

MUNICIPAL SOLID WASTE CONTRACTS:
TOOLS FOR REDUCING RECYCLING CONTAMINATION?

by

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A Thesis
Submitted in partial fulfillment
of the requirements for the degree
Master of Environmental Studies
The Evergreen State College
June 2019

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ABSTRACT

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Since China imposed a 0.5% contamination limit on imported recyclables, cities and waste haulers have increased their efforts to reduce recycling contamination. To examine how municipal solid waste contracts address contamination, I studied collection and processing contracts from cities in western Washington that contract out commingled curbside recycling collection and have populations greater than 15,000 (n = 43). In the contracts, I identified 266 unique contamination-related provisions concerned with processing, curbside mitigation protocols, container conditions, preventative education and outreach, and other contamination prevention measures. The two most common provisions—rejecting contaminated containers for collection and tagging contaminated containers—were found in 74% and 69% of collection contracts, respectively. Some contamination best practices, such as cart tagging, appeared frequently, while others, such as direct personal contact with customers, appeared occasionally. I also interviewed public administrators from cities that contract out recycling collection, managers from haulers serving those cities, and staff from cities that provide in-house recycling collection. When interviewed, 82% of participants said that contracts could be effective tools in reducing recycling contamination. Participants commented that contracts can help by setting service expectations, utilizing monetary tools such as shared risk and reward for the sale of recyclable commodities, and removing common contaminants from acceptable items lists. Respondents also shared what hampers contracts' ability to reduce contamination: staffing, city size, contract enforceability, contract length, a mismatch between contract provisions and automated collection, and factors outside the scope of municipal contracts. Despite contracts' flaws, my research suggests that contracts provide a platform for reducing recycling contamination. Best practices for combating contamination can and have been implemented into collection contracts, but their provisions will not be effective unless contracts are monitored, enforced, and sufficiently staffed.

Table of Contents

List of Figures..... vi

List of Tables..... vii

Acknowledgements..... viii

Background..... 15

Introduction 15

Single-stream Recycling..... 16

 Contamination in single-stream recycling..... 17

 Current recycling context: China’s National Sword policies..... 22

Contamination Reduction Strategies..... 27

 MRF technology and operations..... 27

 Collections..... 28

 Education, outreach, and communication..... 30

 Government policies..... 34

Solid Waste Contracts 36

 Contracting out public services..... 36

 Contracting out solid waste collection in western Washington..... 37

 Research on solid waste contracts..... 39

Conclusion..... 42

Methods..... 44

Overview 44

Sample..... 44

Contracts..... 48

 Data collection..... 48

 Data analysis 49

Interviews..... 56

 Data collection..... 56

 Data analysis 58

Results..... 60

Contract Data..... 60

 Overview of sampled contracts..... 60

 Frequency of individual provisions..... 60

 Provision categories..... 61

Interview Data 62

 Overview of interviews..... 62

 Experience with contracts..... 63

 Recycling contamination..... 63

 Contract provision effectiveness..... 64

Contract effectiveness 66

Discussion **74**

Limitations.....**81**

Conclusions and Recommendations..... **83**

References **86**

Appendix A..... **98**

Appendix B..... **100**

Appendix C..... **139**

Appendix D..... **143**

Appendix E..... **146**

Appendix F..... **148**

Appendix G..... **150**

List of Figures

Figure 1: Map of cities in western WA included in sample.....	11
Figure 2: "Oops tag" from Kirkland, WA.....	28
Figure 3: Label used at Yosemite National Park.....	32
Figure 4: Curbside recycling in WA.....	46
Figure 5: Percentage of contract manager time spent on solid waste.....	47
Figure 6: Section of Excel spreadsheet used to record contract provisions.....	52
Figure 7: Photo of notecards for individual contract provisions	54
Figure 8: Participants' concern about recycling contamination in their service areas	64
Figure 9: Participant opinions on the effectiveness and desirability of ten contract provisions	66
Figure 10: Participant opinions on contracts' potential to reduce recycling contamination	67

List of Tables

Table 1: Most frequent contamination reduction provisions in sampled contracts	61
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Acknowledgements

I would like to thank all the interview participants who contributed to this project with their time and thoughtful responses. I also want to thank the faculty members who supported my research: Tyrus Smith, my thesis reader, who asked probing and productive questions throughout the thesis process, and Kathleen Saul, who offered rich initial feedback on my literature review and questionnaires. I would also like to thank the subject area experts who read sections of my thesis and provided valuable comments: Lucky Anguelov of The Evergreen State College and Susan Fife-Ferris of Seattle Public Utilities. Thanks is also due to the Solid Waste Association of North America's Pacific and Central California Sierra Chapters for allowing me to present my research at their regional symposia. I am also thankful for the MES Thesis Research Fund Committee, MES Student Association, and Student Travel Fund Committee for helping fund my thesis research and symposia attendance. Lastly, I would like to offer my gratitude to my husband and family members who helped encourage me throughout this nine-month process.

Introduction

Fluctuating recycling markets have recently forced recyclers and local governments to ramp up their efforts at decreasing recycling contamination. China, which imports many of the world's recyclables, recently established a 0.5% contamination threshold for imported scrap materials, and recycling processors have struggled to meet this new limit. Their sorting equipment was not designed to meet such a rigorous standard, and incoming loads of recyclables are often 10% contaminants (Oregon Department of Environmental Quality, 2011; Seattle Public Utilities, 2016).

Contamination is a significant concern for solid waste professionals, as contamination carries consequences for people up and down the recycling chain. To capture more contaminants, recyclers have slowed down sorting lines at their facilities, but this has created stockpiled materials that, in some cases, have degraded and were ultimately landfilled (Romano, 2018). Adding more staff and equipment to intercept contaminants at sorting facilities has increased recyclers' operating costs, which has translated to higher garbage bills for some rate payers and complete shutdowns of other recycling programs (Bureau of Planning and Sustainability, n.d.; "Douglas County," 2018; Foden-Vencil, 2018). To maintain viable affordable recycling programs, recyclers and local governments must utilize multiple strategies to reduce recycling contamination.

One way to target contamination is through municipal solid waste contracts. Solid waste contracts are agreements between private waste haulers, such as Waste Management, and local governments. The contracts stipulate which services the hauler will provide, including strategies for mitigating contamination. Most cities in western

Washington contract out their waste collection to private waste hauling companies, so, in theory, most contamination-reduction protocols in the region can be found in municipal solid waste contracts.

My research concerns contamination mitigation protocols in municipal solid waste contracts and asks the question, “Could regional municipal solid waste contracts provide measures for reducing recycling contamination?” Through my research, I sought to understand how contracts in western Washington address contamination. As most western Washington cities use contracts to outline their waste service expectations, my research provides a heretofore absent picture of the contamination mitigation structures in place in regional local governments.

While other researchers have studied solid waste contracts, the studies have focused on topics other than contamination. Most solid waste contract research is concerned with the costs and benefits municipalities experience when they contract out waste collection. Even though some of these studies sample many contracts, the research is not on contract content. To the best of my knowledge, no research has compared the provisions in solid waste contracts on a large scale.

Studies have also been done on recycling contamination, but they have not focused on how municipalities manage it. Contamination studies have tended to focus on three areas: waste composition, contaminant removal technology, and the consequences of contamination. Waste composition studies analyze the contents and contamination levels of garbage, recycling, or organic waste, but the studies do not address solutions to contamination. Other studies on contamination-removal technology in recycling sorting

facilities have helped illuminate how contamination can be reduced post-collection (Cimpan, Maul, Jansen, Pretz, & Wenzel, 2015; Gundupalli, Hait, & Thakur, 2017; Mastellone, Cremiato, Zaccariello, & Lotito, 2017), but this work leaves out prevention and collection strategies for decreasing contamination. Another body of research has studied the negative impacts of contaminants, but, like the contaminant-removal studies, this research tends to focus on the impacts of contaminants at the initial sorting facilities and at remanufacturing sites, such as paper mills. While all this research on recycling contamination helps solid waste professionals understand how and why contaminants should be removed, it provides little information about the tools municipal solid waste program managers have in place to respond to contaminants in their waste streams. My research addresses these gaps.

To study how solid waste contracts address recycling contamination, I collected new data using a mixed-methods approach. For my sample, I gathered copies of all municipal solid waste collection and processing contracts from cities in western Washington that contract out curbside commingled recycling collection and have

populations greater than 15,000 (n = 43). I focused on these cities because they have similar recycling programs and generally accept the same items for



Figure 1: Map of cities in western WA included in sample

recycling, meaning that they should experience relatively similar contamination issues. I then conducted basic content analysis of all the contracts, reviewing them for provisions related to contamination mitigation. After collecting this data, I developed descriptive statistics of the contamination provisions and compared the provisions to best practices in the field.

I also conducted interviews with three types of solid waste manager: municipal solid waste contract managers, municipal solid waste staff who manage aspects of their in-house recycling programs, and staff from private waste haulers who implement contract terms. Using questionnaires I wrote, I asked participants about the contracts they manage. Since most questions were multiple-choice by design, I was able to develop descriptive statistics from the responses. The interviews complemented my content analysis of the contracts because contracts are only part of the equation. Contract provision implementation depends on many factors, such as staffing resources and monitoring protocols. Without input from contract managers, the contract content analysis would have provided an incomplete picture of contamination mitigation strategies in regional local governments.

My research is significant because it addresses contamination, a critical current issue in solid waste management. Recycling companies in the U.S. have been struggling to meet China's new contamination threshold because their sorting facilities were designed to meet less stringent contamination standards. West Coast recyclers have depended upon the export market to China because few local paper and plastic end users exist and because exporting recyclables to China is cost effective. Other Asian countries, inundated with the recyclables that China has rejected, have started to implement their

own import bans on recyclables (Editorial Board, 2018). While efforts are underway in the Pacific Northwest and southern U.S. to upgrade and build remanufacturing facilities for recovered materials (Staub, 2018c), this process will take considerable amounts of time and money, and U.S. facilities may not be able to handle the capacity of recyclables that Chinese companies previously processed. Because international recyclers are demanding cleaner bales of recyclables, and because domestic recycling remanufacturing facilities are insufficient for the amount generated, regional recyclers must decrease contamination in their recyclables. Since solid waste contracts are the mechanism through which many local governments establish their recycling collection programs, understanding how the contracts address contamination is key.

Findings from my research may provide tools for cleaning up recycling streams, as my research could inform administrators about contamination strategies to include in future contracts. Through documenting my interview participants' opinions on contracts and contamination, my research may also provide insight into the limits of solid waste contracts and municipal recycling programs. This research could also benefit private waste and recycling companies, since cleaner recycling streams increase their profits. Hopefully, the research presented here will spur further inquiry into how solid waste collection and processing contracts address recycling contamination.

* * * * *

The rest of this thesis is organized into five chapters: background, methods, results, discussion, and conclusion. The background section summarizes four topics related to my research question: recycling contamination and its impacts, China's

National Sword policies and their regional and global effects, methods for decreasing contamination, and solid waste contracts. The methods section details my processes for data collection and analysis. The final sections present my results, interpret them, and describe the conclusions and recommendations I drew from my research.

Background

Introduction

This chapter reviews the literature on recycling contamination and solid waste contracts. There are four main sections. The first explains single-stream recycling and defines recycling contamination. This section also describes the consequences of contamination, such as risks to worker safety and increased processing costs, and finishes with an overview of regional contamination rates.

The second section explains why recycling contamination has been a frequent topic in the recycling industry for the past two years. There is an overview of China's National Sword policies, which have essentially made selling contaminated recyclables less viable. After the overview is a description of how the policies were implemented and how they have impacted recycling importers in southeast Asia. The section concludes with a discussion of how National Sword has impacted recycling programs in Washington and Oregon.

The third section addresses methods for decreasing contamination. It begins with a summary of interventions that can be made at recycling sorting facilities once recyclables have been collected. This summary is then followed by a review of interventions that can be made earlier, at the point of collection. Next is an overview of strategies for keeping contaminants from ever entering collection containers. Most of these early intervention strategies center on education or government policy.

The final section is dedicated to municipal solid waste contracts. This section describes what government contracts are, why some cities use them, and how the

contracting process works. After describing the solid waste contract landscape in western Washington, this section summarizes the current literature on solid waste contracts. This literature addresses the costs and benefits of contracting out, why cities choose to contract out, and contract design.

While studies have been done on all topics covered in this review—recycling, contamination, and solid waste contracts—no studies have addressed how they intersect. Studies on contamination have not seriously considered the contracts that guide many municipal recycling programs, and research on solid waste contracts tends to compare cost and service outcomes but skip over contamination. This chapter aims to provide a comprehensive review of the literature related to my research question and make a case for the importance and uniqueness of the research presented in later chapters.

Single-stream Recycling

Most regional recycling programs have single-stream collection. In single-stream collection, customers place all recyclables—plastic bottles, metal cans, and cardboard, for instance—into a single container, which is later picked up curbside by a recycling truck (Jamelske & Kipperberg, 2006; Kinsella & Gertman, 2007). Customers do not need to sort their recyclables by type or place them into separate containers, as they would in a dual-stream collection system. In a dual-stream system (also known as multi-stream, two-bin, or source-separated), customers have multiple recycling containers. Customers generally place their recyclables into two different containers: one for paper and cardboard, and one for containers made from plastic, metal, or glass (Lakhan, 2015). Single-stream collection, also known as commingled collection, has been replacing dual-

stream systems because it increases the volume of recyclables collected, reduces injuries to drivers, and decreases the number of recycling trucks passing through neighborhoods (Fickes, 2011; Jamelske & Kipperberg, 2006; Lakhan, 2015). The single-stream system is popular, and most communities in northwestern Washington use it (Washington State Department of Ecology, 2016).

