ATTACHMENT 1

MORRISON HERSHFIELD

REPORT
Curbside Automation Implementation Plan

Presented to:

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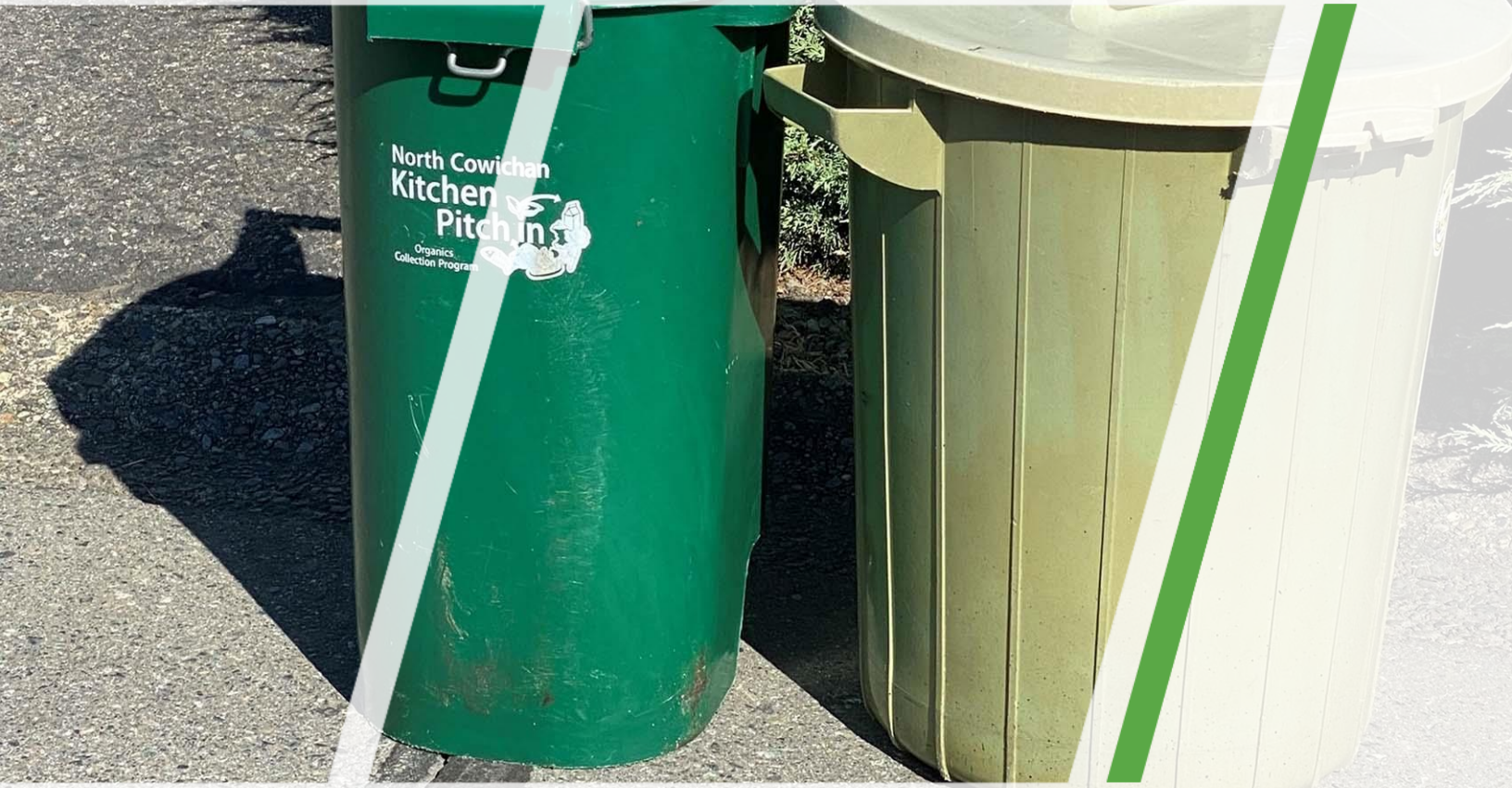

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1. INTRODUCTION AND REPORT SCOPE

The Municipality of North Cowichan (MNC) has been actively reviewing the residential curbside waste collection program since 2020. The 2020 review specifically focused on options to move away from a manual collection program which is currently used.

In 2021 the MNC conducted a public engagement program to determine whether there is interest in the automated collection system. The results from a survey indicated that the majority of residents supported a switch to an automated system, including yard waste collection and different bin size options. In the summer of 2021, the MNC gathered public feedback via a survey (available both online and in hard copy) on the potential transition to automated collection. In the Public Feedback Summary Report from October 2021, survey results showed that 58% of the respondents indicated interest in a new food and yard waste collection service.

Automated collection refers to the system where the operator activates a mechanical arm on the side of the collection vehicle to lift and empty standardized collection carts. The operator does not need to leave the cab and has no direct contact with the cart or its contents.

An automated collection requires standardized carts for lifting.

The Council approved the development of an implementation plan in December 2021, which will lay out the steps for a new automated collection system commencing in 2023. Council has requested that MNC staff look into the alternative service model of contracting out the current curbside collection service for garbage and organics. In addition, there is an opportunity to bring the collection of all three streams in-house. Recycling is collected by a contractor for the MNC and this contractor has experienced resourcing issues that have affected the quality of the recycling service.

MNC commissioned Morrison Hershfield (MH) to support the MNC with planning the transition to an automated collection service. MH first reviewed the MNC's service delivery model to enable the Council to decide if the service would continue to be delivered by in-house staff.

The Council agreed on August 17, 2022, to allow MH to develop an implementation plan that can support the transition from a manual solid waste curbside collection system to a fully automated system with an in-house service delivery model.

Many local governments and private sector collectors have switched recently to automated cart-based collection. For automated collection, the operator stays in the cab and has no direct contact with the cart or its contents. A mechanical arm on the side of the collection vehicle reaches out, grasps, lifts, and empties the collection cart. This switch is often precipitated by a desire to reduce worker injuries, retain an aging workforce, increase the size of the labour pool for waste collection staff and create opportunities to diversify the workforce.

Cart sizes and lift mechanisms are now available for collection programs with smaller carts (e.g., 80 L, 100 L or 120 L) that promote waste diversion.

Figure 1 RDN Automated Cart Collection Truck

Scope of the Implementation Plan

MH previously reviewed the service delivery model and recommended that the municipality plans for an automated collection of garbage and organics using in-house resources.

Recycling would continue to be collected manually by a contractor and can be considered as part of a second phase of automated implementation. The two-phased approach to automation allows the MNC to develop their understanding of the garbage and organics volumes and the potential impacts of collecting recycling in the future. A delay bringing recycling in-house also allows the MNC time to set finances in place for additional capital outlay for any additional trucks and carts. A significant benefit with phased implementation is the opportunity to apply lessons learned about automated collection from the initial phase when reviewing recycling options. The phased approach would also give the MNC a chance to improve recycling compliance and reduce contamination levels in collaboration with residents and Waste Connections of Canada (WCC) through current curbside inspections and education efforts.

This Implementation Plan describes how the MNC can best design and implement an automated organics and garbage collection service. The Implementation Plan was developed in collaboration with Jeff Ainge & Associates, who along with Carey McIver & Associates, reviewed the MNC's curbside waste collection program in 2020.

This Implementation Plan is structured as follows:

- Section 2 describes various aspects of the curbside service design (e.g., cart size selection and options to prevent wildlife attractants relating to curbside collection, and Section 2.3 outlines MH's recommended service design.
- Section 3 highlights important transfer considerations.
- Section 4 summarizes options for collection trucks and low carbon (alternative) fuels with a final recommendation in Section 4.4.
- Sections 5 outlines other considerations including climate change, collection routes and load balancing.
- Section 6 presents options for the current collection bins which will become redundant if the MNC transition to a cart-based collection.
- Section 7 provides an overview of walk-up options provided by other Vancouver Island communities when residents are unable to set-out the carts at the curb on their own.

- Section 8 contains a summary of MH's recommendations with the estimated service costs and potential user fee changes. MH collaborated with Robotica Services to assess and identify the MNC's collection fleet needs and truck requirements for the collection of organics and garbage and potential needs for when the recycling collection is transitioned to an automated service.
- Section 9 summarizes the recommended service design and program phasing.
- Section 10 describes a step-by-step workplan for service implementation.

1.1 Current Curbside Collection Service

Residential solid waste collection within the MNC is regulated by Waste Collection Bylaw No. 3466 (2014). The current curbside collection program includes mandatory collection of residential garbage, kitchen organics (food waste), and recyclables to 10,258 residential households (as of June 2022), which includes single-family homes and properties with up to four dwelling units. According to BC census statistics, the municipality has seen a 7.7% population increase between 2016 and 2021 (1.5% per year).

Municipal Collection Services

Municipal staff are responsible for collecting residential garbage bi-weekly and kitchen organics weekly. The collection area is broken into five coloured zones, each of which is split into two (A and B) for the purpose of scheduling the alternating bi-weekly garbage and recycling collection.

The collection containers are manually lifted and emptied into the collection trucks. The municipality has four manual split body trucks and three full time collection staff. Currently there are two days a week when only two trucks are utilized.

The table below shows information about the current truck fleet. The truck 939 is out of service indefinitely and the last truck listed below (the 2022 Freightliner) is a rental truck that was put in place as a replacement. Currently the MNC estimates that each truck needs approximately 2 days per month for service and maintenance. It is becoming more costly to maintain these older model trucks.

Table 1: MNC's Curbside Collection Fleet (2022)

Truck Unit #	Model Year	Chassis	Body	Single/Split	Packer Capacity (Cubic Yard)
938	2006		Labrie	Single	15
939	2012	International 7400	Labrie	30/70 Split	17
942	2014	Freightliner	Labrie Expert 2000	30/70 Split	29
943	2014	Freightliner	Labrie Expert 2000	30/70 Split	29
a	2022	Freightliner	Labrie Expert	60/40 Split	29

All municipal collection trucks bring their loads to the Cowichan Valley Regional District's (CVRD's) Bings Creek Recycling & Waste Management Centre in Duncan for transfer out to processing or disposal facilities. Garbage is exported to a private landfill in the USA because the CVRD does not have a landfill or other means of managing the residual waste. Kitchen organics are transferred to a local composting facility in Cobble Hill.

Recycling Collection

Waste Connections Canada (WCC) is contracted to provide manual curbside collection of recycling material every second week (alternating with the garbage collection weeks) until the end of 2024. The collected recycling is transferred to the designated Recycle BC facility in Nanaimo.

In 2021 WCC was having an issue with providing the collection service, and municipal staff stepped in to provide recycling collection to residents for two months during the Fall. This issue, primarily a result of post-COVID-19 labour shortages, is being experienced in other BC municipalities and is not limited to MNC and their contractor.

1.2 Current Curbside Tonnages

The MNC records monthly collection tonnages for the curbside garbage, kitchen organics, and recyclables. The annual tonnages for the current curbside collection system are provided in the figure below, with September – December of 2022 as projected values.

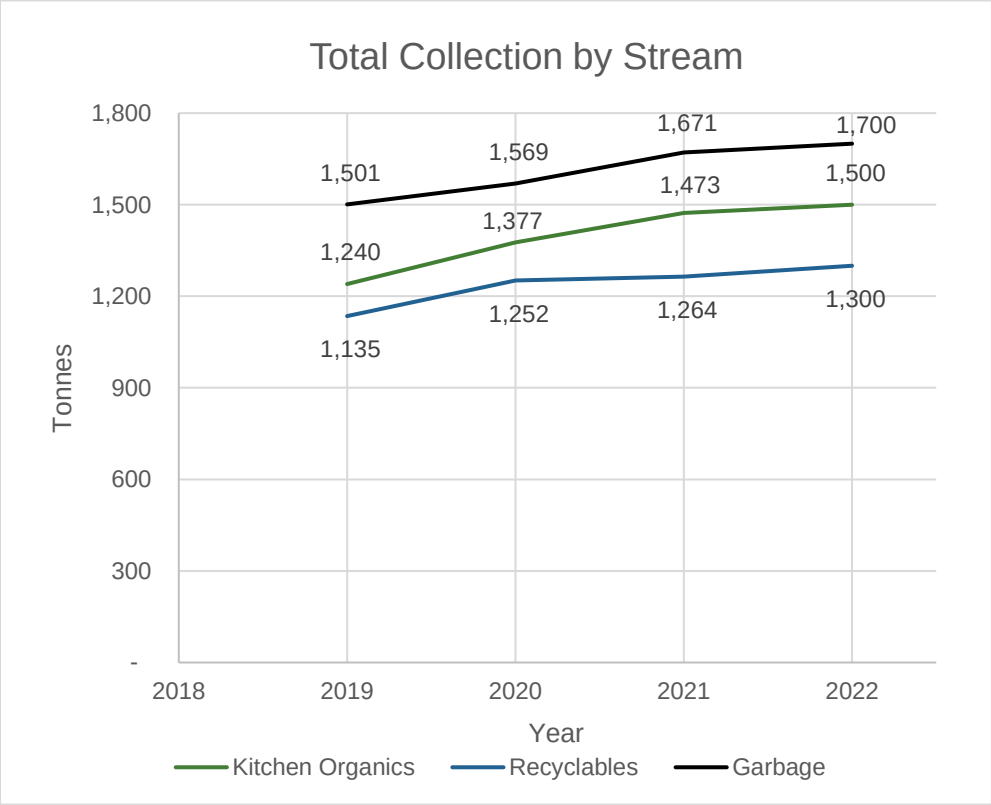

Figure 2: MNC's Curbside Collection Tonnage by Stream

Since 2019, all three collection streams have been increasing in tonnages by approximately a 4-6% each year.

