table 4: Existing Conventional Transit Services in Niagara Region.....	8
Table 5: Annual Transit Ridership Projections.....	10
Table 6: Conventional Transit Bus Requirements.....	11
Table 7: Ten Year 2022-2031 Capital Plan (to Support Conventional Transit)	12
Table 8: Existing Specialized Transit Services in Niagara Region	13
Table 9: Specialized Transit Operating Statistics (2018 and 2022)	14
Table 10: Registrant and Ridership Forecast for Specialized Transit.....	15
Table 11: Specialized Transit Vehicle Requirements (2031)	16
Table 12: Ten Year 2022-2031 Capital Plan (to Support Specialized Transit)	17

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



Table 13: Transit Mode Share by Housing Type in Niagara Region (Source: 2016 T.T.S.).....	19
Table 14: Ridership per Capita Assumption	20
Table 15: Calculation of 2031 Ridership by Population	21
Table 16: Calculation of 2031 Ridership by Population	22
Table 17: Population by Age Cohort.....	24
Table 18: Potential Persons with Disabilities by Age Group	25
Table 19: Allocation of New Registrants to Growth and Non-Growth	26
Table 20: 2041 Annual Ridership.....	30
Table 21: Growth Bus Forty-foot Equivalences	32
Table 22: 2031 Service Vehicle Requirements	34
Table 23: Rebranding Quantities.....	35
Table 24: Ten Year 2022-2031 Capital Plan (to Support Operations and Amalgamation)	36
Table 25: Calculation of Benefit to Growth and Existing of the Operations Facility...	37
Table 26: Capital Plan.....	41

Introduction

Niagara Region (the Region) has experienced significant growth over the last several years, and will continue to experience growth over the next ten years. Population is anticipated to increase from approximately 486,314 in 2022 to 546,355 in 2032 and employment is anticipated to increase from 161,015 to 175,855 during this same period (Source: Watson & Associates Economists Limited).

The Development Charges Act, 1997, as amended (D.C.A.) regulates when and how municipalities may collect Development Charges (D.C.). Changes in the D.C.A., which came into effect in January 2016, have resulted in alterations to growth-related transit funding mechanisms. These requirements are summarized as follows:

- The mandatory 10% reduction of eligible growth-related capital costs was removed for transit services, allowing growth related transit services to be 100% eligible for recovery through D.C.; and
- The introduction of planned levels of services for transit, with the prescribed method and criteria to establish the service level (outlined in O. Reg. 428/15). This allows municipalities to be forward-looking in estimating future level of service for transit D.C. calculations and apportion them to growth accordingly. It also included new highly prescriptive reporting requirements associated with the background reporting for D.C.

Under the 2016 amendment to the D.C.A., the following reporting requirements need to be outlined in the D.C. background study related to transit:

- The calculations that were used to prepare the estimate for the planned level of service for transit services;
- An identification of the portion of the total estimated capital costs related to the transit service that would benefit the anticipated development over the ten-year D.C. period and after the ten-year D.C. period;
- An identification of the anticipated excess capacity that would exist at the end of the ten-year D.C. period;
- An assessment of ridership forecasts for all modes of transit services proposed to be funded, categorized by development types and whether the ridership will be from existing or planned development; and

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

- An assessment of the ridership capacity for all modes of transit services proposed to be funded by the D.C.

The Region's current D.C. By-law was passed in 2017. The 2017 background study excluded transit, as the Region was still operating transit under a pilot program at the time.

The current D.C. By-law will expire in August 2022 and the Region is preparing a new by-law. Additionally, a new D.C. by-law will be drafted for Council's consideration regarding Transit. This is required due to the formation of a new regional transit authority, which will amalgamate each of the local transit services in Region with the existing Niagara Region Transit (N.R.T.) service.

The purpose of this technical appendix is to identify the growth to existing conventional (fixed-route and On Demand), specialized transit and support vehicle capital requirements, including capital expenses to move to a single Regional transit service in 2023. For each of these, the benefit of these investments to the existing and growth populations, both in-period and post-period, will be calculated. This will inform the Region's 2022 D.C. Background Study for Transit prepared by Watson & Associates Economists Limited (Watson & Associates).

2.0 Growth Forecasts

2.1 Population Growth

Table 1 presents the population growth anticipated in the Niagara Region. Population data for mid-2022, mid-2032, and “mid-2041” were provided by Watson & Associates. The population is assumed to grow linearly between these horizon years.

Note that the D.C. period is from January 1, 2022 to December 31, 2031. For the purposes of calculations in this document, the population in Mid-2022 and Mid-2032 represent the beginning and end of the D.C. period respectively. This is due to an assumed half year delay in unit occupancy.

Table 1: Population Forecasts (2022 - 2041)

Horizon	In-Period (2022)	In-Period (2032) ¹	Post-Period (2041)
Population ²	486,314	546,355	608,203

Residential growth was also broken down by unit type and area by Watson & Associates. For the purposes of the analysis in this study, these numbers were converted to population based on persons per unit figures provided by Watson & Associates. The breakdown of population by unit, horizon, and area is shown in **Table 2**. Note that the totals in **Table 1** and **Table 2** differ slightly due to rounding as housing units were converted to population. This has no impact on the final results of the transit analysis.

¹ The 2032 population reflects the expected population at the end of the 2031 horizon year.

² Population count includes institutional population and off-campus students, but excludes census undercount.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Table 2: Breakdown of Population Growth by Area and Housing Type

Horizon³	Singles	Multiples	Apartments	Institutional	Other	Total
Existing	376,287 (77.4%)	47,621 (9.8%)	49,304 (10.1%)	10,529 (2.2%)	2,574 (0.5%)	486,315 (100.0%)
Reduction in Existing Population (2022-2032)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	-25,527
2022-2032 Growth	45,628 (53.3%)	21,104 (24.7%)	17,520 (20.5%)	1,316 (1.5%)	0 (0.0%)	85,568 (100.0%)
2032 Total	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	546,356
Reduction in Existing Population (2032-2041)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	-15,356
2032-2041 Growth	41,053 (53.2%)	18,988 (24.6%)	15,766 (20.4%)	1,365 (1.8%)	0 (0.0%)	77,172 (100.0%)
2041 Total	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	608,172

³ The 2032 population reflects the expected population at the end of the 2031 horizon year.

2.2 A Note on the Horizon Years

This section provides clarification on some differences between the horizon years used to calculate population growth and to calculate transit ridership. The D.C. period is from January 1, 2022 to December 31, 2031.

As noted above, population projections provided by Watson & Associates are reported in the mid-year, but reflect the beginning and end of the D.C. period. Therefore, Mid-2022 represents the beginning of 2022, while Mid-2032 represent the end of 2031. This is due to an assumed half year delay in unit occupancy.

