
Nanaimo Recycling Exchange

ICI Waste Audit Project Report

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ICI Waste Audit Project Report

Nanaimo Recycling Exchange (NRE) received Regional District of Nanaimo (RDN) funding to perform waste audits for the Industrial, Commercial, and Institutional (ICI) sector in the RDN. The project began October 1, 2020 and was completed December 31, 2020. The purpose of the waste audits was to

- a) determine types and quantities of products in Industrial, Commercial, and Institutional (ICI) waste streams,
- b) identify diversion potential for the ICI sector,
- c) prepare businesses to optimize bylaw incentives in the new Solid Waste Management Plan, and
- d) pave the way for new programs the RDN could implement to increase diversion.

Scope

Data from the waste audits were collected to highlight both general and industry specific barriers, and where they occur in the system. Conclusions drawn from these waste audits could inform education and enforcement options, and help to shape incentives to increase ICI sector diversion. Most importantly, the results could be used to increase knowledge of RDN diversion systems and highlight the barriers to promote the innovations that will bring results.

The waste audits were designed to assess quantities and management practices for products that persist as problematic in the RDN landfill: waste stream paper and cardboard, Styrofoam, and plastic were targeted.

Limitations

The average employee cannot be considered a content expert of the ICI solid waste system. For this reason, interpreting employee reports and qualitative data required more than a verbatim account; for example, all participants reported having knowledge of what is recyclable, yet backed up this statement with evidence such as, "I do the recycling at home and so I know how to separate." Therefore raw data from this sector is somewhat less than reliable, but it's the only data that exists.

A sample of 15 is a small sample of the ICI sector; therefore, generalization to the ICI population is limited. Some confidence was taken from similar responses from all 15 sites.

Participant records with weights and measures are largely non-existent. Sample weights and calculations have been checked and re-checked, but some margin of error based on site staff ability to estimate some volumes and frequencies must be considered.

Covid-19 limited bin diving and bag breaking at some sites. Transparent and clear bags, and loose identifiable material provided opportunity to assess content. In the few cases where garbage was in black bags, tools were used to open bags to identify and estimate percentages of each product.

Cause and effect are not 100% provable by this study: best participant practice does not guarantee best practice by haulers down the line, and vice versa. Barriers can be identified at various points in the chain, but when there are multiple probable or possible barriers for low diversion, isolation of cause can be difficult.

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Site selection

The NRE selected organizations from each of the Industrial, Commercial, and Institutional categories of the ICI sector. The target of completing 5 audits from each category became constrained by resistance to invite visitors on site as the Covid-19 pandemic worsened: this was especially true for health and educational institutions. Some confirmed site hosts retracted the agreement as Covid-19 reports and cases increased. The NRE contacted 39 organizations (See Appendix A), and 15 sites agreed to participate in a waste audits.

Sites were pre-screened to ensure their waste stream in fact contained all or some of the target products. Once site confirmation was completed and a host/interviewee identified (indeed a “short straw” process with indeterminate corollary), an email was sent with an outline of purpose, process, and requests for records or information to have on hand at the site visit.

Data Collection

For the purpose of this study, Garbage is defined as the contents in garbage bin; Recycling is defined as the contents in the recycling bin, and Organics is defined as the contents the organics bin. This is an important distinction as categories are subject to arbitrary assignment by haulers providing collection. There is no industry standard: paper and plastic collected as recycling by one local hauler is collected as garbage by another (See Appendix B, C). Participants also make arbitrary assignments based on knowledge or convenience, and depot collectors and government decision makers assign arbitrary definitions based on market value.

At the audit site, all waste streams were inspected and categorized to first identify streams of garbage, recycling, and organics. Hauler instructions, participant practices, and RDN bylaw compliance was generally noted. Product categories within each stream were identified. Sample weights were taken of the targeted categories and general condition (clean, contaminated, food contaminated) noted. Collection frequency and bin volumes were recorded. If available, hauler records were examined.