The average MNC household put out 159 kg of garbage for curbside collection, 138 kg of kitchen organics, and 122 kg of recyclables between 2019 and 2022. Figure 3 shows that the household collection rates increased annually from 2019 values and stabilized in 2021.

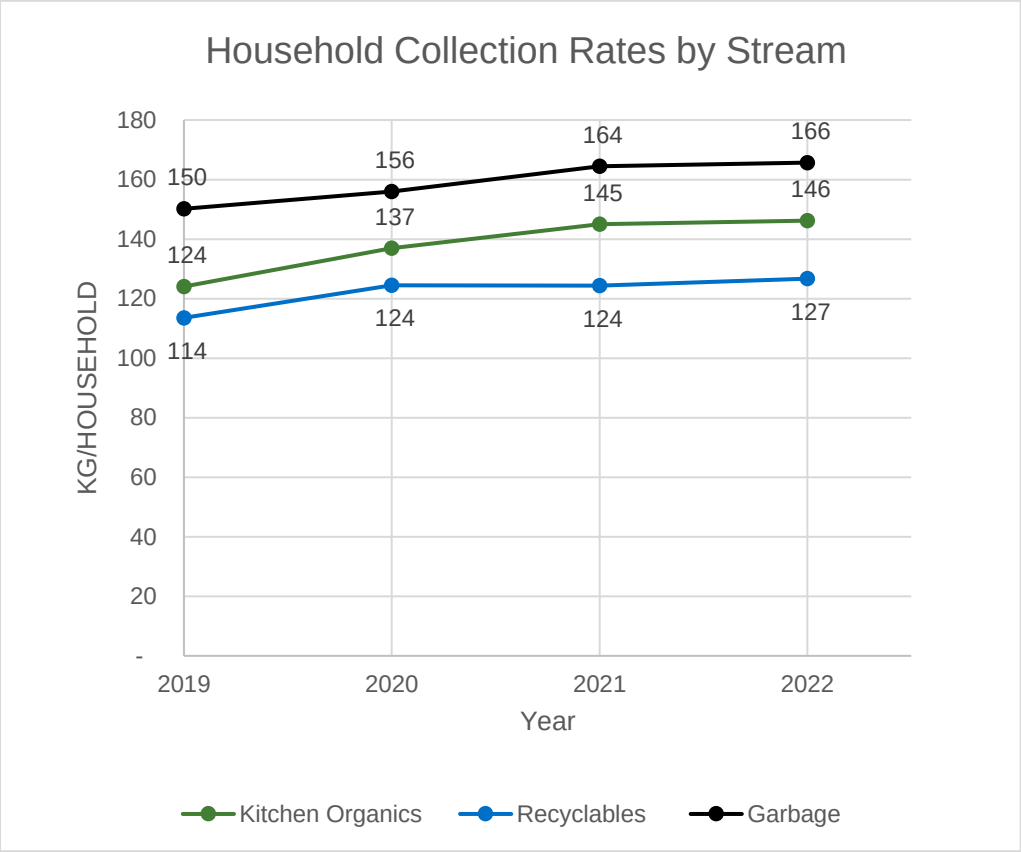

Figure 3: MNC's Household Waste Collection Rate by Stream (kg/ household)

2. CURBSIDE SERVICE DESIGN

The curbside service design primarily focuses on how garbage and organics are best collected from residents using automated trucks. Although recycling would continue to be collected by the WCC, the section provides a proposed service design for all three waste streams (garbage and organics in Phase 1 and recycling collection in Phase 2).

2.1 Cart Sizes

Automated programs have become more common as service providers wish to reduce worker injuries seek collection efficiencies. Automated collections often involved the use of large carts (e.g., 360 L) as the norm. The predominance of large carts was met with skepticism from those in the solid waste industry focussed on diversion, however over time cart sizes and lift

mechanisms changed and can now cater to programs with smaller carts in support of promoting diversion. Automated collection carts range in size and capacity from 80 L to 360 L.

Automated trucks need sufficient space to deploy the lifting arm mechanism which will require residents to be more mindful of where they place carts at the curb on collection day. For example, a three-metre area is typically needed for single-family dwellings. The MNC has not identified any serious accessibility issues for an automated service. However, if a transition to automation is approved, accessibility will need a detailed review in areas with tight/limited space for truck maneuvering, such as cul-de-sacs or in congested parking areas. These are issues that can be overcome with proper planning.

Common Cart Placement Guidance:

- Space carts 1 metre apart
- Place your carts 1-metre apart from each other
- Keep your cart 1 metre away from other barriers like cars, poles and utility boxes
- Ensure there is a 3-metre clearance from overhanging obstacles

APPENDIX A: shows a summary of default organics and garbage cart sizes offered by local governments on Vancouver Island.

2.1.1 Cart Exchange Options

For municipal programs offering cart-size exchanges, swap-out fees are usually applied for residents who request a cart size different from the default being initially provided. The local government would tailor utility bills accordingly so those who have larger carts pay a higher user fee.

Having multiple cart sizes require significant efforts to ensure accurate administration and billing. MH recommends that the MNC keep the size options available to residents relatively limited. A cart size of more than 100/120 L for organics (or garbage) may become too heavy to maneuver, especially for seniors.

When the City of Nanaimo moved to an automated collection program, residents were only provided 120 L organics carts to collect food and yard waste. Additional volumes of yard waste had to be taken to the transfer station. Now, after four years of operation the City of Nanaimo better understands the organics volumes collected and capacity of its collection trucks, it is starting to allow residents to upgrade to two 120 L organics carts[1].

Both the City of Port Alberni and District of Saanich required their residents to select a cart size before the program launch without making any sizes the default. These communities offer cart options for both organics and garbage, and the annual user fees reflect the selected cart sizes.

[1] Based on personal communication with Taaj Daliran, City of Nanaimo, Sept 1, 2022.

2.1.2 Cart Costs

MH approached several Canadian cart suppliers who offer carts suitable for MNC's automated collection. Table 2 shows a summary of cart cost estimates. Pictures of carts from the three suppliers are shown in Figure 4, Figure 5 and Figure 6.

Table 2: Cart Costs Estimates (2022) for Four Cart Sizes

Supplier	80 L	100 L	120 L	240 L
IPL Plastics Inc. by Supplier Rollins Machinery	$45	$45 - $50	$50 - $55	$87
Rehrig	-	$49 - $53	$49 - $53	$61 - $64
Orbis by Supplier Ecotainer Sales Inc.	$52	-	-	-

Rehrig and Rollins Machinery also included the estimated freight, assembly, and distribution costs. These are in addition to the cart supply and are as follows (as of September 2022):

- Freight costs to deliver the carts to a location for assembly ranges from $6 to $10 per cart.
- Costs relating to the assembly of lids and wheels, and cart distribution ranges from $6 to $7 per cart. This includes the assembly of the carts and the association of the carts serial number to a particular household. Discounts can be available when carts for multiple streams are delivered to a single address.

Two of the suppliers estimated that an order of approximately 20,000 carts would typically take between 4 to 17 weeks to deliver from the time of order placement.

The Orbis 80 L cart listed in the table above is not designed for the demands of a fully automated collection program. It is better suited for a semi-automated program (an ANSI Type B system utilising the grab bar on the front of the cart), whereby the cart is positioned onto a cart tipper by collection personnel. The IPL 80 L cart is more versatile in that it is designed for semi-automated Type B American and Type C European grips (using the grab bar or lifting via the protruding cart lip), and Type G fully automated collection (with a mechanised arm with grab claw extending from the truck body to grasp the cart)[2].

[2] Based on personal communication with Sandra Seymour, Sales & Customer Service representative, Rollins Machinery Ltd., September 29, 2022.

Figure 4: IPL Mastercart (240 L)

Figure 5: Rehrig EnviroGuard Roll Out Cart (132 L)

Figure 6: Orbis Environmental Cart (80 L)

2.1.3 Organics Carts

Best practice for a cart-based program collecting only food waste in the organics stream is for a small cart (80, 100, or 120 L); however, program managers need to be aware that even these smaller carts may have too much capacity for food-waste-only programs.

Providing a curbside collection for food and yard waste (commingled organics) would provide a service with a higher level of convenience for North Cowichan residents. Yard waste must be self-hauled to CVRD facilities (Bings Creek and Peerless Road facilities). Allowing commingled food and yard waste can also help to reduce the “ick” factor associated with a separate food waste collection (odour, vectors).

2.1.4 Garbage Carts

Some MNC council members expressed concern that automated collection would involve much larger cart sizes than the current manual collection (77 L garbage bins collected bi-weekly). With larger carts and more disposal capacity, residents may be less incentivized to reduce waste generation. MH has reviewed the options of providing 80 L, 100 L and 120 L garbage carts.

The smallest size (80 L) is a less common size, but there are municipalities on Vancouver Island and within Metro Vancouver who are providing this cart size as a size option to residents. There are fewer cart suppliers providing the 80 L cart size and this size is better suited to a semi-automated collection model, which requires the operator to exit the cab at each stop and position the cart for the lift arm to enable tipping. The Town of View Royal currently has this type of semi-automated collection program.

The City of Port Alberni offers a 120 L cart with a false bottom inserted which results in a capacity of 80 L. This solution eliminates the challenges involved with the automated lifting of a smaller size cart. Residents who have a cart with false bottom could abuse the system and remove the false bottom to have an additional 40 L of capacity for free when only paying for 80L. This is not currently a common issue to our knowledge.

In the nearby municipalities, 120 L is the default size for the City of Nanaimo (CoN) and 100 L is the default size for the Regional District of Nanaimo. Both these programs offer residents the ability to request an upsize to larger carts, which in turn increases the resident's utility fee. The CoN has noticed more requests for garbage cart upgrades as more dwellings have a rent-out suites and generate more waste overall. Currently, approximately 17% of CoN's households have upgraded to a larger garbage cart.

The MNC residents can currently purchase garbage tags if they want to dispose of more garbage than the 77 L collected every-other week. A household can place up to two extra garbage cans using a $3 tag per container each collection period. Approximately 12,000 garbage tags were sold to residents in in 2021, which is equivalent to less than one tag per household per year. Residents appear to be managing with the relatively current disposal capacity by either buying tags of simply self-hauling waste to the transfer station.

2.1.5 Recycling Carts

In BC, it is common to collect recycling using 240 L carts (for an automated collection) at a bi-weekly basis (every-other-week). The figure below shows the default cart sizes provided by the City of Nanaimo, including a 240 L recycling cart.

Figure 7: Default Cart Sizes Used by City of Nanaimo (120 L for Organics and Garbage and 240 L for Recycling)

A change of recycling collection method to one using carts will involve an initial capital outlay for cart purchases and it will result in a lower financial incentive paid by Recycle BC. Data provided by Recycle BC shows that cart-based single stream recycling collection programs have the highest contamination levels of any collection system. To account for the extra effort required in

sorting the cart-based recycling prior to sending the materials to market, Recycle BC pays a lower incentive for cart-based collection programs.