Transit ridership is measured annually from January 1 to December 31 each year. Therefore, ridership in 2021 are associated with the Mid-2022 population, ridership projections for 2031 are associated with the Mid-2032 population projection and ridership projections for 2040 are associated with the Mid-2041 population projection.

Table 3 presents the population and ridership figures used for each D.C. horizon year to ensure a 10-year horizon has been maintained consistent with rest of the D.C. study.

Table 3: Population and Ridership Figures by Horizon Year

Horizon Year	Total Population	Annual Ridership
2018 ⁴	Mid-2019	2018
2019 ⁵	Mid-2020	2019
Base Year 2022	Mid-2022	2021 ⁶
2031	Mid-2032	2031
Buildout Year 2041	Mid-2041	2040

To maintain consistency, the Horizon year is used throughout the remainder of the report when referring to both the population and the ridership figures.

⁴ Used to estimate pre-COVID ridership for specialized transit based on available data.

⁵ Used to estimate pre-COVID ridership for conventional transit based on available data.

⁶ 2021 ridership was impacted by the COVID-19 pandemic; therefore, this figure is adjusted based on 2019 ridership as outlined in **Section 2.2**.

2.3

Transit Ridership Adjustments Due to COVID-19

In early 2020, COVID-19 began to emerge globally. Stay at home orders, quarantines, lock downs and the closing of all non-essential workplaces caused disruptions to travel. As a result, ridership decreased significantly throughout Niagara Region at the start of the pandemic. In 2020, Niagara Region Transit's conventional ridership was approximately 39% of pre-pandemic ridership while Niagara Region Transit's specialized transit ridership was approximately 55% of pre-pandemic ridership.

From a D.C. perspective, this impacts the ridership that is identified for the 2022 base year. Since the start of the pandemic, Niagara Region Transit and each of the local transit services in the Region have made some adjustments in service levels to accommodate for a reduction in ridership. However, the transit fleet in place today is based on the population and associated transit ridership that existed prior to the COVID-19 pandemic (2019). Expectations from the transit industry is that ridership will recover over a 3 to 5-year period as the population is vaccinated. Additional ridership growth within the 10-year D.C. period is also anticipated to meet the Region's transportation objectives, based on transit investments identified in the Niagara Transit Governance Study (Optimus Report) and the Niagara Region Transportation Master Plan, Transit Strategy Technical Paper.

Based on the above, using 2022 ridership as a base year is not reasonable since:

- The existing transit fleet is more closely based on the anticipated ridership that would have been achieved in 2022 had the COVID-19 pandemic not occurred (with the exception of a few vehicles that were retired and not replaced); and
- Any transit ridership growth over the first few years of the D.C. would be associated with recovery from the COVID-19 pandemic and society returning to 'normal'. This ridership growth would not be a result of improved transit service levels and associated capital investment in the transit system (which is used to calculate the benefit to growth and existing).

Therefore, a decision was made to establish a base-year ridership assuming no impact due to the COVID-19 pandemic. For conventional transit, this was calculated by growing the 2019 annual transit ridership based on population growth and applying the 2019 ridership per capita to the 2022 population. For specialized transit, the Optimus Report

Niagara Region**2022 - 2031 Development Charge Study - Transit Technical****Appendix****July 2022 – 22-3702**

provided a 2021 forecast of registrants and trips, based on pre-COVID ridership, therefore these figures were used as the figures for the 2022 base year.

For transit vehicles, not all buses retired between 2020 and 2022 were replaced, due to lower ridership that resulted from the COVID-19 pandemic. Replacement of these vehicles, as ridership continues to return to pre-COVID levels, are not related to overall system growth. As such, the 2018 fleet was assumed to be in place in the 2022 base year and therefore are not counted as part of the D.C. analysis.

2.4 Optimus Report

Optimus S.B.R. completed a Niagara Transit Governance Study (Optimus Report) in April 2020. The study consisted of a review of the transit services operating under local and regional jurisdictions within Niagara, and following assessment and engagement, a governance structure and future transit model was recommended. The recommended future transit model was a consolidated regional transit service to be governed by a Commission.

The Optimus Report outlines the need and justification for transit infrastructure and associated capital costs in order to achieve the planned transit level of service for the consolidated regional service between 2019 and 2031. This report, and associated ridership projections, infrastructure growth projections and capital plan are referenced throughout this technical appendix and form the basis of the capital plan noted in **Section 3.0** and **Section 4.0**.

3.0 Ten-Year Conventional Fleet Capital Plan and Ridership Forecast for D.C. Application

3.1 Existing Conventional Transit

There are currently six transit systems in Niagara Region that operate conventional and On Demand transit across the Region. This includes a new N.R.T. On Demand service, which began operation between 2020 and 2022 servicing the municipalities of Pelham, Lincoln, West Lincoln, Niagara-on-the-Lake, Wainfleet, Grimsby and Port Colborne. The 2022 fleet, 2019 ridership and the service area of each of these is noted in **Table 4** below.

Table 4: Existing Conventional Transit Services in Niagara Region

Transit System	Service Area	Total Fleet (2022)	Annual Ridership (2019)
Niagara Region Transit	Inter-municipal trips within Niagara Region	32	1,065,933
N.R.T. On Demand	On Demand service in West Niagara (Grimsby, Lincoln, Pelham, Port Colborne, Wainfleet, West Lincoln and Niagara-on-the-Lake)	16	30,595
St. Catharines Transit	St. Catharines and Thorold	75	4,792,742
Niagara Falls Transit	Niagara Falls	37	2,009,784
Welland Transit	Welland	17	738,998
Fort Erie Transit	Fort Erie	Not Applicable	40,467
N.R.T. On Demand launched in August 2020	Town of Pelham	0	7,895
N.R.T. On Demand launched in August 2020	Town of Lincoln	0	5,000

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Transit System	Service Area	Total Fleet (2022)	Annual Ridership (2019)
N.R.T. On Demand launched in August 2020	Town of Niagara-on-the-Lake Transit	0	29,510
N.R.T. On Demand launched in August 2020	Town of Grimsby	0	5,000
N.R.T. On Demand Port Colborne joined in January 3, 2022	Town of Port Colborne	0	12,700
Total	Not Applicable	177	8,738,624

Each of these services will be amalgamated into a new Niagara Region Transit service in January 2023, which will be governed by a regional transit commission.

In 2019, there were a total of 8,607,457 conventional trips operated by Niagara Region Transit, St. Catharines Transit Commission, Niagara Falls Transit and Welland Transit. There are an additional 131,167 trips from the new N.R.T. On Demand service which was launched in August 2020 and expanded to include Port Colborne in 2021. Overall, 2019 /2020 ridership in the Region represented a total of 8,738,624 trips. Based on population growth, it is anticipated that this would have grown to 8,859,148 in 2022 if the COVID-19 pandemic did not occur.