Weight samples were recorded at each site. This is because collection methods and business type affect weights. For example, similar volumes of mixed waste typically weigh less than separated waste, and restaurant organics are substantially heavier than residential organics.

For the purpose of this study, contamination is defined in lay terms as

- the wrong thing in the wrong bin according to the site plan/hauler instructions,
- category degradation due to food or other soiling, or
- category degradation caused by collection practices

Qualitative data was collected by interview (See Appendix D) and voluntary information provided by the participant. Interviews were recorded if participants permitted, but conversation outside of the interviews was not. Observations were made of the waste and waste practices. Photographs were taken with permission of participants.

Data Analysis

Important results from this project include category identification at ICI sites in order to calculate potential for increased diversion for each category. Site records and weight samples were used to calculate total weights of each category of waste.

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Some results were reported across all participants, and some results relate to specific ICI sectors. Rather than provide tables and graphs of unrelated data, both quantitative and qualitative results from the audits are presented with the appropriate sector. This approach should help identify targeted solutions.

NOTE: Tonnage records were mostly unavailable: in 100% of sites, haulers neither provide the weight or volume data for collected material, nor were they able to provide weight estimates of collected full bins or totes when contacted. In some cases, the business sporadically recorded weights to monitor costs.

Key Findings

1. Access to recycling is limited: The NRE expected to find “hard to recycle” waste in garbage streams. More notable was the high amount of “easy to recycle” waste found in garbage streams. ICI film and styrofoam are now garbage in the ICI sector; paper and hard plastic have become “hard to recycle.” Cardboard is the single “easy to recycle” product.
2. Access to self-haul is limited.
100% of participants have tried to self-haul to increase recycling beyond their hauler program.
3. Confusion is prevalent.
Participants don’t understand ICI waste programs.
100% of ICI participants use residential recycling principles and facilities to recycle ICI.
Participants can’t envision the road to 90% diversion.
4. 100% of participants have aspirations to improve their recycling programs.
5. Potential diversion from 15 waste audit sites suggests collection and recycling as an option to increase diversion of these identified products from landfill.

Table 1. Potential Diversion available from 15 waste audit sites.

Product	Metric tonnes/yr
Soft Plastic-LDPE	9.1
Hard Plastic-HDPE	4.7
Fibre-as paper	61.0
EPS-Styrofoam	1.0
Metal	.5
	Total mt/yr 76.1

6. Barriers reported, observed, and interpreted from data are wide-ranging, and not always obvious to the business owners. Confusion and inconsistent messaging further confounds attempts by participants to identify and solve barriers.

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Barriers-Reported across sectors

Lack of access to recycling services.

Participants reported fewer recycling options than they need, or than they thought existed. Products reported as previously recycled were reported as no longer recyclable. Participants have all tried various remedies, with various results.

100% of participants have some amount of clean plastic film with no recycling option,
93% of participants have some amount of clean EPS (Styrofoam) with no recycling option,
50% of participants using hauler services have clean paper refused by their hauler,
75% of participants using hauler services have hard plastic refused by their hauler,
100% of participants reported hauler requirements to put recyclable products in garbage bins,
100% of participants have tried to self-haul to increase recycling options.

ICI waste cannot be recycled through consumer Extended Producer Responsibility (EPR) programs at local recycling depots.

- “I’m sneaking around trying to recycle!”
- “We drive all over town trying to recycle at depots. We take it out of the car then we put it back in the car. Eventually we just put it in the garbage.”
- “When we had the NRE, all that used to be recycled. Why can’t it now?”

One participant of 15 could identify a local recycling company appropriate for ICI waste (Cascades or Waste Connections). After NRE instruction to contact these recycling companies for service, follow up data report no response. Participants reported their hauling company seldom returns calls, drivers can’t answer their questions, and they don’t know where to turn. Further investigation determined that neither Cascades nor Waste Connections accepts self-haul or new customers at this time.

- “What’s the point?” was a common response.

All ICI plastic film and styrofoam is now managed as garbage in the RDN. For certain haulers all paper, metal, soft plastics, hard plastics, and Styrofoam is garbage.