2.2 Wildlife Reports and Service Design to Prevent Wildlife Conflicts

MH reviewed WildSafeBC's published data on wildlife reports to BC Conservation Officer Service. There were approximately 200 wildlife reports in the Central/North Cowichan in 2021. The number of wildlife reports were lower in the Central/North Cowichan compared to last five years (the average 2016 – 2020 was 264 reports). In the entire Cowichan Valley area, garbage was the most reported black bear attractant in 80 calls in 2021. However, no specific reports of bear issues relating to waste management were reported in the Municipality of North Cowichan.

In 2021 the WildSafeBC Community Coordinator tagged 262 bins in the MNC when residents had set-out garbage bins at the curb the day before collection. WildSafeBC found that 92% of the residences whose bins were tagged during the initial survey were not found on the curb ahead of collection day again during the second survey. Municipal bylaws regarding timings of curbside placement of waste with enforcement would prove to be an excellent way of addressing the issue[3].

2.2.1 Bylaw Considerations

The MNC's Waste Collection Bylaw 3466 currently only states that every owner or occupier of a dwelling must leave out for collection all garbage, recyclables, and kitchen organics containers, before 8:00 a.m. on days designated for collection. The bylaw can be amended to include requirements for cart storage and collection-day practices.

Storage Requirements: The Bylaw can specify that the organics and garbage carts must be always kept in a bearproof location, except during the day of pick-up. This means that residents need to keep the waste materials inside, in the basement, or in a bearproof outbuilding.

Collection-Day Practices: Residents can be required to set out organics at the curb at a specific time on curbside pick-up day in areas where wildlife interactions are a known issue.

High rates of user compliance with storage and collection day practices is required for significant reduction in human-bear conflicts. The MNC Waste Collection bylaw can be amended to set regulations for storage and collection-day practices and can enable a bylaw officer to enforce requirements if unacceptable levels of wildlife interaction persist or escalates.

2.2.2 Bear-Resistant Carts

Local BC governments have provided bear-resistant residential collection containers for garbage and organic waste in some areas of BC where bears are common. Bear-resistant carts

[3] WildSafeBC Annual Report 2021 - Cowichan Valley, prepared by: Amanda Crowston, WildSafeBC Cowichan Valley Coordinator

can be broadly split into two categories: off-the-shelf bear-resistant cart systems and retrofitted lock systems.

Only a few cart-systems are tested and certified as bear-resistant at North America's only testing centre (located in Montana, US). Grizzly bears (not black bears) are typically used for cart testing. The District of Squamish has tested some of the "bear-resistant" carts and found that black bears can open certified carts that have been tested using grizzly bears[4].

The use of certified bear-resistant containers is recommended for communities with significant wildlife issues, but these are very costly. Rollins Machinery, the supplier of Shaeffer and IPL carts, estimates bear-resistant cart systems at approximately $180-$210 per unit. MH has experience with these carts and has seen costs as high as $300 per cart.

Retrofitted locks help prevent wildlife from opening the container lid but does not reinforce or protect the collection container itself. This is the most cost-effective option to make the cart more resistant to bears. The pictures below show one common lock system that costs approximately $50 to $100 per container, including labour and installation.

The CVRD offers residents the option to pay an extra on-time fee of $60 per household to have the garbage totes retrofitted to be bear-resistant, however the regional district has had very limited uptake so far[5].

For carts with retrofitted locks, municipalities require residents to unlock their cart on the collection day. Having the collection crew manually unlock each cart during pick-up would be too time consuming.


Figure 8: Carts Retrofitted with Hardware to Become More Bear-Resistant

Fitting all garbage and organics carts with bear resistant mechanisms is expensive and does not appear to be justifiable as the MNC has relatively limited wildlife issues. The MNC is best to

[4] Based on personal communication with Shannon White, District of Sqaumish, September 15, 2022.

[5] Based on personal communication with Amanda Kletchko, Environmental Technologist, Cowichan Valley Regional District, August 16, 2022.

provide a retrofitting option to residents at their cost or consider providing free cart retrofitting in areas with prevalent bear issues.

Smaller cart sizes may not be suitable to be outfitted with bear resistant mechanisms if the plastic lid is not substantial (robust) enough. The MNC will need to confirm with the supplier that the selected cart size(s) are able to be retrofitted with bear-resistant hardware and how the retrofitting can influence the lead-time for cart delivery.

2.3 Recommended Automated Curbside Service

2.3.1 Phase 1 Organics and Garbage Collection

The figure below shows the proposed curbside service design for the MNC during Phase 1 of implementation. The cart sizes are compatible with a fully automated collection and will provide serviced residents with an improved organics service as yard waste will be accepted together (commingled) with food waste. There would be no change to how recycling is collected during the Phase 1 of collection automation.

There would be no change to the collection frequency for all three streams. The current collection frequency with a weekly organics and a bi-weekly garbage and recycling collection (alternating every-other-week) is considered best practice in BC.

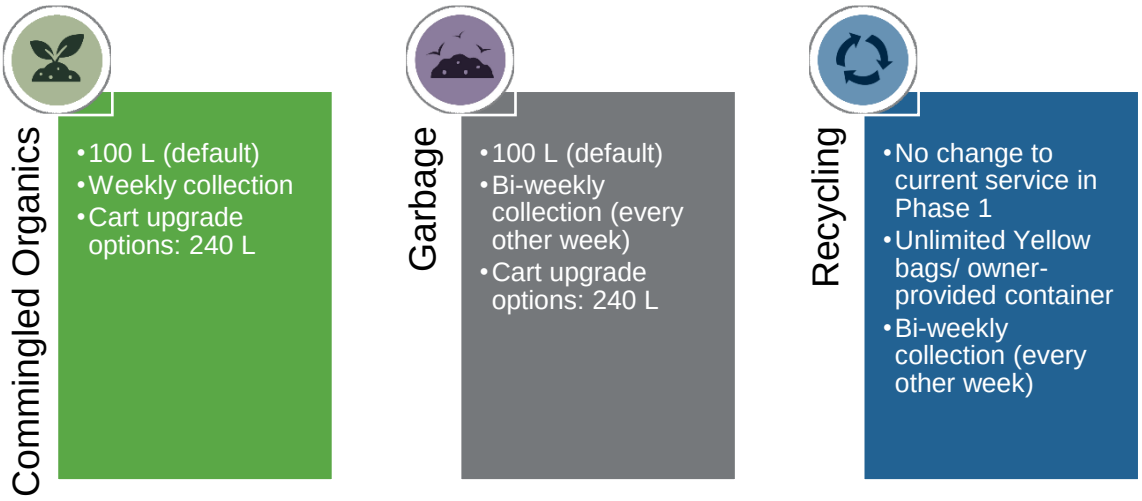

Figure 9: Service Design Overview – Phase 1

The figure above shows the default sizes for a single family (100 L carts for organics and garbage). The recommended default sizes for a duplex are 240 L for both streams.

The 100 L and 240 L cart sizes are relatively common sizes for which MNC can obtain competitive pricing. These cart sizes are currently used by some Vancouver Island

communities, such as the RDN, which provides 100 L as the default cart size for organics and garbage.

The 100 L organics carts will provide sufficient capacity for food and yard waste for most households, based on continuing with weekly collection. Residents may have quantities of yard waste that exceed the weekly cart capacity; however, residents can typically store yard waste until the next collection date as this material is not generally unpleasant to accumulate in small amounts and does not attract wildlife. Residents can also self-haul excess materials to a transfer station.

The disposal capacity for garbage will increase from the current capacity of 77 L to 100 L (a 30% increase). The MNC is likely to see an initial increase in garbage volumes following the transition to an automated system. The City of Nanaimo recorded a 17% increase in curbside garbage when residents moved from 77 L manual garbage cans to 120 L garbage carts. The MNC is likely to see increases slightly lower than what CoN recorded when a 100 L cart size is used. Residents may take advantage of the larger container capacity to dispose of more garbage when the new carts are first put into use. Education and enforcement to maximise organics and recycling diversion will continue to be an important tool for the MNC.

The MNC may want to provide cart upsize options for households with larger families or for those who would are currently making use of the extra bag tag system with the manual collection. A cart exchange fee and increased annual user fee can be implemented to reflect the user-pay system where those who generate more waste pay more to dispose of it. Examples of fees charged in nearby collection programs include the RDN, which charges a $50 cart exchange fee to upsize from 100 L garbage cart to 240 L, and the annual user fee increases by $80 to reflect the higher volume of waste being disposed. The CoN charges $60 for cart exchanges and increases the annual user fee by $100 for upsizing to a 240 L garbage cart. The MNC is best to provide a retrofitting option to residents at their cost or consider providing free cart retrofitting in areas with prevalent bear issues.

Section 8.2 presents recommended user fees and highlights the need to have the utility fee broken down into the three collection streams to easily identify the cost increase for an upsized cart.

2.3.2 Phase 2 Recycling Collection

MH has assumed that recycling would not transition to an automated collection until Phase 2 of the implementation plan. Until then, the MNC can work closely with its current contractor to reduce contamination and review the most suitable collection option and delivery model (e.g., move to an in-house recycling collection).

The MNC can review the option based on operational experience from the automated collection of organics and garbage. Phasing the transition to automation allows the MNC to set aside finances for additional capital outlay involved in additional trucks and carts needed for the recycling.

2.4 Predicted Organics, Garbage and Recycling Tonnages When Using Carts

Projected organics and garbage tonnages were estimated using excel-based forecasting that can predict future values using an exponential smoothing algorithm. This function enables the continuation of historical trends to the specified target date. Forecast values were calculated using the same function but capture the 95% confidence interval above and below the projected value.

The figure below shows a projection of the anticipated collection tonnages for garbage and commingled organics for the first years after program implementation. The solid lines are the anticipated annual tonnages with the dashed lines showing a high and low projection spread.

While the solid line projection is based on historical population growth and tonnages of collected waste streams, the high and low projections (dashed lines) account for potential changes in annual collection tonnages from changing consumption habits, waste composition, demographics (e.g., number of people living and working in each house).

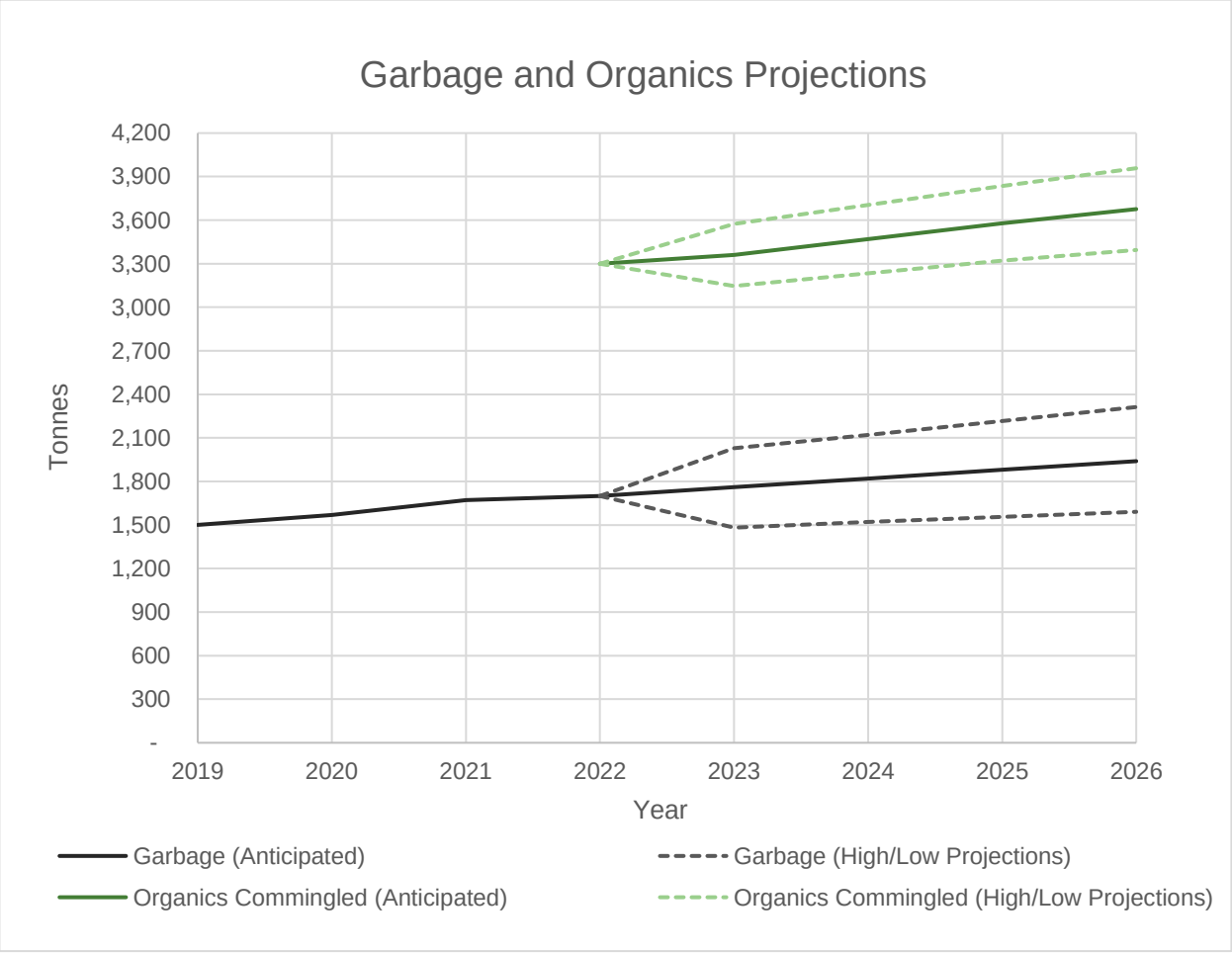

Figure 10: Anticipated Collection Tonnages for Garbage and Commingled Organics Following Program Launch (Phase 1)