3.2 Ridership Forecast

The Optimus Report presented both a low and a high range forecast for ridership to 2031 based on two service level improvement scenarios. The low ridership projection estimated that investment in transit would not significantly change the transit mode share, which was assumed to remain consistent from 2016 to 2031. This suggests that the majority of ridership growth would result from population and employment growth in the Region. The high growth scenario assumed that investment in transit would also result in the existing population using the service more, along with the increase in ridership from the growth population.

For the purposes of this D.C., Niagara Region provided 2031 ridership projections closer to the low end of the Optimus Report ridership forecast range. This was a conservative

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

estimate to reflect the slower recovery from the COVID-19 pandemic and the need for additional planning due to the formation of a new transit commission. The projection includes both a ridership growth from new population, as well as an increase in ridership per capita, to reflect increased use of the service by existing residents. **Table 5** shows the annual combined ridership projections and how they compare to the peer transit agencies of Durham Region, Hamilton, Waterloo Region and York Region.

Table 5: Annual Transit Ridership Projections

Category ⁷	2019	2022	2031	2041	2019 Peer Average
Population	473,506	486,315	546,355	608,203	764,102
Ridership	8,738,624	8,859,148	12,000,000	16,700,000	19,293,971
Ridership per Capita	18.46	18.46	21.96	27.46	27.53 ⁸

3.3 Vehicle Requirements

The conventional transit capital plan is informed by the Optimus Report. The report outlines the need and justification for transit infrastructure and associated capital costs in order to achieve the planned transit level of service for the Region between 2019 and 2031. Capital costs reported in the Optimus Report include conventional bus fleet growth (including technology), facility expansion, On Demand service expansion, specialized transit and other ancillary costs. These capital costs have been reviewed by the Region; projects which have been completed have been removed and the remainder have been adjusted to reflect the projects which will be completed within the D.C. horizon to amalgamate the service and achieve the expected ridership increase.

All new specialized transit expansion vehicles will include a farebox and information technology systems (I.T.S.) including, Automatic Vehicle Location (A.V.L.) and surveillance equipment costs.

⁷ Population and ridership are representative of the horizon years, based on the assumptions noted in **Section 2.2**.

⁸ This figure is a weighted average of the peer systems, and therefore is not equal to the average ridership divided by the average population.

Table 6 illustrates the cumulative existing municipal-owned fleet for transit services that operate in Niagara Region, as well as the projected growth in fleet from the Optimus Report.

Table 6: Conventional Transit Bus Requirements

Category	2022	2031	Growth
30-Foot Buses	3	3	0
40-Foot Buses	143	176	33
60-Foot Buses	15	15	0
On Demand Vehicles	16	23	7
Total Conventional Vehicles	177	217	40
Buses Per 10,000 Capita	3.64	3.97	9%

3.4 Full Transit Capital Plan (Conventional)

The final 10-year capital plan to support conventional transit services is noted in **Table 7** below. The capital plan is based on recommendations from the Optimus Report, adjusted to reflect projects that are expected within the D.C. horizon, changes to base costs, adjustments due to COVID-19, and other capital requirements informed by staff from Niagara Region.

These investments have a benefit to both existing and future populations as they are required to support the new Commission, which was put in place to accommodate ridership growth in the Region.

Each new conventional vehicle requires the addition of a farebox and information technology systems (I.T.S.) such as cameras and passenger counters.

Values are rounded to the nearest dollar. Specialized Transit vehicles costs are included in **Section 4.0**.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Table 7: Ten Year 2022-2031 Capital Plan (to Support Conventional Transit)

Item	Procurement Horizon	Units	Unit Price (2022 Dollars)	Total Cost
Expansion 40-Foot Conventional	2026-2030	33	\$600,000	\$18,590,055 ⁹
Expansion On Demand Van	2026-2030	5	\$80,000	\$400,000
Expansion On Demand Cutaway	2026-2030	2	\$150,000	\$300,000
Fareboxes and Vehicle I.T.S.	2026-2030	33	\$55,800	\$1,841,400

It should be noted that all conventional growth vehicles are projected to be 40-foot vehicles in order to standardize the fleet. This differs from the Optimus Report which indicated that a portion of the growth buses would be 60-foot vehicles.

⁹ The total cost reflects the municipal cost and does not include external funding from provincial or federal sources.

4.0

Ten-Year Specialized Transit Fleet Capital Plan for D.C. Application

4.1

Existing Specialized Transit

Niagara Region operates a specialized public transportation service called Niagara Specialized Transit (N.S.T.) for persons with disabilities who are unable to use the conventional transit service. The service is provided for inter-municipal trips throughout the region, and also for local municipal trips in the more rural communities of Grimsby, Lincoln, West Lincoln, Pelham, Port Colborne, Wainfleet, and Niagara-on-the-Lake. Portions of this service are contracted to a third-party provider. In addition to this, St. Catharines Transit, Niagara Falls Transit and Welland Transit also operate specialized transit services for trips within their respective municipal boundaries. All of these services will be amalgamated into one specialized service serving both local municipal and inter-municipal trips within the Region for registered clients.

Table 8 illustrates the existing specialized transit ridership and registrants from each of the specialized transit services in Niagara Region in 2018. These systems will be amalgamated into the one system in 2023, operated by Niagara Region.

Table 8: Existing Specialized Transit Services in Niagara Region

Transit System	Service Area	Total Fleet (2022)	Registrants (2018)	Annual Ridership (2018)
Niagara Specialized Transit	Grimsby, Lincoln, West Lincoln, Pelham, Port Colborne, Wainfleet, Niagara-on-the-Lake	20	926	34,384
Chair-a-Van	Niagara Falls	8	1,021	27,546
St. Catharines Paratransit	St. Catharines	12	1,355	38,007
WellTransit	Welland	5	297	14,442

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Transit System	Service Area	Total Fleet (2022)	Registrants (2018)	Annual Ridership (2018)
FAST	Fort Erie	0	202	10,186
Total	Not Applicable	45	Not Applicable¹⁰	124,565

The Optimus Report projected that in 2021, there would be 4,580 active registrants of a Specialized Transit service taking 129,460 rides annually. It should be noted that with the amalgamation of specialized transit to the Niagara Region Transit Commission, the number of active registrants would reduce, as a number of existing users are registered with both their local service and the N.S.T. service. Since the growth in the service is based on the total number of trips taken, the duplication of registrants across services will not impact calculations.

Table 9 includes the operating statistics for specialized transit services.

Table 9: Specialized Transit Operating Statistics (2018 and 2022)

Year	Total Active Registrants	Annual Total Trips ¹¹	Total Vehicles	Peak Vehicles	Trips per Peak Vehicle	Annual Trips per Registrant
2018	4,390	124,087	48	43	2,886	28.27
2022 ¹²	4,580	129,460	45	40	Not Applicable	28.27

The Optimus Report was used to determine the total number of specialized transit vehicles across all municipalities. Based on discussions with the Region, a spare ratio of 10% was used to determine peak vehicle requirements for future planning. This may be adjusted in the future as more analysis is conducted of the ideal spare ratio under the

¹⁰ Residents can currently be registered in two separate specialized transit services. As such a sum of registrants across all agencies would not be reflective of unique registrants.