No single plan with instructions for businesses.

Participants were asked how they set up their garbage and recycling programs, who helped them, and who answered their questions.

- “We just guessed.”
- “The hauler told us what to do.”
- “Somebody just figures it out.”
- “I go to the dump and try to do the best I can. If I have too much and have to do all the categories, I throw it all out or it costs too much.”
- “What is the program in this city?”

93% of participants reported uncertainty about what is recyclable in the RDN.
75% of participants reported asking the hauler for advice, with varying results.

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Participants were asked about the RDN's Road to 90% and what it means for their business.

Responses included,

- "Road? They haven't given us a road."
- "I know about the Road to 90%. I also know it means nothing for my business. No way I can recycle 90% of our waste."
- "I called the city, the RDN and they gave me a list of places to call. I called Church Road, called Cedar and they said to take it to Alpine or a recycling depot...ping pong."
- "I called Waste Connections and they told me to take it to Peerless Road. I am still waiting for Cascades to get back to me. That was more than a month ago I called."
- "Someone needs to help us put the vision into reality. Education... we're left on our own."

Participants were largely unfamiliar with landfill bans; 3 had received a warning from their hauler "years ago" and none had received a fine for contamination, or incentive for correct sorting.

Lack of knowledge of ICI waste programs.

Collection of ICI waste in the RDN is provided by the private sector. Most, but not all, multi-family facility hauler contracts include collection of printed paper and packaging under contract with Recycle BC (RBC). Each private sector waste collector offers their suite of collection products and services to businesses in the ICI sector.

In 100% of ICI business sites, waste management was no one's job.

None, 0%, of participants could articulate the differences between ICI and residential programs, and corresponding rule applications.

100% of participants reported using residential recycling rules for ICI waste.

- "It's the same waste."
- "I do the recycling at home so I know the categories."
- "Here's the list the hauler takes. My dad knows how to recycle so he take all the rest to the depot."

Messaging from haulers does not always clearly identify ICI waste as different from residential waste (See Appendix E).

ICI self-haulers report conflicting instructions offered at depots and RDN landfills.

- "...no big loads, like cars are ok, no big loads. We don't take big commercial trucks."
- "One time they (recycling depot) take it and another time they don't."

Participant reporting highlights incorrect applications of rules.

- "We [the Beacon] tell our residents that all delivery companies have to take their packaging back with them."

This practice contradicts RBC contracts and likely reduces diversion: the consumer has bought the product and has paid the RBC fee for recycling the packaging. The delivery company has never owned the product and therefore has no responsibility for the packaging; furthermore, residential packaging has a higher chance of being recycled under a residential EPR program, which exists at the Beacon.

Participant reporting highlights a lack of knowledge about the generator principal.

- "I (daycare operator) can't send all that mess back home in lunch bags."

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- “I (blinds installer) take all the packaging off before I go in the house.”

In these cases, the waste is residential packaging from consumer purchases that belongs in curbside recycling. It is not ICI generated, and therefore is not ICI waste (See Appendix F).

- “The trades leave their packaging everywhere they go.”

It is appropriate for some trades to leave ICI packaging at a construction site that collects ICI waste, but not at a residence because it is generated by the business.

Barriers-Reported by Sector

Barriers-Small to Medium Enterprise

Small to medium sized business participants reported low tonnages of waste. Costs for bins and hauler service are reported as cost prohibitive for small businesses.

94% of participants anticipated costs of increased source separation as a potential barrier.

The participant daycare requires garbage hauling for diapers and waste weighing less than 20kg per month.

- “I can’t justify the cost of bins for this bit of recycling.” (12 kg).
- “I can store it all and take it to the dump. We don’t have a ton of space.”
- “How can I tell the kids we’re not recycling anymore?”
- I take what little I have and put it in my curbside.”

There are approximately 1,460 small businesses in the RDN.

Barriers-Large institutions

Institutional participants reported low accountability for waste management as a barrier.