Even though single-stream recycling customers do not need to sort their own recyclables, their recyclables need to be separated eventually. Enter the MRF. MRFs, pronounced “murfs,” are materials recovery facilities that sort commingled recyclables (Jamelske & Kipperberg, 2006). MRFs are a key link in the single-stream recycling chain. Trucks carrying commingled recyclables deliver their mixed loads to MRFs (Kinsella & Gertman, 2007; Washington State Department of Ecology, 2016). MRFs then use a Rube Goldberg-like assortment of mechanical equipment, manual labor, and often optical sorting technologies to sort and bale the now-separated recyclables (Cimpan et al., 2015; Washington State Department of Ecology, 2016). What comes into a MRF as a jumble of paper, plastic, and metal will leave in discrete bales of aluminum, cardboard, and other separated commodities.

Contamination in single-stream recycling. While single-stream systems generate greater recycling volumes, they also generate something less desirable: contamination. Contamination occurs when a non-recyclable item enters the recycling stream. Common contaminants include plastic bags and film, compostable and degradable plastics, shredded paper, and food-soiled paper and containers (Washington State Department of Ecology, 2016). While some of these materials, such as shredded paper and batteries, are indeed recyclable, MRFs are generally not equipped to sort or

handle them. These materials must be processed at facilities outside the single-stream system, such as recycling facilities that solely handle batteries.

Another source of contamination is recyclable material that a municipality or county has chosen not to collect. For example, plastic-lined paper cups, the kind that customers would use for a hot latte from Starbucks, are one of the items that residents are encouraged to recycle in Seattle and Bellevue. These cups, however, would be considered contaminants in Olympia's recycling carts because the items are not on its list of accepted recyclables. Materials falling into this category—recyclable here but not recyclable there—are often difficult to sort at MRFs or have limited markets. Because these items are not universally accepted, they can become contaminants if they enter the recycling stream of a city that has not included the item among its accepted recyclables.

Contamination can also occur in the MRF, when recyclable items end up in the wrong bale. MRF technology is not perfect, and some items are sorted incorrectly. If, for example, a flat plastic lid is misidentified by the sorting equipment as a piece of paper, it could be sorted into a bale of mixed paper. The lid would then qualify as a contaminant. Shards of glass are common contaminants as well, as they frequently work their way into paper bales (Washington State Department of Ecology, 2016). In summary, contamination can occur through multiple sources, but it always results in an undesirable product ending up where it should not be, either in a recycling cart or in a sorted bale.

Consequences of contamination. When contamination occurs, it generates a range of problems. Wasted resources are one of contamination's biggest casualties. When drivers find contaminated recycling containers, they may collect the contents of the

container or leave it at the curb. If the container is left at the curb, offending customers often have two choices: remove the contaminants or pay to have a garbage truck collect the container's contents, meaning that all the container's reusable resources end their lives in a landfill or incinerator. When drivers collect a contaminated container, it may ruin the entire truckload. When recycling trucks unload at MRFs, MRF staff often evaluate the load based on what they first see coming out of the truck. If that initial part of the load is highly contaminated, staff may reject the load and redirect the driver to dump the entire load as garbage.

If the contaminants make their way into a MRF, they cause other issues. Some contaminants endanger MRF staff. MRFs employ human sorters at different points throughout the MRF. As recyclables travel along conveyor belts and across screens, sorters pull certain materials from the lines, including contaminants. Even though sorters wear thick gloves, sorters are susceptible to injuries from contaminants such as medical sharps. In a 2018 survey of MRFs in the U.S. and Canada, 53% of MRFs reported observing needles daily or several times a week (The Environmental Research & Education Foundation). The same study concluded that each year U.S. MRFs may have between 781 and 1,484 needlestick injuries (The Environmental Research & Education Foundation, 2018).

Another contaminant that threatens worker safety is lithium-based batteries. These batteries power devices such as cell phones, and the batteries may explode when nicked or compressed (Resource Recycling Systems, 2017). These batteries are vulnerable to MRF equipment and, according to MRF operators, cause most MRF fires (Resource Recycling Systems, 2017). Operators blame another contaminant—pressurized propane

cylinders—for being the second greatest trigger of MRF fires (Resource Recycling Systems, 2017). Lithium-based batteries may also explode earlier on in the recycling process, when crushed inside recycling trucks. In the U.S., lithium-based batteries cause almost daily fires in collection trucks, MRFs, transfer stations, and landfills (Resource Recycling Systems, 2017).

Contaminants cause other issues in MRFs. Plastic film, such as bags and product overwrap, is an especially problematic contaminant, as it causes frequent MRF shutdowns (Oregon Department of Environmental Quality, 2011). Because plastic films are thin and have low bulk density (Horodytska, Valdés, & Fullana, 2018), they frequently catch on MRF equipment, such as the gears in paper sorting screens (Oregon Department of Environmental Quality, 2011; Washington State Department of Ecology, 2016). The film decreases the screen's ability to sort accurately, and workers must physically cut away the plastic film, which endangers worker safety (Washington State Department of Ecology, 2016; Washington State Department of Ecology, 2018). This constant contamination removal process causes daily slowdowns, as all lines at the MRF must stop multiple times a day to accommodate film removal (Washington State Department of Ecology, 2016). According to a study by the City of Seattle, plastic bags and film are responsible for 20-30% of MRF labor even though they only account for about 0.2% of materials entering MRFs by weight (King County Responsible Recycling Task Force, 2019). While some municipal programs allow bundled plastic film to enter MRFs, most western Washington cities that allow this are moving toward banning all plastic film from their recycling programs due to processing issues at MRFs.

Contaminants also cause problems for end users beyond MRFs. For instance, materials such as plastic and expanded polystyrene, commonly known as Styrofoam, create issues when they travel to paper mills inside cardboard bales. These contaminants clog filters, and bits of polystyrene may escape into the mills' wastewater (Washington State Department of Ecology, 2016). Contaminants cause mills to lose about 15% of their incoming cardboard bales (Washington State Department of Ecology, 2016).

Recyclables can also cross contaminate each other while in MRFs and cause other problems for end users. Glass, for instance, can cross-contaminate other recyclables, especially paper (Washington State Department of Ecology, 2016). Glass is considered the most destructive contaminant for paper recyclers, due to its abrasive nature (Washington State Department of Ecology, 2010). Each year, glass costs a mill accepting recovered paper an estimated \$306,000, as equipment normally requiring replacement every 15 to 20 years is replaced annually (Washington State Department of Ecology, 2010). Glass can also degrade the quality of newly recycled paper by becoming embedded in it (Washington State Department of Ecology, 2016). Other recyclables may in turn contaminate glass. For instance, when metal is incorrectly sorted with glass and forwarded to glass manufacturers, it can create defects in new glass containers (Washington State Department of Ecology, 2016). Other contaminants, such as ceramics and stones, also ruin new containers and damage glass furnaces as well (Washington State Department of Ecology, 2016).

Contamination rates in the Pacific Northwest. Regionally, contaminants constitute approximately 9 to 13% of commingled recyclables. A 2017 study found that 13% of the materials in King County residential recycling carts were contaminants (King

County Solid Waste Division & Cascadia Consulting Group). A 2016 study indicated that contaminants accounted for 10.5% of recycling collected from Seattle's houses, apartments, and condos (Seattle Public Utilities). Further south, a 2011 study found that 9 to 10% of recyclables entering Oregon's five largest MRFs were contaminants (Oregon Department of Environmental Quality). The same study found that MRFs properly sorted 92 to 94% of recyclables entering their sorting lines (Oregon Department of Environmental Quality, 2011). This means that 6 to 8% of incoming recyclables are lost as waste during the sorting process or cross contaminate other recyclables and become waste during remanufacturing. For instance, the same study found that MRFs sorted 15.78% of incoming plastic bottles and tubs into paper bales (Oregon Department of Environmental Quality, 2011). Once marketed to mills, this plastic fragment is not recovered and is disposed of as waste.

Current recycling context: China's National Sword policies. While regional contamination rates may not appear to be particularly high, contaminants have become a great cause for concern. Contaminants are especially unwelcome now, given the state of global recycling markets. China, a major buyer of international and U.S. recyclables, has implemented a series of policies altering which recyclables it accepts. The policies have limited markets for many recyclables from the West Coast, especially unsorted paper and low-grade plastics. As a result, recyclers have landfilled recyclables, and some local governments have narrowed or altogether eliminated their recycling programs.

The catalyst for these changes was China's National Sword policies. In 2017, Chinese authorities announced a series of regulations restricting which recyclables could flow into the country (Editorial Board, 2018). The regulations are known collectively as

National Sword, and they were aimed at stopping illegal imports of waste (Editorial Board, 2018). According to China's Minister of Environmental Protection, China had been inadvertently importing contaminants and materials prohibited under the international Basel Convention (Staub, 2018a). The policies were also sparked by health and safety concerns, pollution from poor recycling practices, and a desire to develop domestic recycling in China ("DEQ statement," n.d.). To address all these issues, China initiated multiple policies: an increase in inspections of scrap materials, a suspension of scrap paper import permits, a ban on 24 types of scrap material, and a 0.5% contamination limit on other imported recyclables (Editorial Board, 2018; Washington State Department of Ecology, n.d.-b).

While previous Chinese policies had established other curbs on recycling (Editorial Board, 2018), the National Sword policies had teeth, and Chinese authorities imposed them swiftly. In the first weeks after announcing the policies, China's customs authority arrested 90 people, uncovered 15 smuggling operations, and seized over 22,000 tons of imported scrap (Staub, 2017). When authorities inspected 1,792 recycling facilities later in the year, they found that approximately 60% had pollution violations (Staub, 2018a). In March 2018, authorities began enforcing the 0.5% contamination limit on imported recyclables exempt from the materials ban, and in June, China announced that all loads of recyclables bound for China must be personally inspected. Prior to National Sword, inspectors would only conduct quarterly on-site assessments. With the new inspection policy, inspectors must be on-site to certify each load (Staub, 2018b).

Chinese restrictions on recyclables have had ripple effects on neighboring recycling markets. As selling to China became more difficult, Vietnam, Indonesia,

Malaysia, and Thailand began importing much more plastic and paper, but by mid-2018, they had established their own stricter regulations for these materials (Editorial Board, 2018). By August and September, southeast Asian countries had taken further steps to stem the tide: Vietnam and Malaysia stopped issuing import permits for some recyclables, Malaysia announced it would tax imported recovered plastics, Thailand announced it would ban scrap plastics, and Taiwan proposed stricter import regulations (Editorial Board, 2018). As a result, U.S. recyclers have continued to struggle to find markets for these materials.

Impacts of National Sword on the Pacific Northwest. National Sword policies have acutely impacted markets for recyclables from the Pacific Northwest. Washington and Oregon are particularly dependent on China, as shipping containers bringing goods from China could be returned full of recyclables at very low cost (Washington State Department of Ecology, n.d.-b). Furthermore, paper mills in Newberg and Oregon City closed in 2015, leaving Oregon without a local buyer for recovered paper (“DEQ statement,” n.d.). Before National Sword, Seattle and King County sent about 214,555 tons of mixed paper and plastics to China each year (King County Responsible Recycling Task Force, 2019). Now, because China no longer accepts unsorted paper, local recycling companies have been forced to seek new markets for it, such as India, Malaysia, Vietnam, and South Korea. These countries, however, do not have China’s capacity to handle unsorted paper, and their shipping costs are higher. Consequently, Northwest recyclers are earning much less on unsorted paper bales, whose price dropped from \$97.50 per ton to \$5 between March 2017 and March 2018 (Romano, 2018).

National Sword's contamination limit for imported recyclables has also impacted Northwest MRFs. To remove more contaminants, MRFs have installed new equipment, hired more sorters, and slowed equipment speeds ("DEQ statement," n.d.; Editorial Board, 2018). Slower processing, however, carries consequences: increased costs and stockpiled recyclables waiting to be sorted (Pyzyk, 2018; Rosengren, 2018; Washington State Department of Ecology, n.d.-b). When more material is collected than can be processed, some of the stockpiled recyclables—especially paper—can degrade (Romano, 2018). Despite the efforts MRFs are making, it is very unlikely that they will be able to clean up their incoming recyclables enough to meet China's 0.5% contamination standard. MRFs were designed to meet less restrictive standards, and Washington MRFs typically process their bales to meet a 3-5% contamination limit (Washington State Department of Ecology, n.d.-b) According to the Washington Refuse and Recycling Association, China's standard is practically unachievable with the current recycling system (Romano, 2018).

China's new contamination standard, as well as the bans on unsorted paper and other materials, have caused some of the Northwest's recyclables to be landfilled. As China was the main market for unsorted paper, the commodity piled up after the ban, and some of the paper was damaged. As a result, some recyclers sought permission to landfill the damaged paper, and in March 2018 the waste hauling company and recycling processor Republic Services landfilled hundreds of tons of mixed paper (Romano, 2018). The city of Mercer Island, for example, granted Republic Services permission to landfill its unsorted paper for a period of 180 days (City of Mercer Island, n.d.). Some of Oregon's recyclables have also been relegated to landfills. Since September 1, 2017,

Oregon's Department of Environmental Quality (DEQ) has issued 26 disposal concurrences, which give permission to recycling companies and public solid waste agencies in Oregon to landfill recyclables. As of April 30, 2019, 16,030 tons of Oregon's recyclables had been landfilled. This amount represents 2% of all recyclables collected in Oregon since the DEQ began granting disposal concurrences (Oregon Department of Environmental Quality, 2019).