¹¹ Based on projected ridership from the Optimus Report for 2021 horizon. Includes ridership from both registered passengers and attendants.

¹² Three specialized transit vehicles were retired and not replaced between 2019 and 2022 due to lower ridership from the COVID-19 pandemic. Therefore, any projection of new vehicle requirements is based on an assumed total of 48 total vehicles in 2022. This is because ridership and registrant estimates from the Optimus Report assume no impact due to COVID-19 (see **Section 2.3** of this report).

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



new commission. Based on this, it was also assumed that 10% of the total vehicles reported in 2018 were spares.

Based on discussions with Niagara Region staff, changes are not projected to occur in the portion of denied trips with the amalgamation of each of the services. Therefore, changes to trip denial rate were not considered in the analysis of future trips.

4.2 Ridership Forecast

The forecasted number of specialized transit registrants and trips was included in the Optimus Report. The low end of the Optimus Report registrant forecast range was used as a conservative estimate to reflect the slower recovery from the COVID-19 pandemic and the need for additional planning due to the formation of a new transit commission. The forecasted registrant figures and total annual trips during the ten-year D.C. period is illustrated in **Table 10** below.

As mentioned above, the Region indicated that the trip denial rate not expected to change over the 10-year D.C. period.

Table 10: Registrant and Ridership Forecast for Specialized Transit

Description	2018	2022	2031
Registrants	4,390	4,580	5,300
Total Trips	124,087	129,460	149,865
Trips Per Registrant	28.27	28.27	28.28

4.3 Vehicle Requirements

To understand the future fleet requirements for specialized transit, the following assumptions are made:

- Capital costs are solely attributed to the publicly-owned fleet of purpose-built vehicles;
- All new specialized transit expansion vehicles will include a farebox, Automatic Vehicle Location (A.V.L.) and surveillance equipment costs; and
- Each peak period vehicle makes 2,698 trips annually. This productivity level is equal to that which was operated in 2019 prior to the COVID-19 pandemic.

Table 11 outlines the specialized transit vehicle requirements to 2031. By the end of the ten-year D.C. period (2031), Niagara Region will require 17 new vehicles to accommodate growing registrants attributed to population growth and an aging population. It should be noted that only 14 of these are considered expansion vehicles and included in the D.C. by-law, as three are 2018 vehicles that were retired and not replaced due to the COVID-19 pandemic.

This forecast differs from the number of vehicles noted in the Niagara Specialized Transit Study (I.B.I. Report), which estimated an increase of 16 vehicles between 2022 and 2028. The revised estimate was completed to better align the buses with the Niagara Region Transit Commission's amalgamation schedule.

Table 11: Specialized Transit Vehicle Requirements (2031)

Fleet	2022 ¹³	2031
Peak Fleet	43	55
Spare Fleet	5	7
Total Fleet (including spares)	48	62
Additional Vehicles Required (cumulative)	Not Applicable	14

4.4

Full Transit Capital Plan (Specialized Transit)

The 10-year capital plan to support specialized transit services is noted in **Table 12** below. Capital costs include a growth in vehicles to support the projected ridership growth as outlined in **Section 4.2**.

These investments have a benefit to both existing and future populations as they are required to support the new Commission, which was put in place to accommodate ridership growth in the Region.

Values are rounded to the nearest dollar.

¹³ The vehicles indicated here are based on the 2018 in service vehicles as outlined in **Section 4.1** of this report.

Table 12: Ten Year 2022-2031 Capital Plan (to Support Specialized Transit)

Item	Procurement Horizon	Units	Unit Price (2022\$)	Total Cost
Specialized Vehicles	2026-2030	14	\$150,000	\$2,100,000
Fareboxes and Vehicle I.T.S.	2026-2030	14	\$34,800	\$487,200

5.0 Apportioning Benefit (Transit Vehicles)

This section details how the transit capital program is apportioned between benefit to growth, in-period and post-period.

5.1 In-Period Benefit to Existing and Growth

The 2016 D.C.A. requires that the increased need for service be reduced by the extent to which a service would benefit existing population. The in-period benefit is therefore further broken down into benefit to existing populations and benefit to growth populations.

5.1.1 Conventional Transit Vehicles

To determine the extent to which new transit capital will benefit the existing population and the growth population, it is first important to understand the propensity of each to use transit.

New developments and their corresponding populations have an increased propensity to use transit due to changing views on transit, higher densities of new built form, and increased adoption of transit-oriented design in new developments. Existing populations have a lower propensity to use transit due to the existing auto-oriented built form and challenges in changing established behaviours.

New development that is being planned within Niagara Region over the next ten years will on average be denser than existing development. **Table 2** illustrates the percentage of population from both existing and new growth by unit type. Currently, 77.4% of the existing population live in single detached dwellings, compared to only 53.3% of the 2022-2031 growth population. This change in built form has an impact on the propensity to use transit by the different portions of the population.

Data was derived from the 2016 Transportation Tomorrow Survey (T.T.S.) to understand how housing choice correlates with the propensity to use transit. The T.T.S. is a comprehensive travel survey conducted in the Greater Golden Horseshoe Area every five years. The purpose of the survey is to provide data that help governments and transportation agencies make transportation investment decisions.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Table 13 illustrates the average 2016 transit mode share of residents in Niagara Region by housing type (based on 2016 T.T.S. data). The data was used identify the relative differences in mode share by housing type from T.T.S.

Table 13: Transit Mode Share by Housing Type in Niagara Region (Source: 2016 T.T.S.)

Housing Type	Transit Mode Share	Factor Relative to Low Density
Low Density (singles and semis)	1.27%	1.00
Medium Density (multiples)	1.81%	1.43
High Density (apartments)	6.08%	4.79

As seen above, residents that live in higher density developments are more likely to use transit then residents that live in lower density developments.

Note: The T.T.S. data does not include a transit mode share for population associated with institutional and off-campus housing. Since this type of housing is typically high density and includes a student market which are more likely to use transit, the transit mode share for high density development was used for this housing type for the purposes of this analysis.

The factor in **Table 13** refers to transit use relative to low density units. For example, medium density units use transit 43% more than low density units ($1.81\% / 1.27\% = 1.43$).

These factors are used to compare the expected annual trips per capita for the existing and growth population, adjusted for housing type.

To calculate the proportion of trips made by the growth and existing population, several steps were taken.