The collection of commingled food and yard waste would result in collecting larger quantities of materials compared to the current food waste collection. Over the last three years, the MNC has collected 138 kg of kitchen organics per household per year on average (refer to Section 1.2 for historic collection rates). A typical commingled curbside organics collection rate (of kitchen organics and yard waste) is approximately 300 kg per household per year when 100 L carts are provided as default. The collection rates can be as high as 500 kg per household if larger cart sizes (e.g., 240 L or 360 L) are provided. MH assumed that once the MNC begin the commingled food and yard waste collection, the collection rate will steadily increase from 327 kg/ household to 339 kg/hh within four years of implementation.

The total annual collection tonnages are expected to increase 3-4% year-over-year for garbage and 2 - 3% for commingled organics mainly driven by population growth.

Even with three 33 cubic yard capacity collection trucks, there will be spare capacity to allow residents to upgrade to larger organics and/ or garbage carts. For example, the MNC will have 4,488 tonnes of annual truck capacity to manage organics. However, based on a per-capita rate of 339 kg/hh, the MNC is likely to only collect 3,630 tonnes after four years of implementation once collection rates have stabilized. Between the three trucks there is approximately 20% of spare capacity.

If the recycling collection transitions to an automated system (in Phase 2), MH estimates that volumes will increase 3% annually over 4 years (refer to the figure below). This projection will need to be revisited once Phase 1 is implemented and MNC staff can identify overall trends in per-household collection rates and what recyclables are still being sent to landfill as part of the garbage stream.

The collection of commingled food and yard waste would result in collecting larger quantities of materials compared to the current food waste collection and this would result in higher tipping (processing) fees and higher user fees for residents. Section 8 presents a summary of the main factors influencing the service cost.

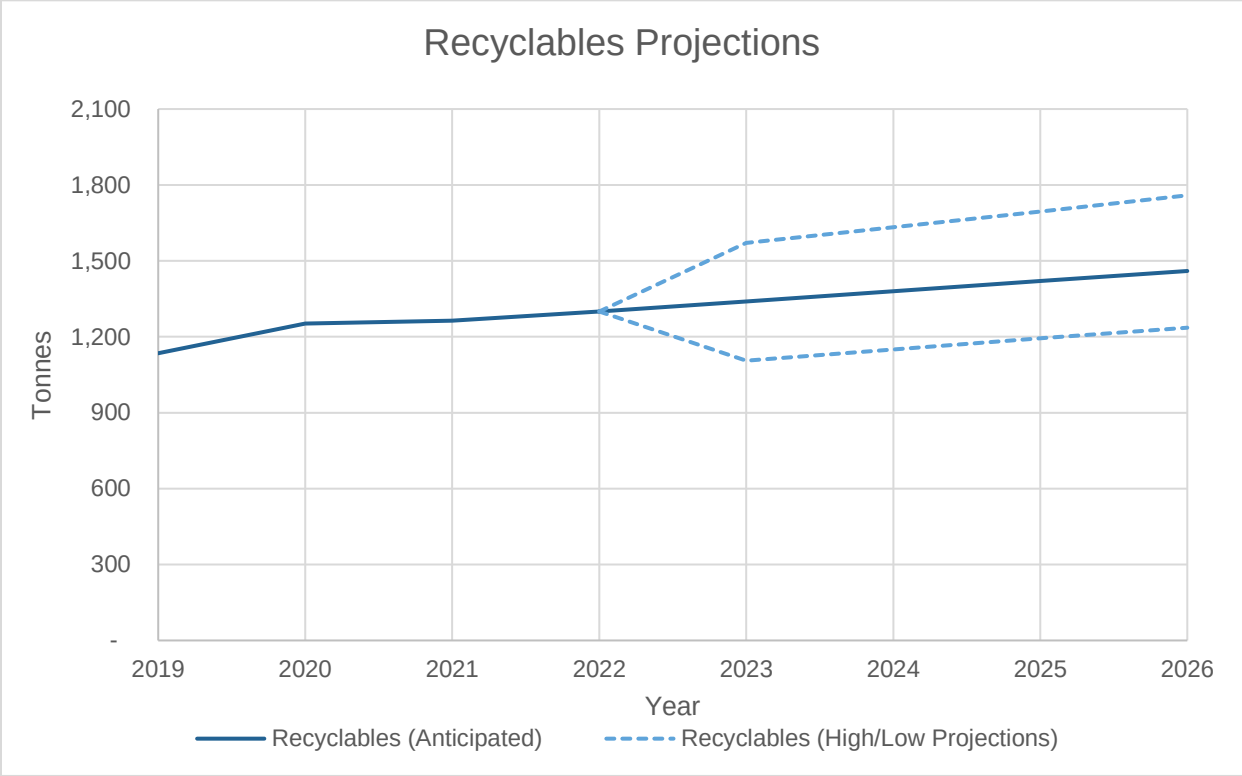

Figure 11: Anticipated Collection Tonnages for Recycling Following Program Launch (Phase 2)

3. TRANSFER CONSIDERATIONS

All curbside collected organics and garbage are taken by MNC to CVRD's Bings Creek Recycling Centre. This is an important transfer location since it is too far for the curbside trucks to direct-haul to the nearest organics processing facility in Cobble Hill. The CVRD charges tipping fees to cover transfer and processing costs it pays to the processing facility (Fisher Road Recycling in Cobble Hill). The contract is only valid until the end of 2023.

MH assisted the CVRD in assessing the organics transfer capacity of the Bings Creek Recycling Centre in 2022. The study included the projection (to 2040) of estimated organic waste quantities collected from member municipalities and the electoral areas. MH assumed in this study that the MNC will implement a commingled food and yard waste collection in 2024.

MH determined that the CVRD facility has some capacity to accept and manage more organics however there currently is not sufficient capacity to accept commingled food and yard waste from a curbside collection program at this time. The CVRD has identified the need for a long-term increase in organics transfer capacity and has begun to develop plans involving a second covered organics receiving and shipping area to increase the transfer capacity at the facility. The CVRD will find out about access to provincial funding for the facility upgrades by mid-2023. Transfer station upgrades are unlikely to begin until 2024/2025 at the earliest. The Bings Creek facility has limited capacity to accept commingled organics food and yard waste without the

upgrade of the organics receiving and shipping area. The CVRD will need to develop and submit a plan for supplemental funding if the provincial funding application is unsuccessful.

The MNC will need to correspond with the CVRD to confirm its future willingness to accept commingled organics. Tipping fees will need to be negotiated based on the CVRD's management costs associated with the transfer station and the tipping fees set by a composting facility contracted to process the organics from the CVRD's facility.

It is MH's understanding that the CVRD has not yet decided if residents who self-haul small quantities of food or yard waste will be charged a tipping fee at the CVRD's facilities in the future.

4. COLLECTION TRUCK OPTIONS

The MNC has been interested in replacing its manual trucks with automated units following their 2020 curbside collection review. The MNC has asked MH to revisit truck requirements and to confirm 2023 costs.

Truck manufacturing and the availability of components have been impacted by the Covid-19 pandemic and there are still significant supply chain issues. Demand is currently outstripping supply for parts and completed trucks. The truck manufacturing is experiencing staffing shortages which stretch build-out times as far out as 18 months, and inflationary pressures and freight costs are resulting in price increases. In addition, the international currency fluctuations also impact orders placed by Canadian customers.

MH obtained updated truck pricing from Rollins Machinery to update previous cost estimates presented in the 2020 curbside collection review. These prices can only be used for high-level budgeting purposes; detailed prices and delivery times can only be confirmed when a truck order is placed. Many municipal truck fleets are sourced through Rollins, including the current MNC trucks and their pricing is considered representative for BC.

The packer configuration for the automated trucks differs from the manual load trucks, specifically in the split compartment ratios. A split body allows for collecting and keeping two waste streams separate: each in their own compartment. In the past manual trucks have typically had a 70/30 split, while the automated trucks have been split 60/40 with a larger hopper to accommodate the larger carts being tipped. The 60/40 split bodies are now becoming more common than a 70/30 split body.

4.1 Automated Trucks

MH, with support by Robotica Services, undertook an assessment of the MNC's truck requirements. It considered the predicted waste stream volumes, the desired collection frequencies, and available collection time in each collection zone. The assessment helped to identify that a 60/40 split body automated truck with 33 cubic yard capacity is best suited.

The automated trucks with 31 or 33 cubic yard capacities have the same chassis length and both are deemed suitable for MNC's collection areas.

The MNC is advised to consider the following specifications when procuring automated trucks:

- Automated side load split body on a chassis of the client's preference (such as Mack, Peterbilt, Autocar, Freightliner, etc.)
- 60/40 split body
- Straight frame, Labrie "Automizer" body type
- Equipped with automated lift arm and grabber mechanism
- Tandem axle, 33 cubic yard capacity

4.1.1 Truck Build and Delivery

The timing of a truck order delivery to a client in B.C. will depend upon the selected chassis manufacturer. MH asked Rollins Machinery for some estimated scenarios based on their recent experience.

The following scenario assumes a truck order through Rollins Machinery for both chassis and a Labrie body:

- A chassis ordered in September 2022 from Mack or Peterbilt will be off the assembly line and ready for the body install in the 2nd or 3rd quarter (Q2 or Q3) of 2023. Autocar estimates a chassis would be ready in the 4th quarter (Q4) of 2023.
- After the chassis is built (typically in the USA) it must be delivered to Labrie in Quebec for the selected body to be installed.
- Fabricating and installing the Labrie body, along with any associated lift mechanisms, is estimated at a minimum of 90 days.
- Transport of the finished truck to B.C., provincial inspection, and certifications, PDI (pre-delivery inspection), local add-ons such as auto lube, and any decaling or body wrapping is estimated at 30-60 days.

Based on the above steps, Rollins Machinery estimated that a Mack or Peterbilt diesel cabover chassis ordered in September 2022, which was specified to have a Labrie Automizer body installed, was unlikely to be delivered to a B.C. customer before the first quarter (Q1) of 2024. This is a total minimum lead time of over 1.5 years. Both the City of Nanaimo and the Cowichan Valley Regional District have recently experienced lead times over two years (28 months of lead time for the City of Nanaimo).

4.2 Dual Purpose Trucks (Manual and Automated Lifting)

The MNC may want to replace one or more of the existing aging manual trucks with new trucks capable of servicing either as manual or automated collections.

Rollins Machinery has presented the option to order a side load truck with an automated lift arm. The Labrie "Expert Helping Hand" combination model is equipped with the "Helping Hand" lift

arm (refer to the figures below). This type of truck has a stand-up cab and drop frame suitable for both manual and automated collection. The estimated cost is $550,000 for this dual purpose truck.

Figure 12: Labrie "Expert Helping Hand" with Stand-Up Cab and Drop Frame Suitable for Manual and Automated Collection

Figure 13: Labrie "Expert Helping Hand" Lift Arm for Cart Tipping

MH is aware that similar dual purpose (combination) trucks are used by the City of Powell River and that the collection contractor servicing the City of Castlegar has recently ordered such truck. The Castlegar curbside program currently collects garbage in 240 L carts, while the recycling is blue box manual lift.