Kiwanis Senior’s Lodge reported some of their challenges.

- “The biggest reason for lack of diversion is those independent living quarters over there (166 units) don’t have Recycle BC. I can’t find out why.”
- “I already have some recycling bins for those units, but there is no bylaw that tells me to collect organics. Why should I? It just costs money.”
- “Haulers don’t care about bans. They tell me to put most of my recycling in the garbage to save money.”
- “Our management is hit and miss on information...they have tried to find services but there’s no one to call. We need a lot of education.”

Kiwanis potential diversion was calculated at 4.4 mt/yr.

There are 32 similar institutions in the RDN.

NRGH Housekeeping Services is managed from a private organization based in Ontario. Staff reports lack of direction and almost no monitoring of their waste program.

- “We aren’t the decision makers.”
- “I never see the contracts for these bins. There’s bins everywhere and I don’t know half of them.”
- “We need constant education.”
- “Only the people with Green hearts recycle. If I stop, this is all garbage.”

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Observed practice: Clear plastic bags of clean recycling aren't broken to remove contamination of garbage such as clean plastic film, or contamination from the wrong category of recycling, or to remove the plastic bag. Instead, the entire bag is placed in the garbage compactor (See Appendix G). Staff reported never having received education. Staff mistakes reportedly go uncorrected, and this increases contamination.

NRGH Housekeeping department potential diversion was calculated at 8 mt/yr.

This estimate does not include all departments within NRGH.

Note: Staff reported an estimated 30% reduction in recycling of some products due to Covid-19.

Construction and Demolition (C and D)

The NRE performed a waste audit for Tectonica Management Inc. at a 28-unit residential subdivision construction site. Waste removal service was provided by a commercial hauler. Garbage was collected in a single 30 yard bin (See Appendix H), and recycling was collected in a separate single 30 yard bin. Following waste hauler instructions, wood and cardboard was eligible for recycling; all other waste was collected as garbage. Of note in the garbage container was significant paper, cardboard, ferrous and non-ferrous metal (See Appendix I), plastic film and container plastic. Much of the waste was identified as heavy paper and packaging left at the site by trades. The garbage container was noted to contain approximately 80% by volume of recycling, and was reported to fill at 5 times the rate of the recycling container.

When asked about barriers and potential for increased sorting, staff reported

- "There's no problem. X (hauler) takes it all away."
- "...too much time spent sorting"
- " ...that would cost too much in labour"
- "We can't do more. It all goes into the price of the house so we can't."
- "Recycling should be free."

At this site, Tectonica Management potential diversion was calculated at 15.6 mt/yr.

There are approximately 1,150 self-identified construction companies in the RDN.

Agricultural waste audit findings

The NRE performed waste audits at two local farms. The farms reported bale wrap (See Appendix J) and "Ag-Bags" (See Appendix K) as garbage in their waste streams. This product is recyclable LDPE plastic. One farm owner was optimistic about ease of collection and storage of clean wrap for recycling, the other farm foresaw challenges collecting and storing clean product.

Plastic has replaced traditional silo construction for fermented feed: Springford farm reports yearly purchase costs for plastic at \$400.00 plus disposal cost of \$1,800.00 to be significantly more manageable than carrying debt on \$200,000.00 silo construction cost. Green Glen Farms reports lower labour costs to manage silage in wraps than in their existing silos.

Springford Farm and Green Glen Farm potential diversion was calculated at 2.2 mt/yr.

The island distributors of bale wrap reported a collective 31 mt/year of bale wrap sold to RDN farms each year. The wrap is neither recycled nor reused.

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Multi-family waste audit findings

In 2015, the NRE collaborated with the City of Nanaimo, the RDN, Emterra Recycling, and the residents and strata council of the Beacon multi-family residence to implement a new organics collection program in the 120 unit building. The intervention resulted in a 30% decrease in garbage going to landfill from the Beacon. In 2020, the NRE returned to the Beacon to discover ongoing success with the waste management program.