Step 1: Determine Base 2022 Ridership

The ridership per capita for the 2022 population was assumed to be equal to the 2019 ridership per capita of 18.71 (based on all transit systems that operate in Niagara Region that will form part of the new commission). The 2019 ridership per capita was used as this was the last full year prior to the start of the COVID -19 pandemic as outlined in **Section 2.2**.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

The 2019 population was calculated by assuming linear population growth between 2016, the last reported census year, and 2022. The 2019 ridership per capita considers the 2019 annual ridership divided by the 2019 population. The 2022 ridership is calculated by multiplying the 2019 ridership per capita by the 2022 population.

Table 14 summarizes the existing and forecasted 2031 ridership and ridership per capita. Note that the total 2022 population differs slightly from **Table 1** due to rounding.

Table 14: Ridership per Capita Assumption

Category	2019	2022	2031
Population	473,506	486,315	546,355
Ridership	8,738,624 (Actual)	8,859,148 (Extrapolated from 2019)	12,000,000
Ridership per Capita	18.46	18.46	21.96

Step 2: Identify Ridership Growth Based on Population Growth Only

The next step is to determine the amount of ridership growth that would occur based on population growth only (assuming no service level improvements would take place).

Since new growth will be at a higher density (see **Table 2**), adjustments were made to the number of rides per capita.

The “Factor Relative to Low Density” identified in **Table 13** was used to calculate a Density Adjustment for the existing population. The “Factor Relative to Low Density” for each housing type was multiplied by the associated population by growth period. The resulting sum of these figures across all housing types provides a “Factor Relative to Housing Type” for each population group (existing residents, growth residents between 2022 and 3031, and growth resident’s post-2031). For example, a factor of 1.0 was applied to each low density unit, 1.43 to each medium density unit and 4.79 to each high density and institutional unit. The weighted average was calculated to be 1.51 for the existing population and 1.94 for the growth population, which represents the impact of density on ridership growth.

The density factor of 1.51 in the existing population yields a ridership per capita of 18.46, while the density factor of 1.94 of the growth population yields a ridership per capita of 23.72.

To calculate the adjusted ridership per capita, the following calculation was used:

Formula: Ridership per Capita:

Ridership per Capita = “Factor Relative to Low Density” from Growth Population / “Factor Relative to Low Density” from existing 2022 population x 2022 Ridership per Capita

Calculation:

$$1.94 / 1.51 \times 18.46$$

$$= 23.72$$

The numbers associated with these steps are summarized in **Table 15**.

Table 15: Calculation of 2031 Ridership by Population

Area	Population	Factor Relative to Low Density	Ridership Per Capita	Annual Ridership
Existing 2022 Population	460,788 ¹⁴	1.51	18.46	8,506,148
2022-2031 Growth	85,568	1.94	23.72	2,029,673
2031 Total	546,356	Not Applicable	Not Applicable	10,535,821

Step 3: Adjust Ridership by Population Group to Reflect 2031 Forecasts

The next step is to adjust the annual ridership in **Table 15** to reflect the full ridership forecast noted in **Table 14**, assuming service improvements reflected in the capital plan are in place.

¹⁴ There is a projected reduction in the existing population between 2022 and 2031, refer to page A7 of Background Study for additional information.

To do this, the 2031 ridership projection is divided by the 2031 ridership calculated in Step 2.

Formula:

Ridership Growth Factor = 2031 Ridership Forecast (**Table 14**) / 2031 Ridership from **Table 15** assuming no service improvements in place.

Calculation:

12,000,000 / 10,535,821

= 1.14

Using this ridership growth factor, the ridership in **Table 15** was multiplied by 1.14. This calculation is reflected in **Table 16**.

As seen in **Table 16**, the average trips per capita is required to grow by the existing and growth population to achieve the 2031 ridership target. This suggests that the service improvements will benefit both the existing population and the growth population, with an increased benefit to the growth population based on the density factor.

Table 16: Calculation of 2031 Ridership by Population

Area	Population	Ridership Per Capita (Table 15)	Annual Ridership (Table 15)	Annual Ridership (Adjusted)	Growth in Ridership	Adjusted Ridership per Capita
2022 Population (Existing Residents)	460,788 ¹⁵	18.46	8,506,148	9,688,260	1,182,112	21.03
Growth Population	85,568	23.72	2,029,673	2,311,740	282,067	27.02
Total	546,356	Not Applicable	10,535,821	12,000,000	1,321,600	21.96

¹⁵ There is a projected reduction in the existing population between 2022 and 2031, refer to page A7 of Background Study for additional information.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

To calculate the apportionment to growth and existing population, the following formula was used:

Formula: Benefit to Existing

(Trips by existing residents in 2031 - Trips by existing residents in 2022) / (Trips by all residents in 2031 - Trips by all residents in 2022)

Calculation

$$= (9,688,260 - 8,859,148) / (12,000,000 - 8,859,148)$$

$$= 26.40\%$$

Formula: Benefit to Growth

Trips by growth residents in 2031 / (Trips by all residents in 2031 - Trips by all residents in 2022)

Calculation

$$= 2,311,740 / (12,000,000 - 8,859,148)$$

$$= 73.60\%$$

Therefore, the benefit to existing and growth for conventional vehicles and associated fareboxes and I.T.S. is as follows:

- 26.40% to benefit to existing
- 73.60% to benefit to growth

5.1.2

Specialized Transit Vehicles

The method used to apportion growth relating to specialized transit vehicles is different than conventional transit as benefits are allocated on a registrant basis instead of trips. Similarly, there are benefits to the existing and growth populations. Thus, benefits are allocated to two groups of customers:

1. New registrants based on the existing population (attributed to an aging population that will register for the service and existing registrants that use the service more); and
2. New registrants based on growth in population.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



To calculate the apportionment of benefit, trips were separated into:

1. Growth of registrants (due to an aging population and population growth); and
2. Growth of trips per registrant (as a result of increased trips).

Growth of Registrants

Ridership on specialized transit will grow as a result of population growth in the community and an aging population.

Population growth will see an increase in the number of specialized transit registrants that will request trips on the service. This will increase the vehicle requirements over the ten-year D.C. period.

An aging population (from both the existing and growth population) will also see an increase in the number of specialized transit registrants. Watson & Associates provided population by age forecast for the D.C. period.

The aging population is shown in **Table 17** below, and illustrates that the existing Niagara Region population is aging. Statistics Canada notes that approximately 13.7% of the Canadian population has a disability. The prevalence of disability rises as we age, from 4.4% of the population in the 15 to 24-year cohort to 42.5% of the population in the 75+ year cohort. With an aging population, there will be a growth in the number of specialized transit registrants from the existing population over the 10-year D.C. period.