Some local governments have responded to National Sword by increasing their solid waste rates, while others have revised which recyclables they accept curbside. To pass along MRFs' increasing costs, some local recyclers have sought rate increases (Romano, 2018), and some cities have complied. The Portland City Council, for example, approved an emergency rate increase for garbage, recycling, and organics collection. Starting May 1, 2018, the average Portland household will pay \$2.55 more a month. The increase is mainly for hiring more workers to prepare recyclables to meet China's 0.5% contamination threshold (Bureau of Planning and Sustainability, n.d.; Foden-Vencil, 2018). Other governments have responded by trimming their list of accepted recyclables or by canceling their recycling programs entirely. For instance, the city of SeaTac passed an amendment to their solid waste collection contract that removes plastic bags and films from its list of accepted recyclables (City of SeaTac, 2018). Areas such as Douglas County, in southwestern Oregon, have gone further and completely cancelled their recycling programs. Starting June 1, 2018, Douglas County suspended curbside collection and self-haul to its transfer stations ("Douglas County," 2018).

State and county agencies have also responded to National Sword policies by forming stakeholder committees to find solutions. Washington's Department of Ecology

created the Washington State Recycling Steering Committee, which will propose actions to update the state’s recycling system (“Washington State Recycling Steering Committee,” n.d.). Oregon’s Department of Environmental Quality also formed a group, the Recycling Steering Committee. The Committee will develop long-term solutions to upgrade Oregon’s recycling systems (“Disposal concurrences,” n.d.). At the county level, King County in northwestern Washington formed the Responsible Recycling Task Force, a stakeholder group of county representatives, elected city officials, municipal solid waste managers, and solid waste haulers, among others. The Task Force has developed immediate, mid-term, and long-term actions to improve recycling and domestic recycling markets (“Responsible Recycling,” n.d.).

Contamination Reduction Strategies

Before the advent of National Sword, governments, nonprofits, haulers, and MRFs already employed a range of strategies to improve recycling and reduce contamination. The strategies operate on a range of scales, from state to neighborhood, and they employ diverse tools, such as advanced technologies, face-to-face education, and legislative policies. The following section provides an overview of these contamination reduction strategies.

MRF technology and operations. One of the functions of MRFs is to remove contaminants, and MRFs adjust their operations to better target contamination. For instance, many MRFs use optical sorters to classify recyclables as they move along conveyor belts. Camera-based sensors interpret color and shape to identify materials, and compressed air jets utilize this information to sort the materials by type (Gundupalli et al.,

2017). A 2012 study on MRFs found that installing additional optical sorters improved sorting accuracy and reduced contamination in sorted bales (Mastellone et al., 2017). Cross contamination in paper bales can also decrease with improved sorting techniques (Miranda, Monte, & Blanco, 2013), and the overall level of technology at a MRF can significantly affect the quality of sorted materials (Cimpan et al., 2015). MRF operators can also reduce contamination by decreasing the rate of waste input, slowing conveyor belt speeds, and adding more sorting workers (Campbell, 2018; Fickes, 2011; Fletcher, 2018; Mastellone et al., 2017). MRFs may use additional technologies and operational strategies to reduce contamination, but confidentiality issues in the highly competitive recycling industry preclude these details from the literature (Cimpan et al., 2015).

Collections. To keep contaminants from reaching MRFs, recycling collection staff employ other methods. Trucks may be equipped with cameras, which drivers use to monitor cart contents (The Recycling Partnership, n.d.). Staff may also tag contaminated carts to alert drivers not to collect the carts. With cart tagging, an inspector usually goes ahead of collection trucks and looks inside recycling carts for specific contaminants. When the inspector notices contamination in a cart, she will mark the contaminants on a tag and place the tag on the cart. The tag, often referred to as an “oops tag,” should be visible to drivers and residents. The inspector also records that the cart was tagged, either on a log chart, with an app, or through a call to operations staff. The cart tag then informs the driver that the cart is contaminated and should not be collected



Figure 2: "Oops tag" from Kirkland, WA (City of Kirkland, n.d.)

(McClure & Michaels, 2018; The Recycling Partnership, n.d.). Cart tagging programs vary however, and some may not use quality inspectors. In this case, the drivers are responsible for tagging the carts and informing operations staff of the contamination issue (Gorgone, 2018).

In Albuquerque, New Mexico, the Solid Waste Management Department has developed a cart tagging program with additional actions. In Albuquerque, drivers are responsible for tagging the carts and calling in the issue. Dispatch staff record the incident and send a letter to the offending household. If the driver cites the same household for a second violation, a code inspector will leave a door hanger at the home. If contamination is noticed a third time, the resident receives a cart removal notice and the cart is removed (Gorgone, 2018).

Cities and counties across the U.S. have implemented cart tagging pilots, and the results generally indicate that cart tags decrease contamination. For example, in 2017, recycling nonprofit The Recycling Partnership worked with the cities of Atlanta and Chicago on cart tagging campaigns. In Atlanta, staff provided residents with recycling information through direct mailers and nearby signage and then tagged and rejected contaminated carts. By the pilot's end, contamination had decreased by 57% (Marshall & Morrigan, 2018). In Chicago, where staff employed similar tactics, contamination decreased by 32% (Marshall & Morrigan, 2018). In 2018, Orange County, Florida conducted a pilot inspired by Atlanta and Chicago's pilots, as well as pilots in Massachusetts. By the end of Orange County's pilot, the number of distributed oops tags decreased by 42%, and the number of "Great Job" tags for uncontaminated carts increased from 31 to 53% (Orange County Government Florida, 2018).

Several regional cart tagging programs have also experienced success in reducing recycling contamination. In 2012, Clark County in southwestern Washington sponsored a project where inspectors observed and tagged contaminated recycling carts at 1,348 households. Eighty-three percent of the recycling carts that were tagged for containing plastic bags during the first audit had no plastic bags during the second audit, and 78% of the recycling carts that were tagged for contamination during the first audit had no observable contamination during the second audit (Green Solutions, 2012). The study only provided two audits—one baseline and one post-intervention—so the results do not indicate whether cart tags have any long-term impacts, but the findings still suggest that one round of cart tags can reduce recycling contamination.

Another cart tagging program conducted in 2018 by Clackamas County, in northwestern Oregon, also found that cart tags on residential recycling carts helped decrease contamination. Auditors visited 3,714 households on 14 residential recycling routes, placing “Nice Job” tags on clean carts and oops tags on contaminated ones. During the first week, auditors placed “Nice Job” tags on 37% of households. Five weeks later, during the last week of tagging, the number of households with “Nice Job” tags increased to 54%. By the end of the six-week project, 64% of routes demonstrated statistically significant decreases in contamination (Clackamas County, n.d.; Ludington, 2019).

Education, outreach, and communication. Resident education may also prevent contaminants from entering recycling containers, but results are mixed. According to Washington’s Department of Ecology (n.d.-b), education is paramount: “While there are many ways to reduce contamination, the most important is education.” But some studies

of resident education suggest the opposite. In a 2007 – 2008 recycling improvement pilot, King County found that its educational strategies did not decrease contamination. Instead, contamination rates at the five pilot apartment complexes remained high: 14% at the pilot’s outset and 15% after interventions were made (King County Solid Waste Division, n.d.). Quantifying education’s impact is also challenging, as educational campaigns often involve multiple strategies. Furthermore, definitions of education vary among recycling organizations. For instance, in King County’s 2007 – 2008 pilot, the County considered the following tools educational: signs, posters, newsletters, refrigerator magnets, and container labels (King County Solid Waste Division, n.d.). National nonprofit Recycle Across America, however, views container labels as a standardization tool, not an educational one (Szczepanski, 2018). Therefore, while resident education may contribute to contamination reduction, the impacts of education might be more accurately measured when broken down into separate components.

Harmonized messaging about what is recyclable may also be an effective educational tool. Communities using the same MRF would receive the same messaging, and residents would “hear the same recycling message no matter where they live, work or play” (The Recycling Partnership, 2017). Communities in western Washington, however, generally lack such messaging. Even though cities such as Kent, Bellevue, and Mercer Island send their recyclables to the same MRF, where all incoming materials receive the same treatment, these cities do not promote exactly the same recyclables. Kent’s website, for instance, encourages residents to recycle bundled plastic bags and aluminum foil and trays, while Bellevue’s and Mercer Island’s sites discourage residents from putting these items in recycling carts (“City of Bellevue residential recycling, organics, & garbage

guide,” n.d.; “Clean recyclables only,” n.d.; “Mercer Island recycling guidelines,” n.d.; “Plastic bag recycling,” n.d.). To curb contamination, King County’s Responsible Recycling Task Force recommends harmonizing recycling programs and messaging (King County Responsible Recycling Task Force, 2019). The Recycling Partnership has made the same recommendations and also argues that there should be regular forums for communities within the same MRFshed (The Recycling Partnership, 2017). A MRFshed is a group of communities within the same geographic area that sends recyclables to the same MRF (The Recycling Partnership, 2017). State recycling programs could organize the forums, where municipalities, solid waste authorities, haulers, and MRF operators could discuss coordinating their messaging about what is recyclable (The Recycling Partnership, 2017). Washington’s Department of Ecology also encourages a MRFshed approach to messaging (Washington State Department of Ecology, n.d.-b).

One approach to harmonized messaging is standardized labels. Mitch Hedlund, executive director of Recycle Across America, argues that standardized labels could eradicate most contamination. Her organization has designed waste container labels to be used in any city, state, or organization (Recycle Across America, n.d.-a). Many of the

waste container labels at The Evergreen State College are actually Recycle Across America stickers. While Hedlund does not view her organization’s labels as educational tools (Szczepanski,



Figure 3: Label used at Yosemite National Park (Recycle Across America, n.d.-b)

2018), she believes the labels are powerful. As evidence of her labels’ success, she cites

multiple examples, including campaigns in Rhode Island and Yosemite. In its first year of implementing statewide standardized labels, Rhode Island's sole recycling facility rejected 20% fewer truckloads for contamination (Szczepanski, 2018). After Yosemite National Park started displaying Recycle Across America's labels on its recycling containers, contamination there decreased to less than 8% (Bornstein, 2018). While Hedlund presents a strong case for the effectiveness of standardized labels in reducing contamination, outside sources would need to validate her claims, as Recycle Across America appears to be the only body measuring the labels' effectiveness.

Conducting door-to-door outreach may also reduce contamination. In a 2008 study in Milwaukee, Wisconsin, interns visited residents at home, shared recycling information with them, and gave them a bag containing a pencil made from recycled materials along with a flyer about the city's recycling program. If residents were not home, interns placed the bag on a doorknob. By the end of the pilot, the number of contaminated carts at control properties without outreach had decreased by 3.11%, while the number of contaminated carts from homes receiving outreach dropped by 7.2% (Maher & Beimborn, 2008). A 2013 pilot in King County also found door-to-door outreach decreased recycling contamination. In this pilot, outreach staff invited residents to take a recycling quiz, asked them questions about their recycling habits, and gave them a free tote bag for storing and carrying recyclables. If residents were not at home on the third outreach attempt, staff left the tote bag, along with educational materials, on the doorknob. To measure contamination rates, staff looked into waste containers and estimated the volume of recyclables and contaminants. On average, pilot groups had a post-pilot contamination rate of 20%, compared to control properties with a

contamination rate of 48% (Cascadia Consulting Group, Inc., 2014). The decrease in contamination cannot be wholly attributed to door-to-door outreach however, as outreach was used in concert with improvements to properties' waste infrastructure, such as attaching multilingual labels to waste containers, posting signs in waste enclosures, and increasing properties' weekly recycling capacity.

Government policies. State, county, and local governments may also establish policies that remove contaminants from waste streams. For instance, plastic bag bans address contamination by decreasing purchases of the problematic contaminant. Taylor and Villas-Boas (2016) found that customers used fewer disposable bags, and fewer bags in general, in communities where plastic bag bans had been paired with paper bag fees. San José, California also experienced the same impacts after imposing a ban on plastic bags and a fee on paper bags: reusable bag use increased from 4% pre-implementation to 62% post-implementation, and the number of customers opting out of bags increased from 19% to 43% (City of San José, 2013). As of September 2017, 271 local governments in the U.S. had banned or placed fees on single-use plastic bags. California has also implemented a statewide ban on plastic bags (Wagner, 2017).

Bottle bills are another statewide policy that contributes to lower contamination rates. With bottle bills, or container deposit laws, customers pay a container deposit when purchasing bottled drinks such as soft drinks or beer and then redeem the deposit when they return empty bottles to stores, redemption centers, or reverse vending machines (Oregon Department of Environmental Quality, n.d.; "What is a bottle bill?" n.d.). Ten states currently have bottle bills, and proponents claim that the policies make recycling streams cleaner (Karidis, 2018). In an article for industry publication *Waste Age*, Fickes

(2011) argues that cross contamination rates are lower in Iowa, a bottle bill state, because residents place less glass out for curbside collection. King County's Responsible Recycling Task Force has also recommended that Washington develop a program similar to Oregon's for managing beverage containers (King County Responsible Recycling Task Force, 2019).

Another policy strategy for reducing contamination relates to improving packaging design. According to the King County Responsible Recycling Task Force (2019), packaging changes are responsible for many recycling contamination issues. The Task Force recommends that local governments partner both regionally and nationally to support "design-for-recycling" (King County Responsible Recycling Task Force, 2019), where product designers intentionally create packaging that is easier to recycle. This recommendation is in line with Extended Producer Responsibility (EPR) policies, which address upstream solutions to materials management by encouraging manufacturers to consider product reuse and disposal in their designs (Massarutto, 2013).