In 2020, the Beacon continues to have success with recycling. With some adjustments to procedures, the Beacon can be documented as a best practices model for diversion from multi-family residences serviced by a commercial waste hauler. Best practices models are useful for community education.

Recycle BC provides collection of printed paper and packaging, similar to curbside collection. Glass was noted as collected by the Beacon hauler, but residents are required to take film and Styrofoam to a depot. Much of it goes into the garbage.

In 2015, the Beacon was hopeful that reducing garbage would reduce hauling service costs.

Table 2. Beacon diversion data in 2015 and 2020.

Waste Category	2015	2020
Garbage	2034 kg/mon	1800 kg/mon
Recycling	Approx. 1600 kg/mon	2138 kg/mon
Organics	0	900 kg/mon

Beacon hauler invoices have doubled since 2015, essentially debunking financial incentive theory for multi-family to increase diversion from landfill. By contrast, risk of even higher hauling service costs provide some incentive for correct separation and sorting.

There are approximately 13,000 multi family residential units in the RDN

Dental Clinic

This dental business has installed technology to recycle amalgam and liquid waste (hard to recycle products), office pens, and is researching ways to recycle PPE. The business pays to shred 275 kg of paper per month (refused by hauler) to ensure it gets recycled.

The dental service participant (one of two partners) reported less success with basic recycling.

- “I want my business to get a 10 out of 10 for recycling.
- “I’m shocked at what basic recycling I can’t get anyone to take.”
- “I’ve been in business since 1992. I have 5 times the waste and nothing has changed. In 1996, they picked up cardboard. In 2020, they pick up cardboard.”
- “Anyone I call refers me to someone else. I don’t do that in business.”
- “I do it all myself now, but I would rather pay someone else to do it. Just give me a system and I’ll buy the bins.”

The dental office potential diversion was calculated at approximately .9 mt/yr.

There are approximately 41 dental clinics in the RDN.

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Mobile services

Businesses that provide installation, repair, construction, and/or trades services often operate solely from a mobile vehicle. Waste is self-hauled by necessity.

Until 2018, the NRE Zero Waste recycling depot program provided drop-off recycling services for 110 known mobile and self-hauling small businesses. Recycling depots in the RDN do not offer the same zero waste recycling programs, and cannot accept products from businesses into their residential EPR programs. This has created confusion and a gap for the self-hauling ICI sector.

- “There is no self-haul for businesses in Nanaimo.”
- “I have to do all my sorting in the van and drive it around forever cuz there’s no drop off in Nanaimo.”
- I spend a fortune taking cardboard to the dump...it makes me over the weight.”
- “I might as well be a hauler cuz I haul it forever.”

Participants report inconsistent instructions at Cedar Road and Church Road landfills. Landfill ICI recycling signage resembles Recycle BC residential program signage (See Appendix L).

- “It’s just like your curbside. Any containers that go in your curbside can go in this bin.
- “Soft plastic is just garbage unless you take to Regional in Nanaimo.”
- “You can bring it [ICI waste] here but no big loads. So your car’s fine.”

Neither the mobile installer participant nor the electrical participant understood waste generator rules for waste packaging.

Participants report that recycling depots in the RDN do sometimes accept products from their businesses.

The mobile service participant potential diversion was calculated at approximately 1.2 mt/yr. There was no estimate found of the number of mobile business operators in the RDN.

Reuse and Retail industry

Reuse facilities have a unique set of constraints for managing waste. The reuse business waste from unsold or unsuitable products was once residential/consumer Extended Producer Responsibility product. It has become ICI waste by virtue of the donation to a reuse facility. Most EPR recycling programs are restricted to consumer (residential) waste and cannot accept commercial waste. This is because eco- fees have been paid at point of purchase by the consumer to fund collection and recycling of products. The reuse business inherits the costs to recycle or dispose of unsold goods and any packaging received.

This gap is created by EPR rules. It is somewhat incorrect to address this gap with a commercial response. The reuse participant reported an abundance of leftover products for which there is no recycling solution.