Table 17: Population by Age Cohort

Age Group ¹⁶	2018 Population	2022 Population	2031 Population
0-19	94,513	98,390	107,929
20-34	81,673	95,281	108,991
35-44	52,506	55,210	65,016
45-54	60,955	60,113	60,535
55-64	71,127	73,807	65,593

¹⁶ Population includes net Census undercount estimated at approximately 4.3%. Source: 2001 to 2016 historical data from Statistics Canada Table 17-10-0139-01; 2021 population data from Statistics Canada 2021 Census of Population; 2022 to 2041 forecast data from Ministry of Finance Spring 2021; Projections summarized by Watson & Associates Economists Limited, 2020. Population figures have been applied to horizon years as outlined in **Section 2.2** of this report.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Age Group ¹⁶	2018 Population	2022 Population	2031 Population
65-74	58,597	63,089	75,178
75+	46,551	52,770	76,987
Total	465,922	498,660	560,230
New Growth Population	Not Applicable	Not Applicable	61,570

To calculate the growth in registrants, the prevalence of disability by each age cohort was multiplied by the number of residents in each corresponding age cohort between 2018 and 2031. This provided the potential number of persons with disabilities each year (as illustrated in **Table 18** below).

Table 18: Potential Persons with Disabilities by Age Group

Age Group	Prevalence of Disability ¹⁷	2018	2022	2031
0-19	13.1% ¹⁸	12,381	12,889	14,139
20-34	14.6% ¹⁹	11,924	13,911	15,913
35-44	15.3%	8,033	8,447	9,947
45-54	24.3%	14,812	14,608	14,710
55-64	24.3%	17,284	17,935	15,939
65-74	32.0%	18,751	20,188	24,057
75+	47.4%	22,065	25,013	36,492
Total Persons with Disabilities	Not Applicable	105,251	112,991	131,197

It should be noted that not all persons with disabilities would be eligible for specialized transit. The definition of disability is broad and could include disabilities that would not prevent a resident from using the conventional bus service.

The population with a disability as illustrated in **Table 19** for each age cohort in 2031 was multiplied by the ratio of existing 2022 population to the total 2031 population

¹⁷ Source: [A demographic, employment and income profile of Canadians with disabilities aged 15 years and over, 2017 \(Statistics Canada\)](#)

¹⁸ 0-14 age category assumed to be the same as the 15-24 age category.

¹⁹ Percentage represents a weighted average of the 15-24 age category and the 25 to 34 age category, adjusted based on the population breakdown provided.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



(including growth). This provided the growth in the existing population with a disability in 2031. The net growth between 2022 and 2031 was the number of new existing residents that could potentially have a disability over the 10-year D.C. period and be eligible for specialized transit.

The growth population with a disability was calculated by multiplying the total 2031 population with a disability in each age cohort by the ratio of growth population (2022 to 2031) to the 2031 total population.

Table 19: Allocation of New Registrants to Growth and Non-Growth

Breakdown of Population	2022	2031
Population	486,314	546,355
% Existing Population	100%	89.0%
% Growth Population	0.0%	11.0%
Population with a disability	112,991	131,197
Proportion resulting from population growth	Not Applicable	14,419
Proportion resulting from an aging population	Not Applicable	3,787
Total change in existing population with a disability due to aging	Not Applicable	18,206
% of new active specialized transit registrants from existing aging population	Not Applicable	20.8%
% of new active specialized transit registrants from population growth	Not Applicable	79.2%

Growth in Trips per Registrant

A different allocation was identified based on the increase in trips per registrant. This would not only benefit new registrants to the service, but also existing registrants that currently use specialized transit. This would result in a higher allocation of cost to the existing population than identified above.

The Optimus Report forecasted that 149,865 trips would be requested in 2031. If registrants were to take the same number of trips between 2022 and 2031 it would be expected that 149,831 trips would be completed. This is an increase of 34 total trips

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



annually. This is a negligible increase across a 10-year projection. As such, it will be assumed that the trips per registrant will remain the same across the D.C. horizon.

Formula

Trips attributed to the change in trip rate between 2022 and 2031 =

Total Specialized Transit Trips in 2031 – (Total Registrants in 2031 x Specialized Transit Trip Rate in 2022)

Calculation

= 149,865 – (5,300 x 28.27)

= 149,865 – 149,831

= 34

Formula

Trips attributed to new registrants by 2031 (using 2022 trip rate) =

(Total Registrants by 2031 – Total Registrants in 2022) x 2022 Specialized Transit Trip Rate

Calculation

= (5,300 – 4,580) x 28.27

= 20,354

The allocation of benefits to existing registrants and growth registrants can be summarized by the following formulas:

Formula: Benefit to Existing

(Trips attributed to new registrants by 2031 using 2022 trip rate X Percent growth of 2022 population with a disability) = Increase in Rides by Existing Registrants in 2022

/ (Increase in Rides by New Registrants))

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



Calculation

$$= (20,354 \times 20.8\%) = 4,234$$

$$/ 16,120$$

$$= 20.80\%$$

Formula: Benefit to Growth

(Trips attributed to new registrants by 2031 using 2022 trip rate X Percent growth of new (growth) population with a disability) = Increase in Rides by New Registrants in 2031

$$/ (\text{Increase in Rides by New Registrants})$$

Calculation

$$= (20,354 \times 79.2\%) = 16,120$$

$$/ 16,120$$

$$= 79.20\%$$

Therefore, the benefit to existing and growth for specialized vehicles and associated fareboxes and I.T.S. is as follows:

- 20.80% to benefit to existing
- 79.20% to benefit to growth

5.2 Post-Period Benefit

The 2016 D.C.A. requires that no portion of the service intended to benefit anticipated development within the ten-year D.C. period remain as excess capacity at the end of the ten-year D.C. period. For the purposes of this D.C. Study, in-period is identified as the period from 2022-2031 and the post-period is assumed to be from 2031 to 2041.

5.2.1 Conventional Transit

The post-period benefit was calculated using the proportion of annual transit trips that are conducted by the 2031 – Build-Out growth population.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



The Region did not have a ridership projection beyond the 2031 horizon. The average ridership per capita of peer systems was used to project the potential ridership to 2041. The peer transit systems used included Durham Region, the City of Hamilton, Waterloo Region, and York Region. These systems were found to have an average ridership per capita of 27.53. Multiplying this by the 2041 Niagara Region population (608,203) the estimated ridership potential in 2041 was estimated to be 16,743,829. This is close to the high growth forecast for 2031 from the Optimus Report, which indicated a total of 16,200,000. In order to reflect a level of accuracy consistent with the Optimus Report, Niagara Region Transit has elected to use a 2041 ridership estimate of 16,700,000. This slightly exceeds the 2031 “High” forecast in the Optimus Report, but is extended to the 2041 horizon year. It is also in line with the average ridership per capita of more mature regional transit services that exist today.

To calculate post-period benefit, the 2041 ridership was adjusted to reflect this expected growth from service improvements using the same methodology as that described in **Section 5.1.1**. However, in this case, the ridership was expanded by a higher factor (1.38). The calculations are summarized in **Table 20**.