If the MNC were to purchase this type of automated ready truck to replace its aging manual lift fleet in advance of rolling out cart collection, the truck body can be utilized as a manual collection truck until such time as the MNC makes the transition to fully automated. Rollins Machinery advises that this has been done as part of other curbside collection programs in the province.

4.2.1 Back Up (Spare) Trucks

A back-up (spare) truck is recommended for the MNC to ensure service flexibility and coverage for events such as breakdowns, weather interruptions, or seasonal operational challenges. This can be achieved by either retrofitting one of the existing most recent municipal trucks with the capability to lift and tip collection carts, or by purchasing a new or used single or split packer truck.

Used collection vehicles may be available from large rental truck providers as they sell their trucks after a few year's of renting/leasing. However, the MNC has investigated this option and understands that the demand is significantly higher for these trucks than the supply in the current market.

Due to the age of MNC's truck fleet, we recommend that the MNC consider the purchase of an additional new vehicle as a back-up truck. This additional vehicle will also be available with spare capacity if the MNC decide to collect recycling in Phase 2 of the implementation.

4.3 Low Carbon Collection Fleet

Conventional diesel-powered collection trucks are needed to meet MNCs immediate needs in the near-term. However, in the longer term, the MNC has committed to a transition to an electric fleet by 2030 as part of the recent Climate Action and Energy Plan update (developed in January 2022). In addition to electric collection vehicles, there are other low-carbon fuel options that can reduce emissions from the curbside collection vehicles. This section presents a summary of some of common and emerging alternative fuels. Additional climate change considerations are discussed further in Section 5.1.

4.3.1 Electric

There are increasing numbers of local governments and private sector parties who are making plans to transition to electric curbside collection trucks. However, curbside collection trucks demand more from electrification than typical passenger cars, and energy is needed not only for driving, but also to power the transportation of loads and the hydraulic functions, which can be significant throughout the day using a fully automated truck.

These types of trucks typically suit electrification as they often travel at low speed with frequent stops/starts, which provide opportunities for regenerative breaking. Regenerative braking is unique to electric vehicles and enables the vehicle's kinetic energy to be converted back to electrical energy during braking (deceleration or downhill running). Electric curbside trucks bring benefits beyond just emissions reductions that may not be obvious at first. For example, they reduce noise and pollution, limit oil/fuel spills and provide a better operator experience that may attract more people to the occupation.

There are two types of electrification to a curbside truck for the body or the chassis. The body of the truck can be:

- Hydraulic, when the truck uses hydraulic fluid through an electric power take-off (PTO) to control all operations including cart dumping and emptying at the end of the day.
- Fully electric, when the functions of the body are completed with electric motors rather than hydraulic fluid. This only applies to a fully automated side load collection truck body.

The truck's chassis will use different technology depending on truck size. These are typically independent of the collection method (e.g., automated in this case), or body technology and most can be mixed and matched. Truck chassis can use gasoline, diesel, hybrid (typically diesel/electric, compressed natural gas (or Renewable Natural Gas, RNG), or electric technology.

Fully electric trucks are not yet common amongst local governments across BC. GFL is contracted by the District of Squamish to provide curbside collection services and started using a fully electric truck for automated curbside collection in the fall of 2022 (Figure 14).

Figure 14: GFL's Fully Electric Curbside Collection Vehicle Displayed at the Coast Waste Management Conference, October 2022

During a session on electric trucks at the Coast Waste Management Conference (CWMA conference on October 26, 2022), the speakers emphasized some of the important aspects that determine the suitability for electrification[6]. These included:

[6] Notes taken by Veronica Bartlett, Morrison Hershfield, based on presentations from Steven Wiebe, Innotech Fleet Strategies, and Wayne McDonald, Mack Trucks.

Access to Charging infrastructure: The proximity to the power grid and to Level 2 or 3 charging stations will be important aspects. The MNC may be able to partner with the local power provider to make any necessary utility upgrades to charge the fleet.

Route Characteristics: Electric vehicles are better suited flat topography with shorter transportation distances between pick-ups and to drop-off locations.

Climate and Vehicle Performance: The battery performance is reduced at sub-zero temperatures and the charging speed become slower. At 0°C, the battery performs at 80% capacity and lower temperatures (-10°C, to -20°C) can result in 40-60% battery capacity unless there is a battery/ cabin heater. Low temperatures can be acceptable if the collection route is dense with frequent stops/starts.

Economics: Maintenance costs are in theory 40% - 60% lower than the costs expected for traditional diesel trucks, but there is only limited operational data to support this claim. Truck suppliers will have more confidence in ongoing maintenance costs as electric trucks become more common. The economics depends on incentives available (federal, provincial, or local).

The CWMA speakers, who represented a truck manufacturer and a large waste hauler, agreed that electric curbside collection trucks are still new in North America and there is little data to show on-going operational costs and collection truck performance in different climates. The truck manufacturers are starting to provide maintenance packages and extended warranties on the electric battery to reduce the unknown operational costs and ensure that electric trucks have the same clearance and durability as conventional diesel-trucks.

For a local government like the MNC with a small fleet of collection truck, MH recommends that electrification can be revisited as an option when more trucks are being purchased in Phase 2 if the recycling collection is brought in-house and automated, or as the MNC is purchasing replacement trucks. Meanwhile, the MNC is encouraged to review the suitability of electric trucks by using software developed by truck suppliers, such as Mack Trucks, which offer the Range Calculator for Electric Vehicles to help customers simulate real-world collection routes[7].

An automated body mounted onto an Electric cabover chassis truck would increase the unit cost by almost double to around $900,000[8]. Rebate and incentives can help to reduce the costs of electrifying the collection vehicles (e.g., Clean BC Go Electric Specialty-Use Vehicle Incentive or other funding, refer to Section 8.1.1 for more information).

The MNC's suitability to meet the criteria to access these funds will need to be determined in detail once the transition to an automated collection is approved by Council. The lead times for electric trucks may be shorter than conventional diesel-trucks according to the truck manufacturer, Mack Trucks, at the CWMA session.

[7] More information available via URL: https://www.macktrucks.com/mack-news/2022/mack-range-calculator-for-electric-vehicles-helps-customers-plan-routes-for-electrification/

[8] Based on personal communication with Jeff Rollins, Rollins Machinery, August 23, 2022.

4.3.2 Renewable Natural Gas

RNG can also be used as an alternative fuel to reduce GHG emissions. The MNC's CAEP includes a commitment to work with Fortis BC to increase natural gas line RNG content. RNG is currently not an option for the MNC vehicles as there is no such fueling station within proximity of the North Cowichan works yard in Duncan. Fortis BC has two fueling stations on Vancouver Island, in Nanaimo and in Langford.

FortisBC requires a significant load demand to justify an additional fueling station in the Cowichan area, which typically cost of up to $2 million in capital[9]. Fortis BC has had communication about future fueling needs in the Cowichan and nearby areas with BC Transit, Village of Cumberland, City of Campbell River, City of Courtenay, as well as Waste Management. The capital cost of a fueling station gets incorporated into the fuel cost to the customer. Therefore, a collective initiative to secure a fueling station is suited for smaller jurisdictions where each individual load demand is not sufficient.

The site requirements for a fueling station are approximately 1,400 m^2 (15000 ft^2). A site needs to be accessible so that larger fleet (even transport trucks) can use the station. The site can either be owned by MNC (or other parties) or by Fortis BC. Fortis BC can build, own, and operate the station, however, for it to be cost effective Fortis BC requires an anchor tenant that requires significant load, e.g., RNG for a vehicle fleet (in flusher, sweeper, sewer trucks, also dump trucks and any transport fleet).

Fortis BC may be able to provide incentives towards the incremental cost of adopting RNG over diesel. Fortis BC incentives will be finalized in early 2023. In addition, Fortis BC funding can be combined with other funding sources, such as the Green Freight Assessment Program from Natural Resources Canada (NRCan) towards incremental cost of RNG fleet, and Clean BC's Heavy-duty Vehicle Efficiency Program with per-vehicle incentives. A collection truck using RNG currently adds approximately $70,000 to the truck cost[10].

Renewable gas rates are currently under review by Fortis BC. The MNC may be able to earn carbon credits for using RNG, which can make RNG more financially viable. MH recommends that the MNC corresponds with Fortis BC to understand the steps (and costs) involved in pursuing RNG. A detailed cost assessment is needed to confirm cost implications for the MNC if there is an interest in pursuing RNG.

4.3.3 Renewable Diesel

Renewable diesel is a biomass-based diesel fuel similar to biodiesel, but with important differences. Renewable diesel is a hydrocarbon that is chemically equivalent to petroleum diesel and can be used as a drop-in biofuel and can be transported in petroleum pipelines and sold at retail stations with or without blending with petroleum diesel. Renewable diesel production uses

[9] Based on personal communication with Della Bond, Sales Manager/C-Tech, Low Carbon Transportation & LNG Business Growth, FortisBC, September 20, 2022.
[10] Based on personal communication with Jeff Rollins, Rollins Machinery, August 23, 2022.

a hydrogenation process rather than the esterification process used to produce biodiesel. Because renewable diesel is a drop-in fuel, it meets ASTM D975 specification for petroleum diesel and can be seamlessly blended, transported, and even co-processed with petroleum diesel[11].

The fuel is not being produced in BC, or even Canada at this time, however there are already opportunities to source this renewable fuel. Renewable diesel results in GHG emission reductions and can be mixed and used as a blend with conventional fossil-based diesel[12]. The MNC may want to enquire with its fuel providers about renewable diesel availability and pricing to see if this is an option to help cut GHG emissions whilst operating a fleet of diesel-collection trucks.

4.4 Collection Trucks Recommendation

The MNC needs to replace the current aging trucks as soon as possible. The current trucks are becoming increasingly more costly to maintain due to their age. MH is aware that the decision to purchase replacement trucks is urgently required regardless of the decision to proceed with the switch to cart-based automated curbside collection.

MH is recommending that the MNC order either four dual purpose trucks that have manual and automated cart lifting capabilities or purchase four new fully automated side load trucks. The truck type will depend on the risk level the MNC is willing to take regarding the timing of curbside automation.

The dual-purpose truck such as the Labrie Expert Helping Hand collection truck with 33 cubic yard capacity with 60/40 split body drop frame has side load lift arms and a stand-up cab on the chassis of MNC's choice. This would enable the MNC to place a truck order as soon as possible and provide a maintenance timeline for the current trucks. The new trucks are likely to arrive for use in 2024/2025. The new combination trucks can serve as manual collection trucks and for automated cart collection as and when required. This option allows the MNC to await developments with the CVRD transfer station upgrades and the CVRD's confirmation on whether commingled organics will be accepted at the Bings Creek transfer station in the future and at what cost.

The alternative is for the MNC to purchase four fully automated curbside collection trucks in 2023 with 60/40 split body and a capacity of 33 cubic yard. There is a risk in committing to cart-based system in advance of the CVRD confirming the transfer capabilities for commingled food and yard waste. The MNC could end up collecting food-waste-only in 100 L carts until the CVRD accepts commingled organics, which would provide too much capacity, or collecting commingled organics that must be hauled directly by the collection truck to a processing facility resulting in larger hauling distances, less collection time, and the risk of requiring additional

[11] From U.S. Energy Information Administration via URL: https://www.eia.gov/energyexplained/biofuels/biodiesel-rd-other-basics.php
[12] Based on personal communication with Steven Wiebe, Innotech Fleet Strategies, November 16, 2022.

trucks. There are Vancouver Island communities however, (e.g., City of Victoria, Town of View Royal and RDN) which collect only food waste via an automated cart collection.

MH is recommending the MNC to purchase a fourth new truck as the back-up collection truck. The alternative to use one of MNC's manual truck retrofitted with a cart-tipper is not suitable due to the vehicle age.

MH recommends that the MNC order traditional diesel-trucks and that low carbon options are revisited next time the MNC invests in more collection trucks (for Phase 2 implementation). The MNC's Climate Action and Energy Plan sets a goal of 80% emissions reduction by 2050, including an electrification goal for the fleet. As of this current time, electrified and/or low carbon fueled collection vehicles are not yet mature enough to be appropriate to meet MNC's immediate needs. This includes uncertainty with accessing both RNG and renewable diesel. However, MNC will need to continue assessment and preparation to adopt low-carbon equipment to meet its 2030 goal. In the meantime, implementation of recommended near-term collection trucks will result in some emission reduction thanks to improved collection efficiencies, and it will help prepare MNC for climate change impacts to collection operations. Refer to section 5.1 for further discussion.