Cities and counties with single-stream recycling can also reduce contamination by eliminating common contaminants from their recycling programs. Local governments develop lists of items that residents can recycle, and as new technologies develop, materials may be added to these lists. Materials may also be removed when recycling markets change, as has happened with National Sword. To reduce contamination, King County's Responsible Recycling Task Force recommends removing shredded paper, plastic bags, and plastic film from recycling programs in Seattle and King County (King County Responsible Recycling Task Force, 2019). Washington's Department of Ecology also suggests removing these materials, but the agency recommends culling even more

items: aluminum foil, trays, and pie pans; and plastic cups, trays, and clamshells (Washington State Department of Ecology, 2010; Washington State Department of Ecology, 2016; Washington State Department of Ecology, 2018). Removing these items from recycling programs would likely reduce cross contamination of other recyclables and improve the marketability of higher quality materials. Due to its small size, shredded paper often contaminates other recyclables, and aluminum and plastic trays, pans, and clamshells flatten easily and are often mistakenly sorted into paper bales (Washington State Department of Ecology, 2018). These items are also often contaminated with food, another cause for concern (Washington State Department of Ecology, 2018).

Solid Waste Contracts

For most cities in western Washington, acceptable items lists come from their solid waste contracts. If the city contracts with a private vendor for recycling collection, the parameters of the city's collection program, including acceptable levels of contamination and contamination mitigation strategies, are often outlined in the collection contract. Solid waste contracts lay the foundation for how most western Washington cities manage their recycling collection programs. The following section provides an overview of these solid waste contracts: their purpose, procurement process, and use regionally.

Contracting out public services. Instead of providing public services directly, many governments choose to contract out some of these services. When contracting out, the government maintains control of the service but hires a private vendor to deliver it (Seidenstat, 1999b). One of the main motivators for contracting out is cost savings

(Moore, 1999; Seidenstat, 1999a), although some research suggests that contracting out services does not necessarily lead to actual savings (Bel, Fageda, & Warner, 2010).

Governments also contract out to access resources they may not have, such as a vendor's specialized skills or innovations (Moore, 1999; S. Fife-Ferris, personal communication, May 3, 2019). Contracts are used extensively for public services such water distribution, building maintenance, and solid waste collection (Bel et al., 2010; Seidenstat, 1999b; Walls, 2005).

Contracting out solid waste collection in western Washington. Contracting out a service such as solid waste collection follows a typical process. The government first solicits proposals from private vendors. After releasing a request for proposals (RFP), the government goes through a competitive process to evaluate proposals, choose a finalist, and award and negotiate the contract (S. Fife-Ferris, personal communication, May 3, 2019). To select a finalist, the government generally uses qualitative and quantitative criteria, such as service quality and the proposal's overall cost (G. Coville, personal communication, March 6, 2019; Seidenstat, 1999b; S. Fife-Ferris, personal communication, May 3, 2019). In western Washington, most cities hire consultants to draft new solid waste collection contracts. The consultant first identifies any changes or goals that the city may have for its new contract (S. Fife-Ferris, personal communication, May 3, 2019). Next, the consultant uses the city's current contract, as well as the most recently signed contract from the region, to develop the new contract's base language, which is often included in the RFP (S. Fife-Ferris, personal communication, May 3, 2019). Finally, after selecting a vendor, cities and haulers enter into a negotiation process

where they finalize the contract terms (S. Fife-Ferris, personal communication, May 3, 2019).

Contracting out recycling collection is common nationally and regionally. In a study of 1,000 U.S. communities, researchers found that contracted out collection was the most common mode of curbside recycling service delivery, followed by government-provided service (Walls, Macauley, & Anderson, 2005). In western Washington, most cities contract out their recycling collection. Of cities with populations 15,000 or greater, 79% currently contract out this service.

Western Washington cities that do not contract out recycling collection provide the service in one of two ways. Some cities, such as Tacoma and Olympia, provide their own recycling collection services. These cities have large solid waste divisions, and collection is provided with city trucks and by city employees. Other cities, such as Everett and Lacey, delegate service to a private waste hauler without using a contract. For these cities, customer rates, terms of service, and haulers are determined by the Washington Utilities and Transportation Commission (WUTC). Small cities without solid waste staff to manage collection contracts often opt for this mode of service, as the WUTC or local county can provide service oversight when the city cannot (K. Harless, personal communication, February 25, 2019). WUTC-regulated service is also appealing because the contracting process can be very time-consuming, complex, and difficult (Brown, Potoski, & Van Slyke, 2006; S. Fisher, personal communication, March 8, 2019). In contrast, larger cities often opt for collection contracts because they offer more control over service options, the ability to determine rates, and lower costs for customers

(B. Lovaas, personal communication, March 6, 2019; S. Fife-Ferris, personal communication, May 3, 2019).

Research on solid waste contracts. Even though collection contracts are common in solid waste service delivery, there has been little scholarship on their content or how they address recycling contamination. To my knowledge, there are no published studies on the content of solid waste contracts as they relate to recycling contamination. Most research on solid waste contracts compares contracting out to providing in-house collection. The following section summarizes the extant research on these contracts.

In general, research on solid waste contracts analyzes the costs and benefits of contracting out solid waste collection. Even though these studies implicitly address solid waste contracts, they are not concerned with comparing contracts; rather, they are interested in comparing contracted-out versus government-provided services. Some of these studies have analyzed the potential cost savings of contracting out. For instance, Adie and McDavid (1999) reviewed Canadian studies that compared public and private solid waste collection services. All five studies surveyed suggested that the cost per household (or per capita) is lower when service is contracted out (Adie & McDavid, 1999). However, a 2010 study on contracting out solid waste collection and water distribution challenged this assumption. Bel, Fageda, and Warner (2010) argue that the evidence supporting cost savings from privatized services is mixed and cannot be proven empirically.

Other research has examined whether contracting out brings service improvements. For example, Merickova and Nemecek (2013) analyzed the costs and

benefits of contracting out waste services in Slovak municipalities. Their findings show that contracting out services does not automatically improve efficiency or service quality. A Brazilian study also compared the costs and benefits of two solid waste collection systems, one managed through contracts and one managed by a public-private partnership. This study concluded that the public-private partnership provided better waste diversion services than the contracted-out service (Marconsin & Rosa, 2013). As with the previous study, Marconsin and Rosa's work focused on the generalized impacts of contracting out waste collection but not the contracts themselves.

Instead of concentrating on the outcomes of different service provision models, some studies on garbage and recycling collection services have analyzed why cities opt for one model over another. For instance, Walls et al.'s 2005 study investigated what determines whether communities contract out. The authors found that the key factor was cost of service. Asset ownership was also a significant factor, meaning that cities using government-owned MRFs, for instance, were more likely to choose government-provided recycling collection. Most other factors included in the study, such as state purchasing standards and environmental regulations, played insignificant roles in determining whether cities contracted out garbage and recycling collection services (Walls et al., 2005). Even though this study addressed recycling collection, it only dealt with the contracting environment, as opposed to the contracts' contents.

In contrast, a 2005 study actually examined the language of seven solid waste contracts. Walls (2005) researched the design of solid waste collection contracts from seven U.S. cities, including Seattle and Bellevue. The study focused on three aspects of the contracts: financial incentives for recycling, asset ownership (who owns and operates

the disposal and processing facilities), and contract specificity (whether the contracts list which materials are collected or which facilities receive them). In analyzing contract specificity, Walls found that each sample contract explicitly stated which recyclables must be collected but that four of the seven contracts did not spell out which MRF must receive the collected recyclables. Walls' study is one of the few to compare contract language related to recycling, but her research does not encompass many contracts or address contamination-related provisions.

A different study of municipal waste collection programs did consider contract provisions related to recycling. In a case study of Carrollton, Ohio's collection program, Chowdhury (2009) argues that curbside recycling programs can create cost savings for customers and increase recycling. He advocates for incorporating the Pay-As-You-Throw (PAYT) model into recycling collection contracts, where customers are charged by the amount of waste they generate. In discussing how to set up a recycling collection program, Chowdhury makes one recommendation related to contamination: he suggests including a provision for using separate trucks to collect garbage and recyclables. Even though contamination provisions are a sidebar in his study, Chowdhury's work is the only peer-reviewed study to my knowledge that has touched upon recycling contamination provisions in contracts.

While not a comparative study of collection contracts, an online tool from the Environmental Protection Agency (EPA) provides some examples of contract language promoting clean recyclables. The Managing and Transforming Waste Streams Tool lists 100 waste prevention strategies and provides examples of how each strategy has been implemented in various U.S. communities (US EPA, 2015). Most pertinent to my

research is a list of waste prevention provisions from model local government contracts. While only one provision in the list directly names contamination, several provisions are relevant to reducing it. These provisions include requiring contractors to set limits on contaminants at MRFs, reporting requirements for residual tonnage, and education and outreach clauses (US EPA, 2015).

The EPA tool is an attempt to catalogue best practices, but the resource does not address the effectiveness of the measures it promotes. For instance, an excerpt from Renton's previous collection contract appears in the section on exemplar contract clauses. The contract excerpt contains provisions requiring the contractor to meet established limits on contaminants and allow city staff to access MRFs at any time to monitor loads (US EPA, 2015). While the online tool promotes this excerpt as a model of language to include in contracts, the two provisions mentioned above received low effectiveness ratings from my research participants (see pages 64-65 for more information on these results). In sum, the EPA's online tool may be the only resource on contract provisions promoting waste prevention, but the tool still has relatively little information on contamination-related contract provisions and promotes provisions that may actually have little impact on reducing contamination.

Conclusion

In reviewing the research on recycling contamination and solid waste contracts, this chapter has attempted to contextualize my research on how municipal solid waste contracts in western Washington address recycling contamination. Some aspects of recycling contamination have been well-researched. For instance, there are many studies

on how contaminants impact the sorting and reprocessing of recyclables. Other topics covered in this chapter have received little scholarship. Crucially, the focus of my research—recycling contamination and solid waste contracts—has received little to no attention. To my knowledge, no studies have analyzed a large group of solid waste contracts at a fine grain. The research on them has been conducted on a more macro scale and centered around analyzing the costs and benefits of contracting out solid waste collection. The contracts have only been studied in aggregate, and when they have been the subject of research, the research question has focused on the impacts of contracting out waste services, not the contracts themselves. What I have researched with this thesis—the language of individual contracts as it relates to recycling contamination—has likely not been studied before. As local governments try to adapt their recycling programs to current markets, which have become rather unforgiving to contaminated recyclables, information about how contracts can address contamination will be important to reducing contamination in municipal programs. The following chapters describe my original research on the under-examined relationship between municipal solid waste contracts and recycling contamination.

Methods

This chapter describes how I gathered and analyzed data on recycling contamination mitigation strategies in municipal solid waste contracts. The first section summarizes my data collection and analysis. The next describes which attributes I used to determine my sample. The third section details how I collected and evaluated municipal solid waste contracts, and the final section explains how I conducted and analyzed interviews with solid waste managers.

Overview

To study the effectiveness of contract provisions related to mitigating recycling contamination, I used a mixed-methods approach. After collecting solid waste contracts from cities in western Washington, I examined the contracts using basic content analysis. Through this analysis, I was able to identify and categorize contamination mitigation provisions in the contracts. While studying these provisions was critical to understanding contract content and scope, I also interviewed staff responsible for managing the contracts to provide context for how the provisions are implemented. The interview questionnaires were also mixed-method, as they gathered both quantitative and qualitative data. After completing the interviews, I analyzed participant responses using descriptive statistics and content analysis.

Sample

For my study, I limited my sample to cities that contract out single-stream curbside recycling collection. Since I was interested in studying municipal contracts, I excluded cities that provide in-house recycling collection as well as cities served by

private waste haulers that operate under WUTC regulations. Cities that do not have single-stream curbside collection were also excluded because they typically have fewer contamination issues. Cities with dual-stream recycling, for example, generally experience less contamination (Jamelske & Kipperberg, 2006; Lakhan, 2015), and consequently may have fewer contamination provisions in their contracts. Therefore, to compare contracts of similar scope, I excluded cities with dual-stream or drop box recycling systems.

I also excluded cities from eastern Washington because they tend to have different recycling collection programs. These cities often accept fewer items for recycling because processing costs are generally higher east of the Cascades. Sorting facilities are scarce—there is only one MRF in eastern Washington—so transporting recyclables is more expensive. Eastern Washington also has few to no end users of recyclables, such as steel mills and glass plants, which further increases transportation costs. While some of eastern Washington’s largest cities do have curbside recycling programs, comparatively fewer cities in eastern Washington offer them. Instead, they often provide public drop boxes (see Figure 4). Another cause of the regional differences in recycling programs is that landfilling fees tend to be lower in the eastern part of the state (Washington State Department of Ecology, n.d.-c), which makes establishing cart-based recycling services

less cost-effective. Because recycling programs in eastern Washington differ from those in western Washington, the contamination issues they face likely differ as well.