Based on the table below, the in-period and post-period benefit were calculated as follows:

Formula: Proportion of Benefit to Growth to Allocate Post-Period

Post-Period Growth Population Annual Ridership / (2041Ridership - 2022 Annual Ridership)

Calculation:

2,540,853 / (16,700,000 – 8,859,148)

= 32.41%

Formula: Post-Period Benefit to Growth

Benefit to Growth x Proportion of Benefit to Growth to Allocate Post-Period

Calculation:

73.60% x 32.41%

= 23.85%

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Table 20: 2041 Annual Ridership

Area and Horizon	Population	Factor Relative to Low Density	Ridership Per Capita (Pre-Adjustment)	Annual Ridership (Pre-Adjustment)	Ridership Projection Adjustment Factor	Annual Ridership (Adjusted)
2022 Population	445,432 ²⁰	1.51	18.46	8,222,676	1.38	11,356,039
2022-2031 Growth	85,568	1.94	23.72	2,029,673	1.38	2,803,108
2031-2041 Growth	77,172	1.95	23.84	1,839,780	1.38	2,540,853
Total	608,172	Not Applicable	Not Applicable	12,092,129	1.38	16,700,000

²⁰ There is a projected reduction in the existing population between 2022 and 2041, refer to page A7 of Background Study for additional information.

Formula: In-Period Benefit to Growth

Benefit to Growth – Post-Period Benefit to Growth

Calculation:

73.60% - 23.85%

= 49.75%

Therefore, the in-period and post-period benefit to existing and growth for conventional vehicles and associated fareboxes and I.T.S. is as follows:

- 26.40% in-period benefit to existing
- 49.75% in-period benefit to growth
- 23.85 post-period benefit to growth

5.2.2**Specialized Transit**

Unlike conventional transit, there is no post-period benefit for the purchase of the specialized fleet in-period. Since specialized transit systems typically have some degree of trip denials, any increase in registrants and trips beyond 2031 will require additional capacity (since some trips from the 2031 population are anticipated to be denied).

As a result, there is no post-period benefit.

6.0

Ten-Year Capital Plan for D.C. Application (Other Capital Items)

6.1

Operations Facilities

The expansion vehicles noted in **Section 3.4** and **4.4** will need to be maintained and stored in a new or expanded transit operations facility during the 10-year horizon period. Each of the three existing operations facilities in the Region (St. Catharines, Niagara Falls and Welland) are at capacity, with many buses stored outdoors. While there are plans to expand these facilities, they were all completed prior to the decision to move to a new Regional Commission and do not take into account the 10-year fleet expansion plan noted in this report.

A key next step will be to undertake a Facility Needs Assessment Study to determine the design and location of a future operations facility expansion under the new Commission structure.

To determine the capital cost of an expanded or new operations facility, the following steps were taken.

The first step was to determine the operations facility expansion requirements. A total of 54 expansion buses (conventional, On Demand and specialized transit) will be required over the 10-year D.C. period as outlined in **Sections 3.4** and **4.4**.

Table 21 presents the conversion of each bus type to its forty-foot bus equivalent (rounded to reflect a whole vehicle). Based on this, a new or expanded operations facility will be required that will accommodate a minimum of 46 forty-foot equivalent expansion buses.

Table 21: Growth Bus Forty-foot Equivalences

Bus Type	Bus Length (feet)	Ratio to 40-foot bus	Quantity	Total 40-foot equivalent buses
Expansion 40-Foot Conventional	40	1	33	33

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Bus Type	Bus Length (feet)	Ratio to 40-foot bus	Quantity	Total 40-foot equivalent buses
Expansion On Demand Van	20	0.5	5	3
Expansion On Demand Cutaway	24	0.6	2	1
Expansion Specialized Vehicles	24	0.6	14	9
Total	N/A	N/A	54	46

The next step was to determine a high level capital cost of this operations facility. To determine this, the capital cost of the planned Niagara Falls Transit facility expansion was used to determine a unit cost based on the space required for each forty-foot equivalent bus.

The total cost of expanding the Niagara Falls Transit facility by 12 forty-foot buses is \$3,850,000 ²¹. Dividing this total cost by the number of forty-foot buses this expansion will accommodate equals a cost of \$320,833 per new forty-foot equivalent bus housed in the facility.

This unit cost was applied to the 46 expansion buses in **Table 21** to determine the total cost of a new or expanded operations facility(s). Based on this calculation, it is expected that the cost of the new or expanded operations facility required to accommodate expansion buses within the horizon is \$14,758,000. An additional \$100,000 is also required to conduct a Facility Needs Assessment Study to determine the location and functional layout of a new or expanded facility.

6.2 Service Vehicles

Service vehicles are used to support the operation of conventional and specialized transit services.

In 2022, there were 38 service vehicles across all systems that operate transit services in the Region. There was a total number of 222 conventional, On Demand and specialized

²¹ Note: This facility expansion is not growth related and will not accommodate any of the expansion buses proposed in Section 3.4 and 4.4 of this report.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



transit vehicles in service in 2022. This translates into an average of 0.17 service vehicles per transit vehicle.

This ratio was applied to the 2031 vehicle requirements to determine the growth in number of service vehicles over the 10-year D.C. period.

Using this methodology, it is expected that 10 new service vehicles will be required to support the fleet growth. The number of service vehicles required by 2031 is calculated below:

Formula:

2022 Service Vehicles / 2022 Total Fleet x 2031 Total Fleet

Calculation:

38 / 222 x 280

= 47.93 (Rounded to 48)

Based on the above calculation, a total of 48 service vehicles are required to compliment the 2031 fleet.

The existing and 2031 service vehicle requirements are noted in **Table 22**.

Table 22: 2031 Service Vehicle Requirements

Vehicle Type	2022	2031	Growth
Service Vehicles	38	48	10

6.3

Rebranding of Bus Stops and Vehicles

As part of the amalgamation of the various municipal services to a regional transit service, the existing bus stops and vehicles will need to be rebranded to reflect the unified system. This will involve re-wrapping existing transit vehicles and replacing existing bus stops with newly branded Niagara Region Transit Commission signs. Both capital expenses are necessary to create a single brand for the commission and achieve the vehicle expansion plans and ridership growth targets noted in the Optimus Report.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Therefore, these capital expenses are treated as an expansion cost, since they are necessary to form the new Regional commission.

The quantity of bus stops and buses to be rebranded are included in **Table 23**.

Table 23: Rebranding Quantities

City	2022 Bus Stops	2022 Conventional Vehicles	2022 Specialized Vehicles
Niagara Falls	4,939	37	8
St. Catharines	1,110	75	12
Welland	1,389	17	5
Total	7,438	129	25

6.4

Full Transit Capital Plan (Other Capital Items)

The final 10-year capital plan, to support the operations and amalgamation of Niagara Region Transit services, is noted in **Table 24** below. The capital plan is based on recommendations from the Optimus Report, adjusted to reflect projects that are expected within the D.C. horizon, changes to base costs and other capital requirements informed by staff from Niagara Region.