5. OTHER CONSIDERATIONS

5.1 Climate Change

Taking climate change into consideration as part of this project is in alignment with MNC's Climate Action and Energy Plan (January 2022) and our recommendations include both actions to mitigate climate change and being prepared for the effects of climate change.

Using automated curbside collection can help the MNC to reduce GHG emission in several ways:

The Climate Action and Energy Plan (CAEP) identifies opportunities to reduce North Cowichan's energy consumption and greenhouse gas emissions through community actions, policy, and other municipal mechanisms by 80% by 2050.

- **Increased Diversion of Organic Waste**, especially yard waste which is not currently collected. When organics is found in garbage it generates potent of greenhouse gases (GHG) as it decomposes, which contributes to climate change.
- **Improved Operational Efficiency** will result in reduced fuel (energy) consumption by the collection fleet and reduced collection time per household with automated lifting. Thus, by reducing fuel consumption, emissions from the waste collection system will be reduced.
- **Less Self-Haul Trips to the Transfer Station** by residents (reduced fuel consumption from individual haulage).

After addressing the immediate needs for automated curbside collection, the MNC should continue to prepare for adoption of a low-carbon (likely electrified) collection fleet. When

planning to purchase additional and replacement trucks it will require further assessment of best option and subsequent infrastructure planning to support the future transition of the fleet to low carbon fuels.

There does not appear to be any significant increased risk from climate change to MNC's operations due to changing the manual trucks to trucks with automated collection abilities. However, moving to automated collection does improve the climate change resilience of the waste collection because of improved worker safety. This is because with climate change there will be more days with extreme heat which can lead to increased worker stress (especially during manual lifting). With the changing climate, longer growing season and increased yard waste we can also anticipate more organics available to collect. Wetter and heavier yard waste may become common in the rainy fall and winters. Thus, automated collection helps MNC prepare for the changing climate's impact on the waste collection system.

5.2 Collection Routes and Load Balancing

The development of this implementation plan included an assessment of how many curbside collection trucks the MNC would require when collecting the three waste streams. MH estimates that three automated collection trucks will be required to collect commingled organics and garbage (with access to one back-up vehicle), and that the MNC is likely to need two additional automated trucks if the recycling collection is brought in-house and transitioned to an automated collection. The exact routing of each collection vehicle needs to be revisited as part of launch plan prior to the service roll-out. A detailed review would help in forecasting each zone (collection route) workload and inform if any changes are needed to balance collection workloads.

5.2.1 Load Balancing

The packer configuration for the automated trucks differs from the current manual load trucks; specifically, in the split compartment ratios. The manual trucks have a 70-30 split, while the recommended automated trucks are split 60-40 with a larger hopper to accommodate the carts being tipped. The tipping of trucks due to unbalanced load can occur even for single stream packer trucks.

Load balancing only creates an issue if a collection truck is accessing uneven ground, such as an unpaved ground at the active phase of a landfill. This is not the case for the MNC's trucks, which take organics and garbage to the Bings Creek transfer station. The trucks only access paved roads with even ground. The issue of load balancing is an important part of staff training and will need to be addressed by operating procedures.

6. OPTIONS FOR RETIRED BINS

Existing garbage and kitchen organics bins owned by residents are typically made up of durable plastics, either with the plastics recycling code 3 (polyvinyl chloride, PVC) or code 5 (polypropylene (PP) (Figure 12). If the MNC implements an automated curbside collection, all residents will need to have new carts that are compatible with the automated collection system.

The old garbage and kitchen organics bins would no longer be used for the curbside collection and there will be approximately 10,000 organics bins (46L) and 10,000 garbage bins (77L) that will become redundant. This section outlines what options are available for these retired bins.

Figure 15: Existing Garbage and Kitchen Organics Bins

According to Recycling Council of BC's online Recyclepedia-tool, code 3 plastics are typically recycled into plastic items such as floor tiles, bubble wrap and traffic cones, while code 5 plastics can be recycled into plastic items, such as ice-scrapers, etc., These two types of plastics cannot be recycled in most areas and are typically not accepted at recycling centres.

the Regional District of Nanaimo (RDN) developed a recycling program for the residents to replace their used containers with new carts during their transition to an automated curbside collection program in 2020.

The RDN's collection and recycling program for used curbside containers was launched through a campaign where residents were encouraged to find creative and environmentally friendly ways to reuse/repurpose the retired curbside containers and to keep them out of the landfill. In addition, the RDN residents who did not want to or were not able to repurpose their used waste collection containers were given two options to dispose of them, free of charge:

- **Drop-Off at Approved RDN Disposal Facilities:** Residents of RDN were able to drop off their used waste containers at RDN's solid waste facility during a one-month period.
- **Curbside Pickup:** Residents had two opportunities to set out their used waste containers for pickup at the curb during a two-week period.

The program was well received by RDN's residents and resulting in high participation rates for both residents disposing of their containers and residents picking up used waste containers to repurpose for other uses. The RDN's recycling program collected over 10,000 used waste containers, where most of them were redistributed back to the community throughout Vancouver Island for reuse.

RDN was able to provide the Cowichan Tribes First Nation with 1,200 food waste and garbage containers to distribute amongst the community to increase community participation in their waste diversion programs. The RDN also donated approximately 700 used recycling/composting containers to the Nanaimo School District, and to neighbouring Comox Valley and Cowichan Valley School Districts to facilitate their zero waste education programs.

RDN's reuse/repurpose examples:

- Reuse as food waste and garbage containers in local First Nation community or in local schools
- Storage for emergency kits, road salt, tools, potting soil, mulch, yard waste, animal feed
- Storage for items only accepted at the recycling depots (e.g., soft plastics, glass, Styrofoam or refundables)
- Rain barrels
- DIY root vegetable planters

Approximately 500 damaged containers remaining were collected and sent to a local recycling processor, where they were baled and shipped to Merlin Plastics in Delta. The plastics were finally converted into pellets to be sold to plastic manufacturing facilities for upcycled materials or furniture.

The RDN's used container collection and recycling program cost $40,000 to implement with most of the cost (almost $38,000) relating to collection (labour, fuel, truck rentals, storage rentals, ferry), and only a small part of the cost relating to the transport and container processing at the processing facility.

MNC may wish to initiate a program like RDN's to reuse and recycle the used waste containers from residents. Depending on the number of unwanted, unused, or broken curbside bins, these can be baled and shipped off to processing facilities outside of Vancouver Island, such as the Reclaim Plastics in Burnaby or Merlin Plastics facility located at Delta. Although Merlin Plastics accepts some types of non-EPR plastics, they have recently not been able to accept additional materials due to limited capacity[13].

The City of Duncan is also planning a transition to an automated collection service with a similar time frame to the MNC (a potential roll-out in 2024). There is a risk that reuse opportunities will be limited due to an excess of retired bins. It may be cost effective to collaborate with the City of Duncan to explore reuse and recycling options together.

[13] Based on personal communication with Denise Imbeau, GFL, November 25, 2021, as part of a project for the Resort Municipality of Whistler.

7. WALK-UP SERVICE OPTIONS

In MNC's curbside collection survey, close to 200 respondents (making up 8% of total surveys) noted concerns about accessibility. These were mainly owners of large properties who have a long driveway which can make it challenging to bring the collection bins out to the front road for collection day.

Residents must set containers out properly to allow automated pick up. Set-out can be challenging in areas with steep or narrow streets or in communities where roadside parking is prevalent. For residents with long, rural driveways it can be challenging for residents to transport the large, wheeled carts to the curb in a car trunk. The current garbage bins and kitchen organics bin are smaller and can be transported out to the curb easier.

Some local governments on Vancouver Island offer alternative service options to residents who require additional assistance in setting out the curbside carts for collection. The table below provides an overview of walk-up options available in different communities on Vancouver Island.

Table 3: Walk-Up Options Provided by Vancouver Island communities

Community	Service Description
City of Victoria	▪ Provides a "Helping Hands" program for assisted set out service. ▪ The program was designed for persons living with a disability and seniors over 80 years of age who have no other resident on their property that is capable of wheeling grey and green waste collection bins to and from their curb. ▪ Depending on which category the resident is part of, either over 80 years of age or living with a disability, the resident may be required to have a medical note from a medical professional/practitioner for this service.
City of Nanaimo	▪ Offers a carry-out service to residents with certain medical conditions that qualify or vulnerable residents who has no one to help them. ▪ This service is provided to individual residents that meet the program requirements. Residents must apply to Public Works. This assistance is offered to < 1% of its households[14].
City of Port Alberni	▪ Offers an assistance program called "Set Out/Set Back" service. ▪ This service helps residents who have physical limitations or difficulty to take their carts out to the curb. Application forms are made available online or at the City Hall. ▪ City crews will assist the resident at annual fee of $52.00.
RDN	▪ Offers an "Assisted Set Out" program where materials will be collected from a mutually agreed location on the applicant's property and placed in the collection truck by RDN's contractor. ▪ The program has a $120 annual fee. ▪ There are two forms to be filled by the applicant, a request form and Eligibility Form.

[14] Based on personal communication with Taaj Daliran, City of Nanaimo, September 1, 2022.

Several local governments, such as the City of Victoria, City of Port Alberni, and RDN require a medical note from medical professional/practitioner for any medical conditions the applicant has that impedes on the ability to take the carts out to/from the curb. This information is typically required as part of an eligibility form.

MH recommends that the MNC provides a walk-up service like those implemented by other communities listed above. The application process should be simple and clear and cater to residents with medical conditions that prevent them from managing the cart set-out themselves, or vulnerable residents who has no one to help them. An annual fee (e.g., $50 – $100) is suitable to set to cover some of the cost of providing this tailored service.

8. FINANCIAL IMPLICATIONS

8.1.1 Estimated Service Cost

The MNC's curbside program operates on a cost-recovery basis and all residents pay an annual collection fee for the three-stream collection service. The 2021 per-household user fee was $111 per year. This was raised in 2022 to $125 per year to cover the increased cost of leasing collection trucks and to fund the implementation plan development for an automated collection service.

The MNC user fees are on the lower end of the fee-spectrum compared to all the other curbside programs offered by Vancouver Island municipalities and regional districts. The fee is greatly influenced by the collection method and tipping fees. Automated collections typically involve having a base fee using carts with larger capacities than bins used in manual collections. The cart capacity is the main factor in determining user fees. It costs more to dispose of a larger amount of waste from a larger capacity container. The costs are also influenced by the tipping fees for each collected waste stream. The capital investment required for automated collection will also result in higher user fees than the current manual collection.

Potential service costs were researched and identified by the MNC in 2021 as $187 per household. MH was asked to revisit the service cost as part of assessing resource needs for the collection fleet and to update costs based on current truck costs and tipping fees.

MH estimates that the automated curbside collection service will cost approximately $190 per household, averaged over the next ten years. These costs were developed based on the MNC collecting organics and garbage using automated trucks and with a contractor collecting recycling using manual trucks (Phase 1 of implementation).

The table below presents the main factors which MH considered when we estimated the service costs and user fees. Canadian currency exchange rates, and other economic influences will impact the impact program budget and the estimated per-household cost.

Table 4: Factors Considered when Estimating Service Costs

Influencing Factor	Assumptions
Type of organic material collected by a municipal collection	Commingled food and yard waste and garbage (Phase 1).
Population/Households to service	We assumed the MNC population would grow by 2% per year. This is a conservative estimate based on historic growth (2016-2021).
Collection truck costs	The purchase of four trucks at $550,000 each in 2023 with automated collection starting in 2025. Capital costs include a 10% contingency. The capital costs would be similar for fully automated truck as the combination trucks.
Cart costs	The purchase of 21,800 collection carts were assumed (10,900 per waste stream). Although there are currently 10,258 serviced households, by the time the MNC program is launched more households will be in place. The estimate also allows for 5% in annual cart replacement costs as residents request cart size changes. Costs include freight, assembly and distribution costs as well as a 10% contingency.
Tipping fees charged by the CVRD	Tipping fees of $135 for commingled organics and $192 for garbage. These are based on 2023 anticipated tipping fees and will need to be negotiated with the CVRD provided the collected materials are accepted at their transfer stations.
Cart size	In the “base user fee” we assumed 100 L organics and garbage carts for single family dwellings and 240 L for duplexes.
Recycling collection costs	Based on current contractor costs considering Recycle BC’s financial incentives.
Asset management reserves	A total of $1.2 million from the capital reserve is assumed to contribute to the purchase of four collection trucks in. In addition, user fees are assumed to contribute $115,000 towards the capital reserve each year.
Borrowing rate	The borrowing rate for capital was assumed to be 4.38% for 8 years with amortization periods of five years for collection vehicles and curbside carts.
Operations and maintenance costs for collection trucks	Costs associated with fleet maintenance, repairs, fuel, tires and insurance.
Inflation rate	The inflation rate of 2.0% was assumed over a ten-year period based on Statistics Canada 2017-2021 5-year average.
Collection costs	Costs are based on staffing needs and labour rates with overhead costs.
Implementation costs during launch and ongoing municipal administrative overhead costs	A 2-year contract coordinator was assumed during initial implementation, as well as communications support and printed materials for program roll-out. Cart inventory management will be needed on an on-going basis.