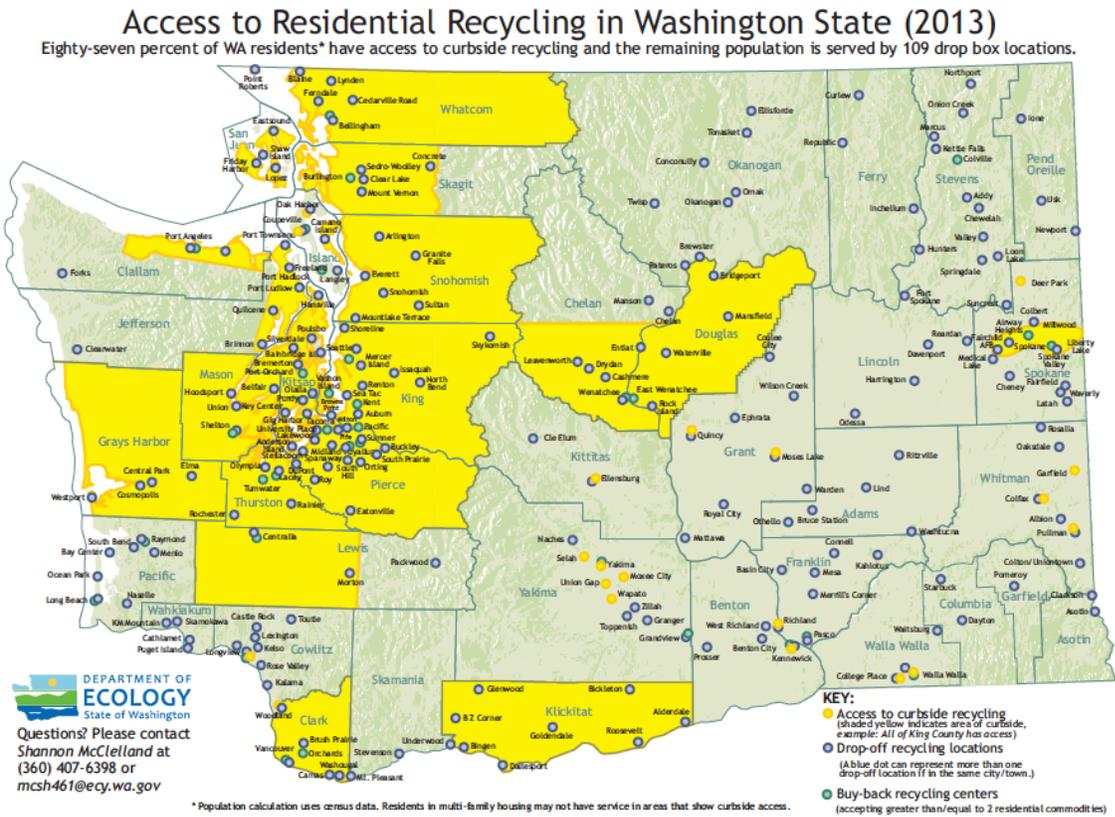


Figure 4: Curbside recycling in WA. Yellow areas have access to curbside recycling. (Washington State Department of Ecology, n.d.-a)

Of the cities in western Washington with contracted-out single-stream curbside recycling, I sampled all cities with populations greater than or equal to 15,000 (see Appendix A for a complete list of sampled cities). I excluded cities with very small populations because I assumed that staff at these cities spend little time monitoring contracts and managing solid waste programs. Even cities with 50,000 residents may lack full-time solid waste staff, so I would expect staff at cities smaller than 15,000 to have little contract knowledge or time dedicated to recycling contamination. My interview data also supported this assumption: of the contract managers I interviewed who work for cities with populations 64,000 or less, nine out of ten reported that they devote 35% or

less of their time to solid waste (see Figure 5). Limiting my sample size also allowed me to conduct my research in the time allotted for thesis work.

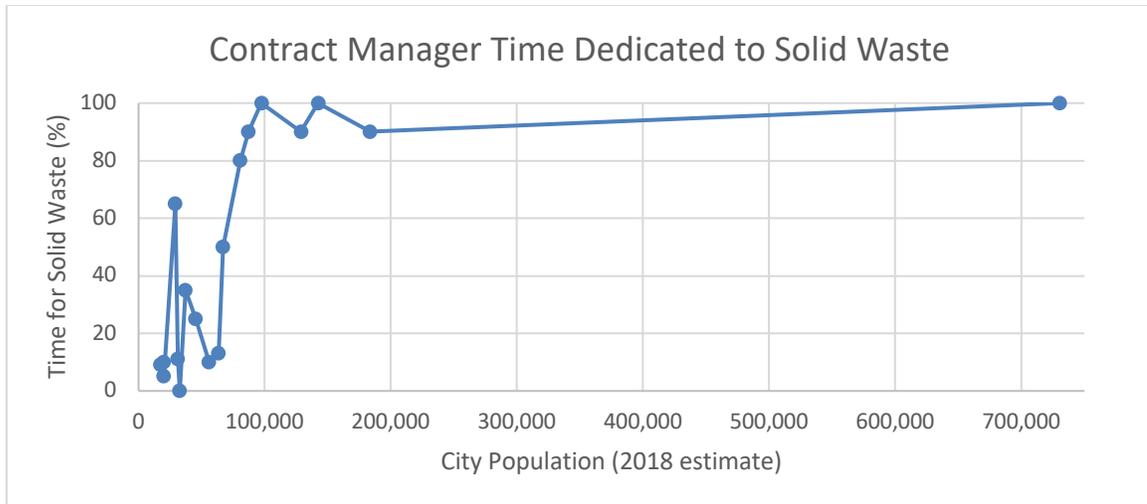


Figure 5: Percentage of contract manager time spent on solid waste

To reduce researcher bias, I partially excluded one more city from my sample: Renton. While Renton met all my sample criteria—single-stream curbside recycling, contracted-out collection, and a population above 15,000—I was an employee of Renton’s Solid Waste Utility while doing my thesis research. As such, I was directly involved in contract compliance and may have been too subjective when communicating with hauler staff serving Renton and the municipal contract manager, a.k.a. my supervisor. Although I chose not to interview staff responsible for Renton’s contract, I included the contract in my sample, as I did not believe that my employment with the city would bias my interpretation of Renton’s contract provisions.

Because I sought specific contracts and participants for my study, my sample was purposive. With purposive sampling, researchers select particular texts or participants because they believe that these sources will provide significant insight into their research questions (Drisko & Maschi, 2015). Because my sample was purposive and not random,

my results are not generalizable to contracts outside western Washington. The nature of my sampled units—the contracts—also precluded me from conducting inferential statistical tests. The contracts were not entirely independent, as some were based off each other. As mentioned in the previous chapter, new contracts in western Washington are generally adapted from the most recent one, and one consultant was responsible for writing or helping to write 61% of the sampled collection contracts (J. Brown, personal communication, May 16, 2019). Since my units were not independent, I only applied descriptive statistics to my data.

Contracts

Data collection. To analyze contract provisions related to recycling contamination, I first had to obtain copies of the current solid waste collection and processing contracts for all sample cities. I received most copies by emailing solid waste managers or public works staff, but some cities required me to complete a public records request. For cities without solid waste divisions, submitting public records requests was sometimes the best way to get copies of the contracts.

Most sample cities had only one solid waste contract, but some cities had more. Several municipalities were served by two haulers and thus had multiple collection contracts. If one of the two haulers only served a fraction of the city, as was the case with several municipalities, I only considered the collection contract with the principal hauler. For Seattle however, where two haulers serve equally large areas, I included both collection contracts in my sample. I also included Seattle's recycling processing contract. Even though no other sample city had a separate processing contract, all other collection

contracts in my sample included processing provisions, so excluding Seattle's processing contract would have left out critical data.

There were also a few sample cities that shared one contract. In Clark County, in southwestern Washington, three cities operate their recycling programs according to a collection contract that the county has with one hauler. Because of the contract relationships in Clark County and Seattle, there is not a one-to-one correspondence between the number of contracts and the number of cities in my sample, although there appears to be one. Even though I sampled 43 contracts from 43 cities, not every city had its own collection contract, and some cities had multiple contracts.

Data analysis

Content analysis. To analyze the contracts in my sample, I used content analysis. Content analysis refers to a group of research techniques that aim to make inferences from systematic studies of textual content (Drisko & Maschi, 2015; Weber, 1990). Drisko and Maschi (2015) argue that “all content analysis is a form of data reduction” where “many texts...are compressed into a few core categories, themes, or ideas” (p. 34). In essence, content analysis “classifies textual material, reducing it to more relevant, manageable bits of data” (Weber, 1990, p. 5). Since one of my goals was to identify and classify contamination provisions in contracts, content analysis seemed like the most appropriate tool.

Content analysis has different approaches, and the particular technique that I used was basic content analysis. The main purposes of this approach are description and data organization (Drisko & Maschi, 2015), and the technique suited my research needs for

several reasons. First of all, basic content analysis mainly focuses on the literal meaning of the text (Drisko & Maschi, 2015), which is what interested me in the contracts. Researchers using this technique tend to code the text's manifest data, or what is overtly present, versus the latent data, which is implicit (Drisko & Maschi, 2015). Basic content analysis also relies heavily on quantitative analysis, especially descriptive statistics and frequency counts (Drisko & Maschi, 2015). Analysts commonly use this method to identify the percentage of a text that is focused on certain topics (Drisko & Maschi, 2015). Because my research was concerned with the types and frequency of contamination provisions in the contracts, this approach aligned well with my research. Furthermore, basic content analysis commonly uses purposive sampling (Drisko & Maschi, 2015), my chosen sampling method. Finally, basic content analysis generally scrutinizes existing documents that are publicly accessible (Drisko & Maschi, 2015), which is characteristic of municipal solid waste contracts.

Identifying and categorizing provisions. To identify provisions related to contamination, I read the main body of the contracts, as well as their attachments and amendments, if included. I looked at all sections, not just those explicitly about recycling. While I read each page of the first contracts that I had gathered, I skimmed over the least relevant sections of the latter contracts. These sections addressed topics such as annexation, labor disruptions, and insurance. Because many of the contracts were based off of each other, some chunks of text were copied verbatim. After reading these sections thoroughly in roughly the first half of contracts, finding no provisions in them related to contamination, and encountering facsimiles of these sections in later contracts, I chose to skim through these areas in the last contracts I read.

As I read, I highlighted provisions concerned with recycling contamination. Many provisions were directly related to contamination, such as the following from Issaquah's collection contract: "Contractor's Drivers will leave 'oops tags' on Recycling Carts contaminated with 20% or more unrecyclable materials based on a visual audit" (2011, p. 35). I also highlighted provisions less explicitly related to contamination, such as requirements to label all recycling containers with materials preparation instructions. Since labeling containers is considered a strategy for combating contamination (Szczepanski, 2018), I included container labeling provisions in my data. I also highlighted provisions related to education, such as annual outreach to all multifamily complexes [apartments and condos], because the literature on contamination cites education as another mitigation strategy (Washington State Department of Ecology, n.d.-b). While many contracts included protocols for contaminated organics, I did not include these in my study as my research focused solely on recycling contamination.

I also excluded other provisions directly related to contamination if they did not address my research question. These provisions mentioned contaminants but had no bearing on preventing or mitigating recycling contamination. The following provision, for instance, was excluded: "All non-Recyclables and contaminants requiring disposal shall be directed to the County Disposal System or an alternative authorized by the [Public Works] Director" (Clark County, 2008, p. 9). While the provision describes where recycling contaminants should be disposed, the process inscribed in the provision would do nothing to prevent or reduce contamination.

I also excluded provisions that potentially addressed contamination but were too many steps removed to be considered contamination prevention or mitigation measures.

For example, many contracts outline procedures for developing pilot programs. Consider the following provision from the “Pilot Programs” section of Vancouver’s collection contract: “The City may wish to test and/or implement one or more new services or developments in waste stream segregation, materials processing or collection technology at some point during the term of the contract” (2019, p. 14). This provision could provide a pathway for Vancouver to conduct a pilot on mitigating recycling contamination, but there is no suggestion that the pilot would actually address contamination. While the provision sets the stage for possible work on recycling contamination, the provision seemed too far removed from actual service expectations concerning contamination. Consequently, I excluded this provision from my data, along with other provisions that I deemed too tangential.

After identifying a unique provision related to contamination, I paraphrased it and logged it in an Excel worksheet. Each provision was entered as a column header, and data for sample cities were recorded in separate underlying rows. As I identified provisions in each new contract, I placed tallies under the corresponding column headings (see Figure

6). Since my research question asked *which* contamination provisions were in the contracts, and not *how many* times the same protocol appeared in each contract, I did not

		All recycle containers must have materials prep labels	Recycle carts must have materials prep labels	Dumpsters & drop boxes must have materials prep labels	Commercial recycle carts & dumpsters must have materials prep labels
1	CONTRACT				
2	Aberdeen				
3	Anacortes		1		
4	Arlington				
5	Auburn		1		1
6	Bellevue	1	1	1	
7	Bonney Lake				
8	Bothell	1	1	1	
9	Bremerton				
10	Burien		1		1
11	Camas				
12	Centralia				

Figure 6: Section of Excel spreadsheet used to record contract provisions

make additional tallies if the same provision was mentioned again in a single contract. For instance, Bellevue's contract repeatedly mentions labeling recycling containers with materials preparation instructions, but I did not record how many times this service requirement appears, only that it does (see Figure 6). When I identified new provisions, I created new column headings for them, and I organized the columns into provisional categories, such as "labels" and "color." The distinctions between provisions were made at a small grain, meaning for instance that provisions for labeling carts, dumpsters, and commercial containers were logged separately (see column headings in Figure 6). A list of all provisions, as well as contract language exemplifying each one, can be found in Appendix B.

Once I had read roughly two-thirds of the contracts, I reached data saturation. Data saturation can be understood as information redundancy (Saunders et al., 2018). In qualitative research, data saturation often indicates that additional data collection or analysis is not needed or would be counter-productive (Saunders et al., 2018). As I read the final one-third of contracts, I did not find many new contamination provisions. The exception was Vancouver's contract, which I read last, because it was new and had not been approved by council until well into my research process. Vancouver's contract contained many unique provisions related to contamination, which makes sense, as it was one of the few contracts I read that went into effect in 2019, at a time when contamination was a greater concern for municipalities and haulers.

After reading all the sample contracts and identifying and recording their contamination provisions, I grouped the provisions into broad categories. To do so, I wrote out each provision at the top of a notecard and then jotted down possible categories

for the provision, such as “education” or “processing.” Next, I placed the notecards into groups, according to the most commonly appearing categories. Once all the cards had been grouped, I reviewed the cards within each category for redundancies. During this process, I found two provisions that were the same. After referencing the language in the original contracts, I collapsed the provisions into one and adjusted my tallies.