- “What’s a business going to do with batteries and appliances and light bulbs and electronics?”
- “I have a large network of reusers scattered around and I spend all day giving things away.”
- “I pay for plastic and metal in the bin but I can’t get rid of all the donations.”
- “I just take the rest to Regional...on Kenworth..the one on Victoria won’t take it anymore.”

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Retail businesses have many of the same constraints as reuse. Much of the original packaging observed at the Flying Fish was noted to be Recycle BC packaging if items had not been un-packaged for sale. This was noted as rationale for recycling packaging at a depot instead of putting in the garbage. Their hauler recycled cardboard only.

- “It’s the same so I was taking it to Parksville, but now they don’t take it.”
- “It’s more than a business can handle.”
- “We fill this bin (6 yd) every two weeks.”

Flying fish potential diversion was calculated at approximately 1.2 mt/yr. There are approximately 55 reuse, and 732 retail businesses in the RDN.

Aquaculture

The aquaculture participant noted,

- “Everything that withstands salt water is made of complex multi-product plastic.”
- “ Nobody deals with this waste.”
- “Saving the fish is destroying the oceans and we are the stars. You should see what goes on in the remote farms.”

Stellar Bay Shellfish potential diversion was calculated at 9 mt of PVC and ABS product (See Appendix M).

There are approximately 6 aquaculture farms in the RDN.

Haulers

Participants attributed some barriers to their hauler service.

75% of participants have used a hauler service for waste.

100% of participants using haulers knew their hauler program required recyclable products to go into garbage bins.

0 % of hauler users have been penalized for contamination. One participant was told,

- “Put most of your organics in the garbage...it’ll save you money.”

Other participants reported,

- “There’s no incentive. I can’t get weights for my garbage and recycling. I can’t tell the managers it’s worth the money when I can’t prove it so I keep track. But I can’t do that all the time.”
- It’s volunteer time to recycle everything they don’t take. Why do we pay them?”
- “Who is watching the people picking up the garbage? I don’t know where anything goes.”
- “With the haulers, it’s all sales.”
- “No one knows what businesses need.”

Observation of one participant hauler invoice noted,

- No category weights provided,
- no record of number of bins or totes on site, or the numbers collected,
- standard service price invoice (See Appendix N).

One hauler offered: “What do you think is happening? Tip fees for recycling are \$295/mt and \$125 for garbage.”

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Conclusions

The ICI sector as an entity seems fraught with barriers to diversion. The ICI sector defined by the people facing all challenges of running a successful business is marked with good intention and blameless confusion.

1. Limited, and perhaps dwindling, access to recycling is an important factor affecting ICI diversion in the RDN.

2. The ICI sector does not understand the collection programs.

Sector participants

- are confused,
- manage waste that isn't theirs to manage,
- manage waste as an afterthought,
- manage ICI waste as residential,
- try to get answers; try to do the right thing,
- have a range of needs with no single solution,
- want a plan with instructions.

3. The ICI sector fails to make use of existing services for ICI waste.

For the most part, participants don't know the appropriate commercial options. Some have tried to find services in the past, and some tried in response to NRE instruction. Further inquiry would be needed to determine why their requests for service fail to elicit response. One hauler has informed the NRE that market decline for recycling is likely the reason.

4. Incentives to increase diversion are not obvious.

- No reported incentive to collect organics at multi-family residences.
- No reported incentives to source separate: increased cost of bins is noted as barrier.
- Limited access to recycling encourages default to garbage.
- No reported consequences for ICI violations of landfill bans

5. For a large population of ICI self-haulers, the NRE filled a drop-off/education gap.

Its not clear if that gap can be fully addressed given global recycling challenges. Regardless, it would appear the ICI sector has not been successful navigating the post-NRE private sector waste services landscape.

6. Hauling and collection practices can be barriers to diversion.

Profit remains the driver for the private sector hauler, and tip fees favour landfill disposal. Trickle-down effects of profit constraints, lack of industry standards, relinquishment of responsibility for waste, and inconsistent service delivery are difficult to measure as variables affecting diversion.