The table above highlights many key factors that determine the user fees of an automated collection program.

MH estimates that bringing recycling collection in-house and switching this to an automated cart-based collection would cost approximately $210 per household during a ten-year implementation period. The estimated recycling costs would not be influenced by minor changes in the hauling location if they are in the within the same geographic areas. For example, the cost estimate still applies whether the recycling is transported to the Bings Creek facility in Duncan or directly to GFL's facility in Chemainus. GFL administers post-collection services for Recycle BC's residential packaging and paper recycling program and is responsible for managing the processing and marketing of the collected materials.

Potential Funding

There are potential funding options available to reduce the program costs to residents. The MNC may want to review funding options for program implementation (e.g., purchase of new collection trucks or carts) through organizations including the Federation of Canadian Municipalities' Green Municipal Fund and the Government of Canada's Low Carbon Economy Fund.

There are also grants available to support the transition to collection vehicles with lower GHG impacts. As mentioned in section 4.3 there are funds available from Fortis BC funding for RNG, as well as NRCan's Green Freight Assessment Program, and Clean BC's Heavy-duty Vehicle Efficiency Program with per-vehicle incentives or Clean BC's Go Electric Specialty-Use Vehicle Incentive.

The MNC's applicability to these funds will need to be determined in detailed once the transition to an automated collection is approved by Council.

8.2 User Fees Changes

The curbside collection service is regulated under Bylaw No. 3466 for which a user fee is charged and applied as part of the municipal property tax. MH is estimating that the current user fee of $125 will need to increase to approximately $190 per household. This is the average program cost over ten years to implement an automated organics and garbage collection and keep recycling collected manually by a contractor.

The user fee of $190 is for the default cart sizes (100 L) for organics and garbage. Residents could also upgrade cart sizes to 240 L and pay higher user fees. MH recommends that the MNC provide upgrade options, provided the residents pay a cart-exchange and delivery cost. The MNC is advised to set the costs for cart upgrades once the long-term tipping fees are better understood.

MH is encouraging the MNC to identify the costs to residents of managing each waste stream (organics, recycling and garbage) and identify the selected cart sizes on the utility bill. This information will help residents to understand the full waste management costs.

9. SUMMARY OF RECOMMENDATIONS - SERVICE & PHASING

The MNC manual trucks are all in very poor condition and require frequent repair and maintenance. Due to the extended lead times from truck order to receipt, MH is advising the municipality to place order for new trucks in early 2023. With the current minimum lead time of over 1.5 years, the MNC may be able to use the new trucks in mid-2024/2025 at the earliest.

The exact timing of curbside automation implementation is dependant on external factors. The MNC is not able to commit to a fully automated organics collection for commingled food and yard waste as the municipality needs to await developments with the CVRD transfer station upgrades and CVRD's confirmation on whether commingled organics will be accepted at the transfer station in the future and at what cost. This information is crucial before the MNC commits to including yard waste in the organics collection carts. The MNC could end up collecting food-waste-only in 100 L carts until the CVRD accepts commingled organics. Although the 100 L carts would provide too much capacity temporarily, there are examples of Vancouver Island communities where food waste collection is taking place using carts (e.g., City of Victoria, Town of View Royal and RDN). The MNC may be willing to take this risk and procure fully automated trucks knowing that a food waste collection is likely to be short-term until the MNC can confirm if commingled food and yard waste can be accepted at CVRD's transfer station.

MH recommends the MNC order four side load collection trucks, either fully automated or dual purpose combination trucks that can serve as both as manual collection trucks for the current service and for automated cart collection as and when required.

The use of the dual-purpose trucks would enable the municipality to address immediate operational needs and it would help to address the uncertainty of when the automation will be initiated.

Capital Investments

Immediate (2023)

- Four trucks (60/40 split body with 33 cubic yard capacity) suitable for both manual and automated collection

The implementation of the curbside automation is recommended in two phases:

Phase 1 involves the implementation of the automated collection of organics (commingled food and yard waste) and garbage throughout the municipality. The residents will need to adapt to new carts and specific set-out requirements to enable an efficient (and automated) collection. Section 10.4 details the communications planning involved before, during and after the service launch. In phase 1, the MNC is best to continue working closely with the recycling contractor to address recycling contamination, which continues to be a significant issue currently.

MH estimates that Phase 1 is likely to cost approximately $190 per household per year to implement over a ten-year period. MH recommends a default size of 100 L carts for organics and garbage for single family dwellings.

In the **Phase 2** of implementation, the MNC can potentially include recycling collection into the automated collection service. However, it is unclear at this stage what the best option is for the MNC. MH estimates the that Phase 2 is likely to cost approximately $210 per household per year to implement. The MNC may want to consider bringing the recycling collection in-house, firstly as a manual collection if the contamination rates are still relatively high. The MNC would then have full control over the collection, can react much faster when issues present themselves (e.g., contamination issues), and can offer a direct, single point of contact with residents. MH reviewed the MNC's service delivery model and presented pros and cons with in-house vs. contracted curbside collection services to the Council on August 17, 2022.

Capital Investments

Phase 1

- Default carts sizes for organics and garbage:
  - 100 L carts (single family)
  - 240 L for duplexes.

Phase 2:

- Potential to procure two automated trucks
- Default cart sizes for recycling:
  - 240 L (single family)
  - 360 L (duplexes) for recycling

The move from a manual to an automated recycling collection will require approval by Recycle BC. The stewardship organization may be unwilling to approve this transition and accept MNC's curbside recyclables if they continue to have concern about the contamination levels at the curb.

The MNC may want to explore the option of transitioning the recycling collection service directly to Recycle BC and opt out of participating as a contracted collector in the Recycle BC program. The MNC is likely to have the opportunity to request such transition to Recycle BC in approximately five years when the contract is up for renewal again.

MH recommends that the MNC order traditional diesel-trucks in 2023 and that low carbon options are revisited next time the MNC invests in more collection trucks for Phase 2 implementation. The MNC's Climate Action and Energy Plan sets a goal to electrify the vehicle fleet by 2030. As of this current time, electrified and/or low carbon fueled collection vehicles are not yet mature enough to be appropriate to meet MNC's immediate needs. This includes uncertainty with accessing both RNG and renewable diesel. However, MNC will need to continue assessment and preparation to adopt low-carbon equipment to meet its climate action goal.

10. PROPOSED WORKPLAN

Careful implementation planning is needed to enable MNC staff to transition to an automated collection system. MH has developed a proposed workplan for the new service implementation. This workplan includes key tasks and suggested duration of each task with the assumption that the MNC will roll-out an automated garbage and organics collection service in Phase 1. The workplan does not include provisions for the automation of the recycling collection (Phase 2).

Many of the key tasks are included in the Ministry of Environment's Best Management Practices for Curbside Collection of Residential Organic Waste published in 2021, such as suitable timelines for local governments for planning a curbside collection service, truck, and container procurement. The timing of the key tasks is relaying on MNC staffing commitments and resourcing to complete the tasks as per the workplan timeline.

The workplan reflects current supply chain constraints (e.g., extended lead times to procure collection trucks), which has been experienced by Western Canada (and the rest of the world) post-COVID. The MNC will need to allow at least a two-year lead time from when the automated trucks are purchased to service launch.

10.1 Administrative Tasks

Table 5 below highlights the main administrative tasks that are needed to transition to automated collection. The table is followed by considerations for bylaw amendments.

Table 5: Administrative Tasks for the Implementation of Automated Collection

Task	Timing Before Launch
Council staff reports to support implementation process	-24 months
Confirm project capital & launch budgets to initiate implementation and allocated funds	Council dependent
Design a detailed collection program	-24 months/-12 months
Confirm staffing requirements & project leadership to support implementation	-12 months
Appoint (or hire) project Communications Coordinator	-12 months
Develop Communications Plan with messaging, budget, roles & responsibilities – refer to Section 10.4.1	-12 months
Work with mapping and finance to prepare cart distribution database - refer to Section 10.3.1	- 7 months
Bylaw amendments prepared for Council review and approval	-6 months
Prepare for and undertake 4-6 weeks of staff training for MNC's collection crew	-3/2 months

At first, the Council approval is needed to initiate the implementation with an approval to allocate funds to capital investments in new collection trucks. Other Council approvals may be needed throughout implementation, such as approval of launch budgets, communications plan, etc. Key components of communications planning are described in Section 10.4.

Further Council approvals may be needed if the estimated budget is not sufficient to cover anticipated capital costs that then require borrowing bylaws or the need to revise financial plans.

MH is recommending the MNC to consider typical climate and seasonal weather patterns when scheduling the timing of the service launch. Undertaking cart distribution in the winter can be problematic and result in delays.

10.1.1 Considerations for Bylaw Amendments

The MNC will need to plan for amendments to its Waste Collection Bylaw No. 3466 (2014) well ahead of the service implementation. The following main aspects are typically found in the collection bylaws of successful curbside programs:

- Making participation in the collection program mandatory for all residences where curbside collection is feasible (i.e., single family homes and their equivalent such as mobile homes, patio homes etc.), and clarifying where service is not provided (commercial premises, multiple residence properties, etc.).
- Establishing cart ownership to ensure that the distributed carts stay with the property, while the MNC is responsible for cart repair and replacements.
- Establishing limits (e.g., container sizes and quantities) for how much garbage and organics is to be collected each collection day.
- Setting collection frequency for each material stream being collected.
- Defining acceptable materials and unacceptable or prohibited materials to match the CVRD and processor's requirements. For example, it will be important to be clear if "compostable bags" are permitted/banned from use in the organics collection.
- Setting storage requirements for organics and garbage containers to ensure that carts are always kept in a bearproof location, except during the day of pick-up (refer to Section 2.2.1).
- Setting collection-day requirements to mitigate wildlife interactions (refer to Section 2.2.1).
- Establishing the utility (user) fee for the collection service.
- Establishing penalties (e.g., fines) for non-compliance with the bylaw.

Organics disposal bans are becoming a common and effective policy tool to accelerate organics diversion for local governments operating disposal facilities. If there are organics disposal bans at the disposal facility (Bings Creek), the MNC's bylaw would need to define these materials as being accepted at the curb for diversion to an organic waste processor.

10.2 Procurement Tasks for New Collection Vehicle

Table 6 highlights the procurement tasks needed to secure new curbside collection vehicles. The timeline will need to be confirmed with prospective suppliers.

The first steps involve a review of procurement options with municipal staff. A Climate impacts assessment should be part of that future decision when the MNC is considering procuring trucks for Phase 2, or replacement trucks for organics and garbage collection. Specific procurement policies may be available to set specific procurement priorities, such as GHG emissions. The suitability of a competitive Request for Proposal (RFP)/Invitation to Tender (ITT) process should be weighed against procuring trucks via the cooperative buying agreement called Canoe. This

can enable a conversation and negotiation with a preferred supplier. Either process would require the MNC to prepare truck specifications.

It will be essential for the MNC to receive the collection trucks with sufficient time before the program launch to allow sufficient time to identify defects/faults, confirm operations compatibility at transfer stations, undertake staff training with new trucks and allow mechanic familiarization. The MNC should be prepared to allow for delays in the truck delivery.