After verifying that each provision represented a unique contract expectation, I split the large categories into smaller subgroups by dividing the cards into smaller piles. As I placed each notecard under a subcategory, I flagged the card with a yellow sticky note if I recognized that the provision also fit under another subcategory (see Figure 7).

For example, a provision in Marysville’s contract (2012) requiring multifamily property owners to train their custodial staff to support recycling, help deliver educational information, and monitor waste enclosures fits under multiple categories, including monitoring and distributing educational materials. After placing the cards into secondary groups, I went back through the small card piles to be sure that each provision was placed



Figure 7: Photo of notecards for individual contract provisions. The cards have been arranged into five subcategories under the main category “Labels.”

within the most appropriate subcategory. Next, I recorded which categories each provision belonged to in another Excel worksheet. This organizational tool allowed me to calculate which categories and subcategories had the most provisions.

My process of labeling and ordering contract provisions can be understood as a form of descriptive coding. Coding is a method of qualitative data analysis where researchers assign labels to chunks of data to organize and condense information (Miles, Huberman, & Saldaña, 2014). In descriptive coding, the codes summarize the basic topic of the data chunks in single words or short phrases, often in the form of nouns (Miles et al., 2014). The codes that I used to label and categorize contract provisions were generated inductively, meaning that they had not been established before I began reading and coding the contracts (Miles et al., 2014).

Assessing effectiveness. After coding the contract provisions, I assessed how effective they are at reducing recycling contamination. To do this, I used several approaches. Using Excel's filter, sum, and ranking functions, I determined which individual provisions and provision categories appeared most frequently in the contracts. I then compared the most common provisions and provision types to best practices in the field for reducing contamination. I used the best practices that I had already identified in my literature review as the source of comparison, along with best practices that were shared by research participants during interviews (see the following section for information on my interview methods). I also used participant answers to a survey question where I had asked participants to rate the effectiveness of 10 contract provisions. I employed all three methods to evaluate the effectiveness of the provisions I had identified in the sampled contracts.

Interviews

Data collection. In addition to searching for contamination-related provisions in solid waste contracts, I conducted structured interviews with public- and private-sector staff who manage the contracts, as well as public-sector staff responsible for in-house municipal solid waste programs. My goal was to learn what contract managers think of the contract provisions, how managers oversee their contracts, and what managers think about using contracts to mitigate recycling contamination. My participants were the municipal staff members and hauler employees most responsible for contract oversight. For cities without solid waste contracts, I interviewed people who manage aspects of their cities' recycling programs. To reduce researcher bias in my sample, I did not interview Renton's contract manager or the municipal manager of the private hauler that serves Renton. Because the managers and I sometimes work together on contract compliance issues, it would have been difficult for the managers to answer my questions freely and challenging for me to conduct the interviews objectively.

To structure the interviews, I developed three questionnaires. I created one for each participant type: municipal staff managing contracted-out solid waste services, private hauler staff responsible for complying with municipal contracts, and municipal staff managing in-house programs. Because I wanted a mostly quantitative analysis of interview responses, I made most of the questions closed-ended. To read the three questionnaires, see Appendices C, D, and E.

While I could have asked my participants to respond to my questionnaires through online surveys or mailed-in responses, I opted to engage with participants directly

through in-person and over-the-phone interviews. When questionnaires are delivered face-to-face, participants are more likely to provide long responses (McGuirk & O'Neill, 2010), which is something I wanted. The interview format also allowed me to ask follow-up questions, which gave me the opportunity to clarify participants' answers and encourage them to share more information.

To recruit participants, I emailed program managers and requested interviews. After participants agreed to an interview, I emailed them an informational letter about my research and a consent agreement to be part of the study. For copies of these documents, see Appendices F and G, respectively. If I did not already have copies of their solid waste contracts, I used the recruitment email to request digital versions.

I conducted the interviews in person and over the phone. For in-person interviews, I provided participants with a physical copy of the questionnaire, and for over-the-phone interviews, I emailed digital copies to participants. During the interviews, I read the questions aloud and wrote participants' answers on a personal paper copy of the questionnaire. I also made audio recordings of the interviews to ensure that I had accurately recorded participants' answers. Interviews lasted from 9 to 97 minutes, with a median length of 35 minutes. In total, I conducted 23 interviews: 8 in person and 15 over the phone. After the interviews were over, I entered participants' answers into digital versions of the questionnaires on SurveyMonkey. This software helped me collate participants' answers and re-familiarize myself with the responses.

Throughout the interview process, I took several steps to protect participants from risk. Before reaching out to participants, I completed a human subjects review

application, where my questionnaires, informational letter, consent form, and recruitment emails were approved by The Evergreen State College's Institutional Review Board. During the interviews, I started the audio recordings a minute or two into the interview—once personal introductions were over—to avoid recording participants' names. I also concealed participants' identities by using codes to identify the documents associated with their interviews. To create the codes, I used Excel to randomly assign a number to all cities in Washington, and I used this number to label the audio files from the interviews and the paper copies of the questionnaires where I had recorded participants' answers. I kept the key linking participants' identities to their codes in only one location, and once my thesis was published I deleted the file containing the key.

Data analysis

Quantitative. By design, most of my interview questions could be analyzed quantitatively. To develop descriptive statistics from the responses, I downloaded the answers to quantitative questions from SurveyMonkey into Excel. Where appropriate, I plotted the data and calculated the median. I used the median instead of the mean because my data were not collected randomly. Because my sample was purposive (and not random), I did not perform any inferential statistical tests.

Qualitative. I used qualitative methods to analyze participant responses to two open-ended questions: “Please explain your answer to [the previous] question: ‘Do you think solid waste contracts could be effective tools for reducing recycling contamination?’” and “Is there anything else you would like to share about solid waste contracts or recycling contamination mitigation strategies?” As I conducted interviews, I

made marks in my notes to highlight the sections of responses most directly related to my research question. To analyze the completed interviews, I established themes using the cutting and sorting method. With cutting and sorting, the researcher identifies exemplars, which are the most important quotes or expressions, and arranges the exemplars into piles of similar expressions (Bernard, Wutich, & Ryan, 2017). To create my “piles,” I typed the key interview quotes into a Word document, with sections for each interview. As I noticed overarching themes emerge, I grouped the related quotes in a separate section of the document. For each group of quotes, I wrote a sentence stating the shared theme, and I recorded how many participants had quotes related to it. After establishing the main themes, I reordered the piles by frequency, listing themes with the most supporting quotes first.

Unlike my contract analysis, I did not reach data saturation with my interview analysis. Each participant shared different perspectives in response to my open-ended question about whether solid waste contracts could be effective tools for reducing recycling contamination. I did not reach the point where, according to Grady, the researcher hears the same comments repeatedly, which signals a stop in data collection (as cited in Saunders et al., 2017, p. 1896). If I had interviewed more solid waste managers, I believe I would have encountered more diverse and novel opinions. This is not to suggest that my results are invalid but rather that additional interviews would better illustrate what regional contract managers think about the connection between contracts and recycling contamination.

Results

Contract Data

Overview of sampled contracts. For this study, I sampled 43 contracts from 43 cities in western Washington. The median contract length was 73 pages, and the median contract duration was 7.5 years. Most contracts (33) were for the collection of garbage, recycling, and organics, but eight contracts covered collection for just two streams, and one was exclusively for recycling collection. Another contract only addressed recycling processing.

Frequency of individual provisions. In reviewing the contracts, I identified 266 unique provisions related to reducing recycling contamination. Some provisions appeared frequently. The two most common provisions appeared in 74% and 69% of collection contracts, respectively. The nine most frequently appearing provisions were in at least half of the contracts (see Table 1). While some provisions were common in many contracts, over half of the provisions existed in only a few contracts. Of the 266 provisions, 176 appeared in only one or two contracts. For a complete list of provisions and their frequency in the sampled contracts, see Appendix B.

	Provision	# of Contracts
1	Reject contaminated containers for collection	31
2	Tag contaminated containers	29
3	Recycle carts have materials preparation labels	28
	Residential carts set down with lids closed	
4	Hauler website says how to prepare materials	26
	Performance fee for not notifying customer why container rejected	
5	City and/or hauler monitors set-out recyclables or waste composition	25
	Customer service reps trained to inform customers about recycling properly	
6	Hauler's monthly reports show residue disposed	24

Table 1: Most frequent contamination reduction provisions in sampled contracts

Provision categories. The contract provisions fit under two broad categories: prevention and what to do once contamination is present. I identified 161 provisions related to prevention. The prevention provisions fell under three main subcategories, which I classified as *preventative education and outreach*, *container conditions*, and *contamination prevention measures*. I identified 86 unique provisions related to preventative education and outreach, such as a requirement to deliver recycling educational materials with new recycling containers. For container conditions, I identified 59 provisions. These were related to container color, labeling, lids, locks, location, and nearby signage. The other prevention subcategory, *other contamination prevention measures*, had 16 related provisions. These included requirements such as biannual training on service initiatives for recycling drivers, as well as removing plastic bags—a common contaminant—from the list of accepted materials.

The other broad category of provisions addressed what to do once contamination is present. These 119 provisions consisted of measures in response to visible or present contaminants. I divided this category into two groups, depending on where the interventions would be made. For one group, *curbside contamination protocols*, I identified 76 provisions. These provisions included requirements such as tagging contaminated carts and asking customers to remove contaminants from their containers or pay to have their containers collected as garbage. The other main group of provisions in this meta-category concerned processing. These 43 provisions addressed processes for managing contaminants at MRFs, such as permission for the processor to reject portions of contaminated loads and ceilings on the percentage of prohibitives in outbound bales.

Interview Data

Overview of interviews. I conducted 23 interviews with solid waste professionals. Eighteen participants worked for municipalities and managed their cities' collection contracts. Three participants worked for municipalities that provide their own garbage, recycling, and organics collection services. Two participants worked for private waste haulers and managed the municipal collection contracts from the contractor's side.

In the interviews, participants responded to a range of questions about their work, recycling contamination, and contracts. While the questionnaires I used varied depending on the participant's employer (city with contracted out collection, city with in-house collection, or hauler), most questions were similar. The following section summarizes participants' responses to the questions most intimately linked to contracts and their ability to mitigate contamination.

Experience with contracts. To learn about managers' experiences with their contracts, I asked several questions. One question concerned how much time managers dedicate to solid waste, and two questions focused on how involved managers were in creating their current contracts. When contract managers who work for municipalities were asked what percentage of their position was dedicated to solid waste, the median response was 42.5%. When I asked the same participants how involved they were on a scale of 1 to 10 in creating their cities' current solid waste contracts, the median rating was 7.5 (a rating of 1 equaled "not involved at all" and 10 equaled "very involved"). For participants who were involved, I asked which roles they played in developing their contracts. Of the 11 contract managers who were involved in contract development, 91% negotiated contract terms, 55% revised the entire contract, 36% revised part of the contract and drafted sections of it, and 18% drafted the entire contract.

To evaluate how familiar contract managers are with their contracts, I asked two additional questions: how well managers know their contracts, and how often they review them. When asked how well managers know their contracts on a scale of 1 to 10, where 1 equaled "not at all" and 10 equaled "extremely well," the median response was 7. In regards to how frequently managers review their contracts, most managers stated that they scan or read sections of their contracts monthly (50%) or every two to three months (28%). The remaining managers scan or read parts of their contracts weekly (17%) or less than once a year (6%).

Recycling contamination. To evaluate the importance of contamination to participants, I asked them to express how concerned they are about recycling contamination in their service areas. Municipal contract managers, non-contract city staff,

and hauler staff provided their answers on a scale of 1 to 10, where 1 equaled “not at all” and 10 equaled “extremely concerned.” Most managers responded that they are concerned about contamination. The median rating was 8, and ratings ranged from 4 to 10 (see Figure 8 for all participant responses).

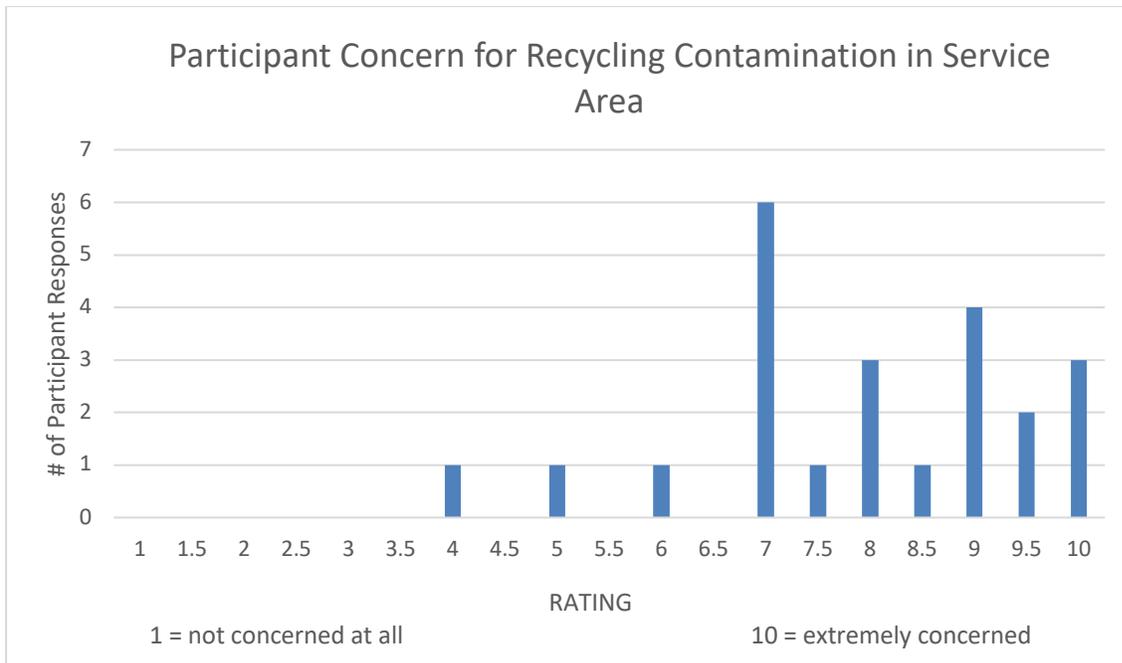


Figure 8: Participants’ concern about recycling contamination in their service areas

Contract provision effectiveness. To evaluate the contract provisions, I asked participants to rate their effectiveness. From the first three contracts I gathered, I chose 10 provisions that either seemed common or that I was curious to ask contract managers about. Participants rated the provisions on a scale of 1 to 10, where 1 equaled “has no effect on mitigating contamination.” Participants who worked for cities without collection contracts only rated eight provisions, since two were unrelated to their work. As demonstrated by Figure 9, participants rated eight of the provisions favorably: contaminated carts rejected by drivers, contaminated carts tagged by drivers, educational

follow-up for customers with contaminated containers, annual outreach to all multifamily complexes, all recycling containers labeled with materials preparation instructions, annual training for recycling drivers, periodic visual audits of residential recycling carts, and monthly hauler reports list contaminated containers. Each of these provisions had a median rating between 6.5 and 8. Two provisions were rated unfavorably: city staff can access MRFs at any time to monitor incoming loads and processing (median rating of 5) and limits on the percentage of contaminants in outbound bales (median rating of 3).