"Confuse and conquer" was one participant's characterization.

Observed ICI hauler practices don't seem to be consistent with RDN policy of managing waste according to highest and best use, RDN landfill bans, or RDN bylaws restricting recyclable material and volumes of recyclable material hauled to landfills. Without more data, this remains an assumption.

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Beyond RDN: 100% of participants have clean packaging in their waste stream, highlighting the absence of EPR programs to manage commercial packaging, and the importance of continued RDN lobby for Recycling Regulations changes to include ICI waste.

No remarkable reports or data, except the costs and concomitant dis-incentive to collect from multi-family, were provided about organics. Conclusions might be that the program is well understood, and that there is consistency of delivery with little room for pricing competition from haulers tipping at a single provider.

Recommendations to increase diversion in ICI sector

1. Use Zero Waste Recycling Funding to increase access to recycling for the ICI sector. Plastic film, paper, glass, Styrofoam, ABS and PVC pipe can be recycled if transported to the lower mainland. Existing recycling depots could be provided with collection, baling and shipping capacity for this purpose.
2. Use Zero Waste Recycling Funding to increase access to self-haul ICI waste. Expand and promote the Church Road and Cedar Road/DBL/Cascades recycling programs to other depots and locations where services are lacking. This will also promote best practices for self-haul entrepreneurs in the expanding junk removal sector.
3. Enforce landfill bans as a strategy to reach 90% diversion now, and this will help prepare ICI for coming source separation bylaws. If ICI sectors (such as C and D) or ICI haulers don't experience consequences from sending bins of recyclable materials to the landfills, the practice will likely persist. Future source separation bylaws may increase diversion on several fronts, but the success will also rely on enforcement.
4. Articulate and communicate the Road to 90% plan for the ICI sector to be successful. The plan itself does not provide the instruction required. Results from these waste audits can be used to identify steps for each business to implement.
5. Educate: The ICI sector is expected to navigate a labyrinth of influences to manage their waste.

Education that increases common knowledge of options and limitations could help the ICI sector navigate the system and learn to "row in the same direction" as recycling depot and landfill staff, haulers, and local government decision-makers and practitioners. Competing goals, lack of diversion infrastructure, and diverse needs can be barriers for all parties, but knowledge and awareness of options and constraints could affect the will to collaborate, innovate, and achieve collective success. Education would support diversion goals of all parties.

Use sector best-practice models to educate same sector businesses. The NRE 2021 ICI Diversion Project is designed to use the results from the 2020 waste audit project to create sector champions to demonstrate strategies for diversion, competitive advantage, and to form communities preparing for the circular economy. Five 2020 waste audit participants

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have agreed to implement problem based learning projects to increase sorting and diversion, and provide information for distribution within their sector. The five represent C and D, including a project to de-construct before construction, Multi-family residential, Agriculture, Fast food, Daycare.

The NRE would provide the sector specific education and guidance for these projects to be successful, with the expectation that sector communities will continue to share information to advance learning and create scalable diversion results.

6. It is likely premature to introduce circular economy principles to the ICI sector at this time. Increasing access to basic recycling will increase diversion in 2021. If circular economy solutions can be implemented in the RDN to generally decrease dependence on recycling, the ICI sector will no doubt participate and benefit.

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Appendix A Waste Audit Participants