These investments have a benefit to both existing and future populations as they are required to support the new Commission, which was put in place to accommodate ridership growth in the Region.

Values are rounded to the nearest dollar. Costs associated with vehicle growth are included in **Section 3.4** and **4.4**.

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

Table 24: Ten Year 2022-2031 Capital Plan (to Support Operations and Amalgamation)

Item	Procurement Horizon	Units	Unit Cost (2022\$)	Municipal Cost
Facility Expansion and Study	2026-2030	1	\$14,858,000	\$14,858,000
Service Vehicles	2026-2030	10	\$53,300	\$533,000
Bus Stop Rebranding	2023	7,438	\$150	\$1,115,700
Conventional Bus Wraps	2023	129	\$4,000	\$516,000
Specialized Bus Wraps	2023	25	\$4,000	\$100,000

7.0 Apportioning Benefit (Other Capital Items)

7.1 Operations Facility

The total cost to expand facilities to accommodate growth buses within the D.C. horizon including the cost to complete a Facility Needs Assessment Study is \$14,858,000. This cost is based on the cost to expand facilities to accommodate only expansion vehicles. The benefit to growth and existing for this facility would be same benefit to growth and existing of the expansion vehicles. Since it is unknown which vehicles would be accommodated in this new or expanded operations facility, an average benefit to growth and existing of each of the vehicle types was applied. This is calculated in **Table 25** below.

Table 25: Calculation of Benefit to Growth and Existing of the Operations Facility

Vehicle Type	Total 40-foot equivalent buses	In Period Benefit to Existing	In Period Benefit to Growth	Post Period Benefit to Growth
Expansion 40-Foot Conventional	33	26.40%	49.75%	23.85%
Expansion On Demand Van	3	26.40%	49.75%	23.85%
Expansion On Demand Cutaway	1	26.40%	49.75%	23.85%
Expansion Specialized Vehicles	9	20.80%	79.20%	0%
Total	46	25.30%	55.51%	19.18%

Therefore, the benefit to existing and growth for a new or expanded operations facility is as follows:

- 25.30% in-period benefit to existing
- 55.51% in-period benefit to growth
- 19.18% post-period benefit to growth

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702

7.2 Service Vehicles

The method used to apportion in-period and post-period benefits related to service vehicles is directly related to the benefit to growth and existing of conventional transit and specialized transit expansion vehicles. Reflecting that service vehicles will be used for both services, a weighted average is used to calculate the benefit to growth and existing for both services.

Formula (Benefit to Existing):

(Conventional Vehicle Growth/Total Vehicle Growth) x Conventional Benefit to Existing
+ (Specialized Vehicle Growth/Total Vehicle Growth) x Specialized Benefit to Existing

Calculation (Benefit to Existing):

$$\begin{aligned} &(40/54) \times 26.40\% \\ &+ (14/54) \times 20.80\% \\ &= 24.95\% \end{aligned}$$

Formula (In-Period Benefit to Growth):

(Conventional Vehicle Growth/Total Vehicle Growth) x Conventional Benefit to Growth In-Period
+ (Specialized Vehicle Growth/Total Vehicle Growth) x Specialized Benefit to Growth In-Period

Calculation (In-Period Benefit to Growth):

$$\begin{aligned} &(40/54) \times 49.75\% \\ &+ (14/54) \times 79.20\% \\ &= 57.39\% \end{aligned}$$

Formula (Post-Period Benefit to Growth):

(Conventional Vehicle Growth/Total Vehicle Growth) x Conventional Benefit to Growth Post-Period

Niagara Region

2022 - 2031 Development Charge Study - Transit Technical

Appendix

July 2022 – 22-3702



Calculation (Post-Period Benefit to Growth):

$$(40/54) \times 25.18\%$$

$$= 17.67\%$$

Therefore, the benefit to existing and growth for service vehicles is as follows:

- 24.95% in-period benefit to existing
- 57.39% in-period benefit to growth
- 17.67% post-period benefit to growth

7.3 Rebranding of Bus Stops and Vehicles

The rebranding of bus stops and wrapping of vehicles that are necessary to create a new Niagara Transit Commission will benefit both existing residents and new residents that may use the service more often. Both actions are required to create the regional commission and provide one-brand for all transit services in the Region. To calculate the benefit to growth and existing, the same benefit to growth and existing were used as described in **Section 5.1.1** and **5.2.1** for conventional bus wraps and bus stops, and **Section 5.1.2** and **5.2.2** for specialized transit bus wraps.

Based on this, the benefit to existing and growth for conventional vehicle rebranding and new bus stops is as follows:

- 26.40% in-period benefit to existing
- 49.75% in-period benefit to growth
- 23.85% post-period benefit to growth

For new specialized transit bus wraps on existing vehicles, the benefit to existing and growth is as follows:

- 20.80% in-period benefit to existing
- 79.20% in-period benefit to growth
- No post-period benefit

Summary of Key Values

Table 26 presents the full capital plan including how the capital costs are apportioned between benefit to existing and growth.

Table 26: Capital Plan

Item	Horizon	Unit Price (2022 Dollars)	2022-2031 Units	10-Year Municipal Capital Cost ²²	In Period Benefit to Existing	In Period Benefit to Growth	Post Period Benefit to Growth
40-Foot Conventional Bus	2026-2030	\$600,000	33	\$19,800,000	26.40%	49.75%	23.85%
Fareboxes and Vehicle I.T.S. Conventional Vehicles	2026-2030	\$55,800	33	\$1,841,400	26.40%	49.75%	23.85%
On Demand Van	2026-2030	\$80,000	5	\$400,000	26.40%	49.75%	23.85%
On Demand Cutaway	2026-2030	\$150,000	2	\$300,000	26.40%	49.75%	23.85%
Specialized Vehicles	2026-2030	\$150,000	14	\$2,100,000	20.80%	79.20%	0%
Fareboxes and Vehicle I.T.S. Specialized Vehicles	2026-2030	\$34,800	14	\$487,200	20.80%	79.20%	0%
Facility Expansion and Study	2026-2030	\$14,858,000	1	\$14,858,000	25.30%	55.51%	19.18%
Support Vehicles	2026-2030	\$53,300	10	\$533,000	24.95%	57.39%	17.67%
Bus Stop Rebranding	2023	\$150	7,438	\$1,115,700	26.40%	49.75%	23.85%
Conventional Bus Wraps	2023	\$4,000	129	\$516,000	26.40%	49.75%	23.85%
Specialized Bus Wraps	2023	\$4,000	25	\$100,000	20.80%	79.20%	0%

²² The total cost reflects the municipal cost and does not include external funding from provincial or federal sources.