I also asked participants to express how interested they were in including the same provisions in future contracts. Participants rated the provisions again, but for this question a rating of 10 meant “the provision will certainly be included in the next contract.” Only participants who worked for cities with contracted-out recycling collection answered this question, as it was irrelevant for non-contract city and hauler staff. All provisions received a median rating of at least 8, except the provision requiring annual recycling outreach to multifamily complexes, whose median rating was 6. The median participant responses to this question appear in Figure 9.

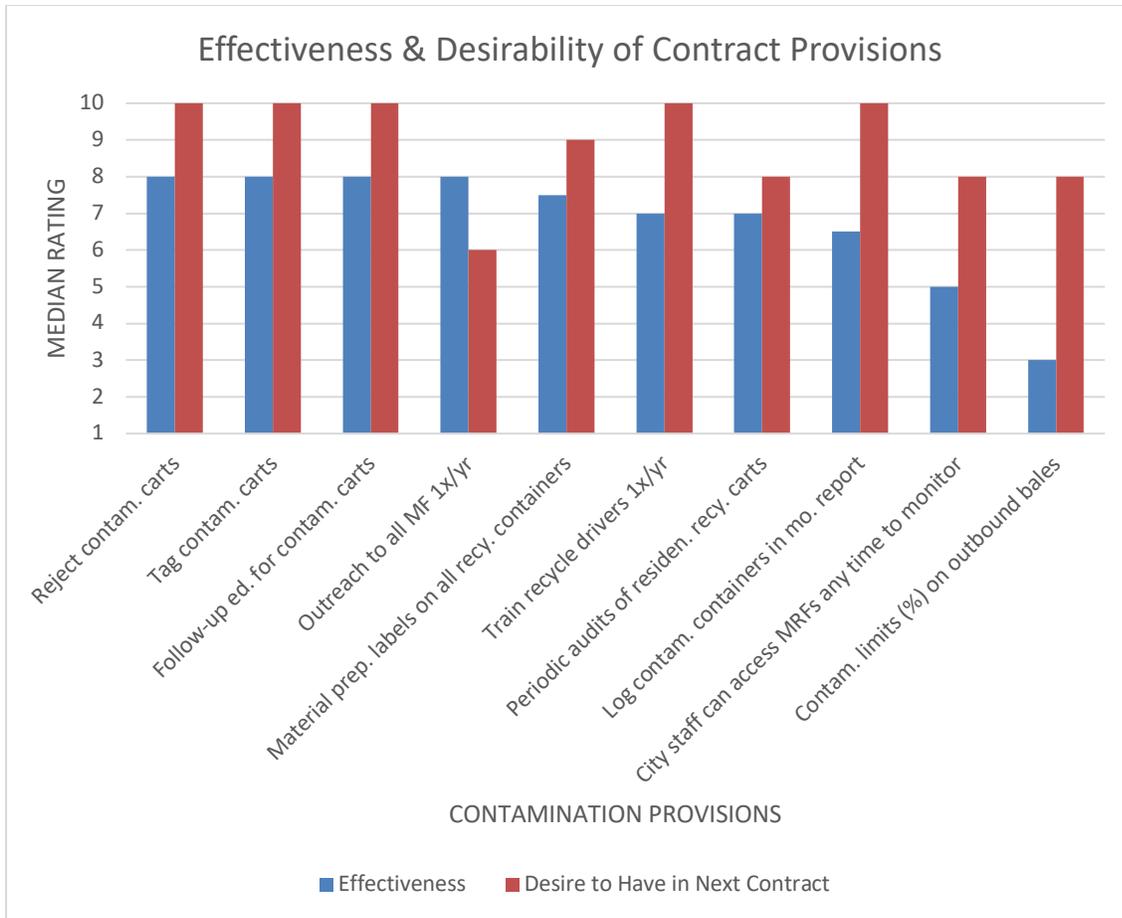


Figure 9: Participant opinions on the effectiveness and desirability of ten contract provisions

Contract effectiveness. As my research was concerned with the effectiveness of contracts, not just contract provisions, I also asked participants about the potential of contracts to reduce recycling contamination. The exact question was “Do you think solid waste contracts could be effective tools for reducing recycling contamination?” This multiple-choice question had three response options: “yes,” “no,” and “don’t know.” Of the participants who responded, 82% (18 participants) said “yes.” Even though it was not

one of the given answer choices, 14% of participants (3 of them) answered “potentially” or “it depends.” One participant responded “don’t know,” and no participants answered “no.” The graph in Figure 10 displays all participant responses to this question.

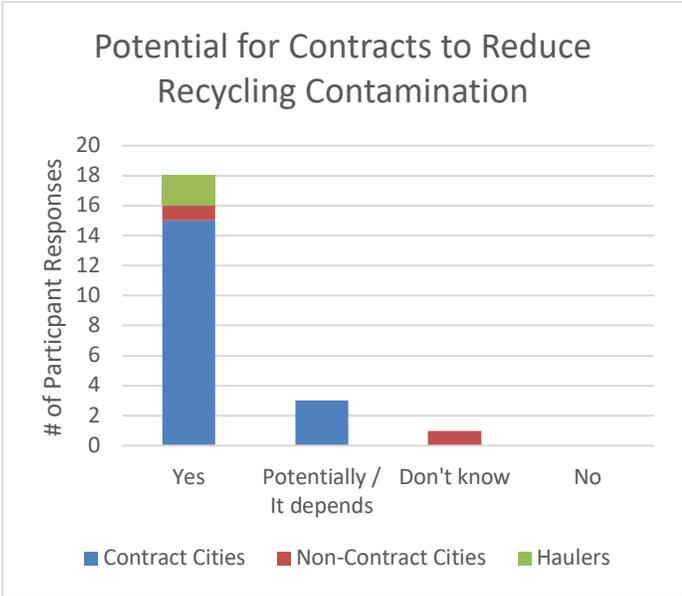


Figure 10: Participant opinions on contracts' potential to reduce recycling contamination

To learn more about their opinions, I asked participants to expand upon their answers about contracts’ potential to reduce recycling contamination. In their responses, participants shared several reasons why contracts could be effective. The most common was that contracts are helpful because they set service expectations. As one participant said, contracts are effective “as far as they lay out the requirements of what needs to be done.” Another participant claimed that contracts are “the way to hold people accountable and provide the tools to the hauler to be able to hold people accountable. [Cities] hold the hauler accountable, and they hold their customers accountable.” A participant working for a hauler seconded this idea, adding that contracts “put parameters in place that [haulers] can follow, whether it’s rates or to do a procedure about contamination.” Other participants shared that contracts’ clarity around service expectations also helps when dealing with customers and council members on contamination-related issues. As one participant stated, a contract “gives [haulers] the power to [not collect containers] without

the backlash” from customers. Another participant shared that contracts help program managers get backing from city council for programs that could be related to contamination because managers can refer back to the programs and services outlined in the contract. In other words, contracts are tools against contamination because they outline procedures for contamination reduction and name the parties responsible for carrying out the associated tasks.

Some participants also believed that contracts can effectively address contamination through different monetary tools. One tool is a rate structure where, instead of the hauler bearing the risks and rewards of recycling and receiving the same fee regardless of how low or high prices are for recyclable commodities, there is risk and reward sharing with cities. Commodity prices would have floors and ceilings, beyond which the city would pay or receive funds. As one participant said, “If there was mutual shared risk and reward in contracts, there’d be more partnerships in weathering the recycling turmoil and perhaps more collaboration...for really cleaning up the recycling waste stream.” Another participant claimed that this type of rate structure “can be a good thing because money talks with people and if they’re seeing that they have to pay more in a given month for overall contamination, if everybody sees their bills go up slightly in a given month for contamination, it’s another way to send a message.” While in support of this rate structure, another participant added a caveat: municipal staff must have the time to analyze current market prices for recyclable commodities to ensure that the rate adjustments are appropriate.

Two other monetary tools that participants thought contracts can effectively use against contamination are incentives and penalties. With incentives, customers are

rewarded for doing the right thing. For example, a contract could have a provision whereby businesses receive a credit on their account worth one month of service for having clean recycling. Alternately, with penalties, customers are fined per contaminated load of recycling. One participant argued that penalties for bad recycling are important because “unless there’s a monetary penalty, there’s no disincentive to putting out contaminated loads.”

Another way some participants believe contracts can help address contamination is through limiting their lists of acceptable items. Contracts outline which materials can be recycled curbside, but, as one participant pointed out, some of the items included on current contract lists contaminate loads and devalue bales made of other commodities. Through modifying the list of what is accepted and removing common contaminants, such as plastic film, contracts could help reduce contamination.

Participants also shared issues that hamper contracts’ ability to reduce contamination. The most commonly cited concern was staffing. As one participant declared, “The fact that [other local cities] have full-time staff dedicated to these things, staff that know the industry, I think that that’s hugely more helpful than the contract document itself.” Another participant added that contracts can contain great tools, but someone still needs to administer the contract. As another participant stated, “We could put all these things in our contract but how do we enforce it if you don’t have the staff to enforce it?” Participants shared that while small municipalities are especially challenged by staffing, even cities with one full-time staff member dedicated to solid waste management can be spread thin, and large cities have their own limitations on what they

can do. Without adequate staff resources, contract provisions related to contamination reduction could be ineffectual.

Another concern related to staffing was city size. Some participants argued that the scale of a city affects its contract's impact on hauler practices. Referring to city size, one participant claimed that "for the small ones, it doesn't really matter that much because the haulers that service many different jurisdictions are not going to change their practices for a tiny city significantly." The same participant added that only large cities can really influence hauler services and performance:

If you're a large city, you can put a lot of pressure on haulers to do things the way you want them to do it. Some of these bigger, better connected cities kind of have to lead the way with their contracts on some of these issues.

In essence, without operating on a large enough scale, a city may struggle to have its contamination provisions put into practice, especially if the provisions mandate less common services.

Related to city scale and contract effectiveness was the issue of contract enforceability. One participant argued that contracts can be effective "if there are enforcement mechanisms and if those mechanisms are actually put into practice...but to build a contract that does that, you have to scale, you have to have dollars, you have to have some staff." Even if enforcement mechanisms have the appropriate backing, other aspects of contracts, such as their wording, make enforcing their provisions challenging. As another participant stated, "It's really hard to enforce a contract when there's something prescriptive but nebulous." The same participant raised another issue that

hinders how cities enforce contamination provisions—a lack of data: “We don’t have all the data either, we don’t have sampling going on in the field for containers before they’re collected.” Another participant shared this concern about data:

Before we talk about implementing these solutions [to contamination], we need better information about what’s the extent of our problem. We do not have good data on this stuff...Is the marginal cost of making sure that everything that someone puts into that cart the right thing worth the effort, the money, the time?... There’s no data that I’m aware of that shows the cost benefit is there.

In sum, contracts can be effective if they are enforceable, but lack of data, staffing, and scale, as well as unclear language, can impede contracts’ ability to mitigate recycling contamination.

Another issue with contracts’ ability to reduce contamination was that contract provisions related to contamination may clash with the hauler’s mode of collection. According to one participant, “If you can enforce things to the letter of the contract, sometimes you’re going to not get as far as if you work and come up with a strategy that fits in with [the hauler’s] operational model.” Collection trucks in western Washington are now largely automated, meaning that drivers often do not leave their vehicles to dump containers into their trucks. While this shift toward automation increases efficiency and safety (Expanded Southwest Region Commingled Workgroup, n.d.), automation also means that drivers generally do not see container contents before they are emptied into the trucks. This mode of operation may conflict with the contract provisions that require drivers to reject and tag contaminated containers, as these provisions imply that drivers

are checking container contents before emptying them and spending time outside on the curb that would allow cart tagging. One participant even suggested that cart tagging work may go against drivers' own contracts, as cart tagging requires much more time spent outside drivers' vehicles. In short, for a contract to reduce contamination, its contamination provisions must align with the hauler's collection protocols.