Norm's Blinds Installation

2509 Rosstown Rd, Nanaimo, BC

Stellar Bay Shellfish

7400 Island Hwy W, Bowser, BC

Tectonica Management, Inc

890 Crace St, Nanaimo, BC

Subdivision address: 2040 Mountain Vista Dr,

Flying Fish

18- Commercial St, Nanaimo, BC

Wenner Group

#101 - 1934 Boxwood Rd, Nanaimo BC

NRGH

1200, Dufferin Crescent, Nanaimo, BC

Kiwanis Senior's Village

1233 Kiwanis Crescent, Nanaimo, BC

Little Star Children's Centre

600 Beach Dr, Qualicum Beach, BC

Franklyn Street Dental Centre

450 Franklyn St, Nanaimo, BC

Springford Farms

1934 NW Bay Rd, Nanoose Bay, BC

Green Glen Farms

3110 Alberni Hwy, Qualicum Beach, BC

Big Wheel Burger

601 Bruce Ave, Nanaimo, BC

Friends of Haven Thrift Shop

451 Albert St, Nanaimo, BC

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The Beacon

154 Promenade Dr, Nanaimo, BC

Well Beings Daycare

31 Lebarz Rd, Nanaimo, BC

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Appendix B Clean source separated recyclables at Flying Fish



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Appendix C

Flying Fish source separated recycling becomes single stream garbage



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Appendix D Sample Interview Questions

ICI Waste Audit Interview Questions

- 1) Does your company have a Green, Recycling, or Sustainability policy?**
- 2) How do you manage your waste now?**
 - a) How did you figure out what to do?
 - b) Who answers your waste questions?
 - c) Is your waste program working for your business?
- 3) Has your business received education about recycling?**
 - a) Do you know what is actually recyclable in the RDN?
 - b) Do you know what is recyclable for a business in the RDN?
 - c) What recycling does your hauler accept? Do you have left-over recycling?
 - d) Do you ever take the recycling to a depot? Which products?
- 4) Tell us your barriers to waste management.**
- 5) Do you have a paper trail for your waste services?**
- 6) What do you know about landfill bans?**
 - a) Do you know how they apply to your business?
 - b) Does someone check and monitor your bins?
 - c) Have you ever had a fine or warning?
- 7) Do you know about the RDN Road to 90%?**
 - a) Do you know how that affects your business?
 - b) How did you learn about it?
- 8) Do you know about the coming source separation bylaws?**
- 9) If you had free help, what would you ask for?**
- 10) Overall, what grade would you give your waste program?**
 - a) What grade would you like to have?
 - b) What do you need now to get there?

ICI Waste Audit Project Report

Appendix E

ICI Bin Label with Instructions for Household Recycling



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Appendix F Recycle BC waste collected as ICI waste



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Appendix G Mixed/bagged recycling bound for garbage



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Appendix H C and D garbage bin



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Appendix I Non-ferrous metal in garbage bin



ICI Waste Audit Project Report

Appendix J LDPE as Bale Wrap



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Appendix K LDPE as Ag-Bag



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Appendix L

Church Road ICI signage resembling Recycle BC residential program signage



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Appendix M ABS and PVC recyclable pipe



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Appendix N Redacted hauler Invoice

NANAIMO, BC		
SERVICE GROUP 001 QTY 1.00 COMM FRONT LOAD 5.00YD WASTE 08/01/20-08/31/20	1.00 BASIC SERVICE CHARGE	\$903.41
SERVICE GROUP 002 QTY 1.00 COMM FRONT LOAD RECYCLE 5.00YD 08/01/20-08/31/20	1.00 BASIC SERVICE CHARGE	\$37.32
SERVICE GROUP 008 QTY 2.00 COMM SIDE LOAD 0.45YD 08/01/20-08/31/20	1.00 BASIC SERVICE CHARGE	\$118.26
SERVICE GROUP 009 QTY 3.00 COMM SIDE LOAD 0.45YD 08/01/20-08/31/20	1.00 BASIC SERVICE CHARGE	\$354.74
	RECYCLE COST RECOVERY	\$72.00
	1515.73	\$1,591.52
	SITE TOTAL	\$75.79
		\$75.79
TOTAL TAXES		\$1,591.52
TOTAL INVOICE DUE		

INVOICE CODING Received:	SEP 11 2020
Approved by:	
1.5% per month late charges (18% per annum) will apply on balances over the payment terms reflected in your agreement.	
Posted:	6930 L

The Remit To Address below is for PAYMENTS only. Please use the Address and Telephone Numbers above for any other correspondence.