Table 6: Procurement Tasks for New Collection Vehicles

Task	Timing Before Launch
Review procurement options with procurement & finance staff	Immediately
Confirm number of trucks required, capacities, operational requirements, chassis & body options	-24 month minimum
Review/update options & prices sourced from marketplace (if costs presented in this memo become redundant dur to project delay)	-24 month
Confirm delivery timing with potential suppliers	-24 month
Prepare RFP/ITT for collection vehicles	-24 month
Issue RFP/ITT	-24 month
Close RFP/ITT	-22 month
Evaluate and Award RFP/ITT	-22 month
Receive new trucks	-3/2 months minimum

10.3 Procurement Tasks for New Collection Carts

The MNC will need to discuss various procurement options with municipal procurement staff (e.g., RFP/ITT process/cooperative buying agreement) to initiate the cart procurement process. This can take up to four months from contract award to receipt of containers.

The lead time should be confirmed with potential suppliers before/ during the RFP or (ITT) is issued and when awarding the contract. The time required to receive containers will depend on supplier/manufacturer location, freight mode, and distance to the receiving location. A container supplier/manufacturer needs to know the delivery location and when the carts are required. If the supplier needs to stagger container delivery, the MNC would need to provide secure cart storage (e.g., a works yard or warehouse) if there is a lag between the delivery and cart distribution.

Table 7 shows typical timing for cart procurement tasks, assuming the MNC order regular carts without requirements for universal bear resistant hardware.

The container supply contract could include having the collection program's branding or the MNC's logo hot stamped onto the containers during manufacture.

If different cart sizes are offered to residents, the MNC will need to prepare by having an adequate supply of new containers on hand. If options are provided, residents are best to pre-

select a size before the program launch to mitigate the challenge of having enough carts at program launch. MH recommends that the MNC give residents time to get accustomed to the new container and its capacity and usefulness and that subsequent exchanges is not allowed for a while after the program launch.

Although an automated collection program cart has a typical lifespan of approximately ten years, wheels and cart lids may require replacement or repair sooner. The MNC will need to maintain a continuous supply of containers and parts. New properties will be added to the service routes as the population grows and stolen or damaged carts need replacement.

Table 7: Procurement Tasks for New Collection Carts

Task	Timing before launch
Review options and prices sourced from marketplace	-12 months
Discuss procurement options with MNC's procurement staff	-12 months
Confirm delivery location, marshalling space available, and storage for carts	-12 months
Confirm delivery timing with potential suppliers	-12 months
Confirm household distribution process/options	-7 months
Prepare RFP/ITT for containers	-8/7 months
Issue RFP/ITT	-7 months
Close RFP/ITT	-6 months
Evaluate and Award RFP/ITT	-6 months
Provide graphics for hot stamps (if required)	-5 months
Receive containers	-2 months
Assemble Launch Package (information for residents – refer to Section 10.4.1)	-1 month
Coordinate distribution logistics (work with assembly and distribution contractor)	-1 month
Distribute containers & launch package (work with assembly and distribution contractor)	-2 weeks

10.3.1 Cart distribution process

The MNC will need to confirm the cart distribution process with the supplier. The MNC can include cart assembly and distribution as a requirement in the RFP/ITT, which leaves all responsibility with the cart supplier. Alternatively, the MNC can take on the full responsibility of the task or hire a local logistics firm or a community organization fundraiser (with MNC's staff support) to undertake cart assembly and distribution. The MNC is recommended to include cart distribution as a requirement of cart supply in the procurement document to limit complexity and risks for delays.

The MNC will need to establish a database for whomever will work with the cart supplier and coordinate distribution (refer to the administrative task listed in section 10.1). The database should contain an address list of all serviced dwellings, number of carts per address, cart sizes selected by address (if this is an option at the outset). The party responsible for the cart distribution will need to plot the best distribution routes and logistics and undertake the distribution with oversight by the MNC.

The cart distribution process may take approximately one-two months before the program launch, but the timelines may be longer if a third-party logistics firm is engaged for distribution.

The MNC may want to distribute carts to all households at once, but stagger the cart service commencement. For example, cart collection for zone 1 starts week 1 and zones 2 - 5 are still being collected per current manual system. Zone 2 starts cart collection service on week 3 (after zone 1 has had a full collection cycle of garbage and organics), and zones 3 - 5 are still manual.

Every two weeks a new zone starts up for cart collection and the old system is phased out until all zones are receiving cart collection. This does mean keeping the old trucks in operation a bit longer and may need extra staff on the road. On the other hand, the service phasing in this way would spread out the call volume and reduce set-out challenges and operations hiccups. Having an overlap of the manual collection calendar with the new automated cart collection calendar could however cause confusion for some residents and require careful planning.

10.4 Communications Planning and Implementation

The MNC is recommended to appoint (or hire) a project Communications Coordinator up to one year before the service launch. The coordinator will be responsible for developing a Communications Plan with confirmation of roles and responsibilities, messaging to residents and a communications budget.

This section highlights some of the key components of communications before, during and after the service launch.

10.4.1 Communications Plan Implementation: Pre-launch

Table 8 summarizes the main communications planning tasks that should take place before the service launch. A comprehensive Communications Plan is needed to identify and describe the purpose, target audience, key messages, tools, and timing for communications for successful launch of a collections service. The major components of a communications plan are best led by a Communications Coordinator.

Residents will want to know why the service change is needed, when it is happening, and what it means to them. Early messaging will help to create interest and enthusiasm for the new program.

A suite of communications tools can be used, from traditional and social media, outreach events, and curbside ambassadors to online and printed information and advertising.

Information and program inserts can also be mailed out with tax and utility bills to highlight upcoming service changes.

Table 8: Communications Planning Tasks Pre-Launch

Task	Timing before launch
Implement Communications Plan initial steps to generate interest and enthusiasm	- 10 months
Develop targeted outreach materials to support the upcoming changes to the collection service (e.g., newsletters, FAQs, social media posts, web page updates, displays for events and at unstaffed community locations, advertisements, how-to video)	- 10 months to 4 months
Prepare content for Reminder App during pre-launch	- 10 months to 4 months

Residents should already be advised of the upcoming program changes and container size options (if this is being offered) through an extensive communications campaign before new carts are distributed. This information should also be available in the launch package distributed with the containers.

A useful tool for changes in collection service is the preparation of answers to anticipated frequently asked questions (FAQs). These can be provided with launch packages, set up on posters at display booths, and made available on the relevant solid waste pages of the MNC website.

MNC has developed a collection day reminder app in collaboration with ReCollect. This app can be downloaded to electronic devices and provides the waste collection schedules and reminders for the Municipality of North Cowichan. The MNC curbside app also has the Waste Wizard feature for subscribers to search recycling and disposal options for a wide range of items. The app provides the MNC with the ability to broadcast general information about the collection program and upcoming changes to the service. If needed, the MNC can target subscribers by zone if there are specific messaging required (e.g., cart distribution schedule, or service disruptions). In advance of the program changes, the MNC can promote the use the Reminder App.

10.4.2 Communications Plan Implementation: Service Launch

Leading up to the service launch the MNC will be developing and applying communications tools as outlined in the Communications Plan. Table 9 highlights the timing of the key communications planning tasks at the time of the service launch.

Table 9: Communications Planning Tasks for Service Launch

Task	Timing before launch
Finalize Launch Package components for printing and collated for distribution	-3 months to -1 month
Establish an Ambassador Program, hire temporary staff to assist with outreach and the launch	-3 months to -1 month

Task	Timing before launch
Establish customer point(s) of contact (e.g., front counter/admins staff to answer phone and collection personnel) and provide training to assist these staff	-3 months to -1 month
Develop compliance notices to help launch and print	-3 months to -1 month
Prepare upload updated content to the Reminder App	-3 months to -1 month
Distribute the Lunch Package in coordination as part of container deliveries	-2 weeks

The collection crew will benefit in the first couple of collection cycles from having a helper in each truck to assist with carts movement and place necessary stickers for incorrect carts set-outs. The MNC admin staff needs to be available to answer calls and emails through the service launch and the following month.

10.4.3 Post- Launch Communication

The MNC will need to focus on communication that highlights successes and specific aspects that require improvement following launch of the new program.

The Communications Plan will identify which engagement techniques and tools to use for on-going communication. If the MNC has an ambassador program in place, it can focus on resident/collector liaison and education during initial weeks to trouble shoot specific issues (e.g., set-out requirements, accepted materials, etc.,). This would help residents gain familiarity and knowledge through compliance actions (e.g., container inspections and compliance notices), and to assist with questions and direct personal contact.

The communications staff will need to update the web page and FAQs as new issues are registered and residents bring forward questions. Press releases or social media posts can be developed with targeted messaging.

Monitoring the Messaging

Keeping track of resident responses is important. Change can be uncomfortable for some people and changing how their garbage is collected may trigger a strong reaction received by MNC staff via calls, emails, and social media posts. Limiting debate on social media platforms is recommended. If you are using social media platforms, you need to have the resources to respond to comments and monitor what is being said about the program. If the Communications Plan has worked well, tracking all resident responses is greatly beneficial and may help to understand resident sentiments.

Ongoing Communication

Ongoing communication with residents is important to keep them engaged and promote participation. This also lets program staff remind residents of the program requirements and report on program successes and milestone achievements.

Five weeks after the Sunshine Coast Regional District launched their curbside food waste collection program in 2020, a local media article provided a comprehensive summary of the start-up, highlighting examples of what was and was not being done correctly by residents. Reminders on material preparation and waste reduction tips were also included, along with data explaining participation rates and positive resident feedback.

10.5 Program Maintenance

The following aspects will need to be considered to evaluate program performance and adequately maintain the program:

- Hold 1- 2 collection training days to bring the entire operations team together for training and team building.
- Obtain transfer station and processor feedback on operational issues requiring attention.
- Monitor and evaluate participation and capture rates as well as contamination levels.
- Consider conducting a survey to assess the understanding, acceptance, and support for the changes. Compare with a pre-change survey if one was done.
- Continue curbside engagement and compliance efforts.
- Deploy ongoing communications tools, such as newsletters, social media, and web updates.
- Maintain cart inventory and work with cart supplier(s) to ensure damaged carts are replaced and that a supply of spare/new carts is always available. Following the launch, a part-time administrative staff may be needed for 8 to 16 hours per week for inventory management.
- Optimize the collection zones after approximately one year after implementation.
- Track capture rates for all collected material streams to help calculate diversion rates and to guide ongoing operational requirements.
- Review organics and garbage quantities and assess truck/operational capacities if the MNC is considering transitioning the recycling collection to a cart-based automated system (Phase 2).

11. CLOSURE

The Municipality of North Cowichan retained Morrison Hershfield to conduct the work described in this report, and this report has been prepared solely for this purpose.

This document, the information it contains, the information and basis on which it relies, and factors associated with implementation of suggestions contained in this report are subject to changes that are beyond the control of the author. The information provided by others is believed to be accurate and may not have been verified.

Morrison Hershfield does not accept responsibility for the use of this report for any purpose other than that stated above and does not accept responsibility to any third party for the use, in whole or in part, of the contents of this document. This report should be understood in its entirety, since sections taken out of context could lead to misinterpretation.

We trust the information presented in this report meets Client's requirements. If you have any questions or need addition details, please do not hesitate to contact one of the undersigned.

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APPENDIX A: Default Cart Sizes Offered by Other Local Governments

Table: Local Governments on Vancouver Island Automated Curbside Service Delivery (2022)

Area	# Serviced hh (approximate)	Utility Fee Annual Base Fee ($)	Service	Default cart sizes
City of Nanaimo	29,000	$216	Garbage Food & Yard Recycling	Garbage: 120 L Organics: 120 L
City of Port Alberni	7,000	$170 assuming 80 L cart	Garbage Food & Yard Recycling	Garbage: 3 sizes Organics: 2 sizes[1]
City of Victoria	14,000	$200	Garbage Food waste Recycling (manual by contractor)	Garbage: 120 L Organics: 120 L
District of Saanich	33,100	$204	Garbage Food & Yard Recycling (manual by contractor)	Garbage: 2 sizes Organics: 3 sizes[2]
Regional District of Nanaimo	29,000	$165	Garbage Food waste Recycling	Garbage 100 L Organics 100 L
Town of Lake Cowichan	1,300	$188	Garbage Food waste Recycling (manual by contractor)	Garbage: 80 L Organics: 80 L
Town of View Royal	4,000	$191	Garbage Food waste Recycling	Garbage: 80 L Organics: 80 L

[1] City of Port Alberni requires resident to select a size: Garbage in 80L, 120L or 240 L, and Organics in 120L or 240L.
[2] District of Saanich requires resident to select a size: Garbage in 120L or 180L, and Organics in 80L, 120L, or 240L.