Participants also shared that the long-term nature of contracts encumbers their ability to address contamination. Because contracts tend to last for years (the median length of sampled contracts was 7.5), it is difficult to make contracts respond to changing conditions, such as market fluctuations or the current crackdown on contaminated recyclables. One participant described the issue thus:

One of the tricks to using contracts to help shape contamination reduction is that they're very long-term...if the issues are a lot shorter term, you either have to try and amend the contract, which a lot of municipalities don't want—to open up their contract for an amendment—or you have to try and find other ways to reduce contamination [such as grant money for education projects].

According to the same participant, it would take the region about a decade to shift contamination practices if contracts were the main vehicle for fighting contamination, since contracts are often extended a few years past their typical seven-year terms. As the participant succinctly put it, "Contracts are a good tool but they take a long time."

The final issue that several participants raised is that haulers and contracts cannot tackle all aspects of recycling contamination. One participant, who manages the solid waste contract for a municipality, stated that cities should be responsible for some of the

contamination reduction work, including some of the provisions listed in the questionnaire. The same participant argued that other aspects of contamination should be dealt with nationally. One issue that other participants mentioned cannot be solved entirely by a city and its hauler is product packaging. Several participants argued that packaging complexity contributes to contamination and needs attention, in addition to curbside contamination. One participant also stated that work needs to be done upstream of curbside collection to address how household containers are labeled. This participant argued that there must be more truth in advertising with product labeling so that consumers better understand what is recyclable. Regardless of what contracts can do to reduce recycling contamination, some elements of the contamination equation need to be handled by actors working outside municipal contracts.

Discussion

My results suggest that there is not a direct relationship between the effectiveness of contamination reduction provisions and their inclusion in contracts. Some highly rated provisions appeared in most contracts, while other highly rated provisions appeared in only several. For instance, the provision for rejecting contaminated containers for collection was in 74% of collection contracts and received a median participant rating of 8 out of 10. In contrast, the provision for annual training for recycling drivers received a median rating of 7 but appeared in only 5% of collection contracts. Some poorly rated provisions also appeared more often than well-rated ones. For example, the provision that city staff can access MRFs at any time to monitor incoming loads and processing received a median rating of 5 and appeared in 11 contracts, but a provision with a higher median rating of 6.5, which mandated logs of contaminated containers in monthly hauler reports, was in only 1 contract.

Other well-regarded contamination reduction practices were underrepresented in the sample contracts. Take, for instance, harmonized messaging about what is and is not recyclable. In its 2019 report, the King County Responsible Recycling Task Force argues that people will be less confused about what is and is not permitted in curbside recycling if there is consistent regional or statewide messaging. Even though the Task Force, Washington State Department of Ecology, and The Recycling Partnership recommend incorporating harmonized messaging into municipal recycling programs (King County Responsible Recycling Task Force 2019; The Recycling Partnership, 2017; Washington State Department of Ecology, n.d.-b), only 2 of the 42 collection contracts contained provisions about it. One provision, which appears in a 2018 amendment to SeaTac's

contract, mandates that the city's hauler work regionally and statewide to develop standard container labels. The other provision, from Vancouver's 2019 contract, requires that the hauler work with neighboring cities and Clark County to deliver common messaging about proper recycling. Since the provisions were part of contract sections developed to address current contamination issues, future contracts may contain more provisions about harmonized messaging as tackling contamination becomes a greater consideration during contract development. Still, there are currently very few contracts in western Washington that include this recommended anti-contamination measure.

Other contamination reduction provisions are included in contracts even when the provisions are not perceived as being effective against contamination. While a provision's effectiveness at decreasing contamination generally corresponded to its desirability in future contracts (see Figure 9 on page 66), there is not a direct link between these two traits. To illustrate: participants gave a low median effectiveness rating of 5 to the provision allowing city staff to enter MRFs at any time to monitor incoming loads and processing. When asked, however, how interested they were in including that provision in their next contract, contract managers gave the provision a median rating of 8 out of 10 (10 signifying that managers would certainly include the provision in their next contract). In discussing their rating, some participants stated that being allowed access to MRFs was necessary, even if the provision had little to no effect on contamination. Participant responses therefore suggest that there are factors beyond efficacy that drive contamination provisions' inclusion in contracts.

The contracts I sampled also contained contamination provisions whose effectiveness is not supported by the literature. Many of the provisions related to

outreach, for example, do not match best practices in education and behavior change studies. Take for instance three of the most frequently appearing provisions related to preventative education: having a hauler website that describes how to prepare recyclables, sending an annual mailer with recycling information to all customers, and sending a mailer with recycling information to all new customers. These provisions appeared in 62%, 38%, and 31% of all collection contracts, respectively. What these provisions take for granted is that print or web-based materials deliver information that transforms behavior, when many studies have challenged this assumption. Case in point: a 2018 survey sponsored by Oregon Metro found that certain written materials were much more effective at reducing contamination than others. Six hundred survey respondents were shown one of three things: a detailed list describing the main categories of curbside recyclables, an infographic showing icons of the main items that should be recycled, and a list describing eight items to keep out of recycling. The survey results showed that the respondents who read the list of eight common contaminants were much better at identifying the contaminants than the respondents who saw the other materials (Oregon Metro, 2018). Providing information is not the same as providing effective information, yet many of the most commonly occurring educational provisions in this study do not account for this difference or provide strategies for overcoming it.

Other recommended education and behavior change practices were poorly represented in the sampled contracts. For instance, many program managers and outreach specialists from municipal solid waste divisions in western Washington have been trained in community-based social marketing (CBSM), a method based in social psychology that promotes behavior change (McKenzie-Mohr, 2011). CBSM challenges the idea that

information-based campaigns, such as annual mailers to all customers, have much effect on behavior (McKenzie-Mohr, 2011). Instead of information-heavy campaigns, CBSM encourages outreach strategies that address the benefits and barriers to behavior change (McKenzie-Mohr, 2011). In terms of recycling contamination, not having garbage containers next to recycling containers would be a barrier to clean recyclables, as contamination is higher when trash containers are not placed near recycling containers (Andrews, Gregoire, Rasmussen, & Witowich, 2013; Murrigan, 2016; Skumatz, D'Souza, & Santulli, 2018). Even though co-locating containers is a best practice, only one contract had a provision requiring that commercial garbage and recycling containers be co-located whenever feasible (City of Redmond, 2016). Municipal codes may address the issue of container co-location, but the sampled contracts lacked language targeting this significant barrier to clean recycling. Furthermore, very few contracts contained other provisions addressing barriers to clean recycling at multifamily properties, a sector well-known for high contamination rates. For instance, only Vancouver's and Seattle's contracts mentioned providing site-specific outreach tailored to multifamily buildings with high contamination levels. While outreach is important to reducing contamination, it needs to be the right kind of outreach, but there was not much support for this in the sampled contracts.

The contracts also contained relatively few provisions related to another type of outreach promoted by CBSM—direct personal contact. According to McKenzie-Mohr (2011), the progenitor of CBSM, personal contact is an effective outreach strategy because direct requests from others are more likely to alter people's attitudes and behavior. But direct personal contact was not a common contamination reduction strategy

in the sample contracts. For example, most haulers are not required to provide in-person or over-the-phone feedback to customers with contaminated containers. The most common form of feedback—cart tags—is required by 69% of collection contracts, but this method does not involve personal contact. Half of the sampled collection contracts require some form of educational follow-up for customers with contaminated containers, but the contracts typically do not specify how the contact will be made or what form the education will take. Of the 21 contracts that require further customer education, only 6 mandate over-the-phone or in-person contact. With the exception of one contract (Vancouver’s), which requires direct contact after any multifamily recycling container has been tagged for contamination, this form of direct feedback is only required if the customer’s container is consistently or significantly contaminated. This means that 86% of collection contracts do not require any direct personal contact for customers with contaminated containers.

Another form of direct personal contact that few sampled contracts promote is door-to-door outreach. Several studies have demonstrated that door-to-door resident outreach decreases contamination levels in recycling containers (Cascadia Consulting Group, Inc., 2014; Maher & Beimborn, 2008), yet very few contracts require haulers to use this form of education. Only three contracts require some type of door-to-door resident outreach. A recent amendment to Burien’s contract requires the hauler to deliver a multifamily customer education program involving door-to-door outreach about reducing contamination (2018). The other two contracts require one to two weeks of door-to-door outreach for multifamily or commercial properties each summer (City of Seattle, 2019b), annual door-to-door outreach at five multifamily buildings with low

diversion rates and/or high contamination levels (City of Seattle, 2019a), and annual door-to-door outreach that emphasizes multilingual, multicultural and millennial populations at up to 20 multifamily buildings (City of Seattle, 2019b). Door-to-door outreach is labor-intensive, which may explain why only three contracts require it, but the general absence of contract provisions mandating door-to-door outreach suggests that cities and haulers may be underutilizing this well-regarded contamination reduction strategy.

In contrast, some contamination reduction measures recommended by the literature appear regularly in the sampled contracts but were regarded as relatively ineffective by my participants. One of these measures, recommended by Kinsella and Gertman (2007), is creating contract provisions that establish allowable contamination rates. This practice is also recommended in the EPA's Managing and Transforming Waste Streams Tool, even though the contract managers I interviewed gave low ratings to two of the EPA's exemplar provisions: limits on the percentage of contaminants in outbound bales (in 39% of contracts that address processing), and access for city staff to MRFs at any time to monitor processing (in 27% of contracts that address processing). On a scale of 1 to 10, where 10 signifies extremely effective at reducing contamination, participants gave these provisions median ratings of 3 and 5, respectively. In this case, there is a mismatch between recommended practices and contract managers' opinions about which measures are effective at reducing contamination. This mismatch reflects a larger disjuncture between theoretical best practices, perceived best practices, and the practices actually in regional contracts. This lack of alignment should encourage further

study into how effective established and assumed best practices actually are at reducing recycling contamination.

It is worth noting, however, that the most highly rated contract provision was also the one that appeared most frequently. As previously mentioned, the provision for rejecting contaminated containers for collection was in 74% of collection contracts, appearing more frequently than any other provision. This provision also received the highest median participant rating. Another provision receiving a high median rating of 8 was tagging contaminated containers. This provision was the second-most common in collection contracts, appearing in 69% of them. Together, these provisions form the basis of cart tagging programs, which have been effective at reducing recycling contamination in several U.S. cities and counties (Clackamas County, n.d.; Green Solutions, 2012; Ludington, 2019; Marshall & Morrigan, 2018; Orange County Government Florida, 2018). While contracts may lack the structure to implement cart tagging programs—only one sampled contract required that the hauler hire a full-time employee to support cart tagging programs (City of Vancouver, 2019)—the frequency of cart tagging provisions in the sampled contracts provides some evidence that best practices for fighting contamination are and can be embedded into municipal contracts.

There is further evidence that some regional contracts support contamination reduction best practices. Color-coding, where the same color is used for all recycling containers in a municipal program, is recommended as a standard practice because it can help reduce confusion and contamination (Expanded Southwest Region Commingled Workgroup, n.d.; Morrigan, 2016; Oregon Department of Environmental Quality, 2018). Of the collection contracts I studied, 64% had at least one provision related to recycling

container color, and 38% required all recycling carts and dumpsters currently in use to be blue or at least consistent with the recycling program color. While at least half of the collection contracts addressed recycling container color to some extent, only 48% mandated that all commercial recycling dumpsters be blue or a color consistent with the recycling program. This lack of commercial dumpster color requirements in 52% of the collection contracts is problematic because commercial containers, especially from multifamily complexes, are generally much more contaminated than residential carts. While repainting or swapping out containers on a large scale is expensive and can increase customer rates, contracts should still incorporate requirements regarding the color of commercial recycling containers.

Ultimately though, including provisions in contracts that reflect best recycling practices is not enough to achieve low contamination rates. The contracts themselves need to follow the tenants of good contract management. With any government contract, the government should write detailed agreements that clarify performance metrics, monitor the contractor's performance, and enforce the contract when necessary (Brown et al., 2006). Well-monitored contractors are more likely to meet contract specifications (Brown et al., 2006). If these conditions are not met, even the best written and researched contamination reduction provisions will likely struggle to be implemented.

Limitations

This study examined municipal collection contracts from all cities in western Washington with populations above 15,000 that contract out commingled curbside recycling. As such, this research represents the recycling programs of 79% of western

Washington cities with populations greater than 15,000. Despite this reach, there are limitations to the study's findings. Had I included contracts from eastern Washington, I would have been able to generalize my findings to programs statewide. Including contracts from throughout the Pacific Northwest or the U.S. would have allowed me to make claims about regional or national patterns in solid waste contracts, but as is, I can only make pronouncements about recycling contamination provisions in western Washington's contracts. Had I had more time, I would have liked to interview more contract managers, especially those working for haulers. I did not reach data saturation with my interview data, and interviewing more contract managers would have helped me develop a more cohesive picture of how contract managers view contracts and recycling contamination. I also would have liked to moderate my provision codes with a contract manager. As it was, I identified and categorized contract provisions by myself, but having someone else read through at least one of the contracts, code it, and then compare answers with me would have strengthened my study's rigor. Nevertheless, I am confident that my research will contribute to the understanding of municipal solid waste contracts and recycling contamination.

Conclusions and Recommendations

Despite the limitations of contracts, my research suggests that municipal solid waste contracts could be effective tools in reducing recycling contamination. Most of the contract managers interviewed believe that contracts are capable of decreasing contamination, and some of the provisions that appeared most frequently received favorable ratings from interview participants. The sampled contracts also contained best practices for preventing and managing recycling contamination, even though these provisions were not always the most frequently occurring ones and sometimes presented clashes with day-to-day hauler operations. Although my study did not find direct alignment between best practices in the field and inclusion in contracts, municipal solid waste contracts still have the potential to reduce recycling contamination.

For contracts to be effective at reducing contamination, contract provisions need to meet certain conditions. Provisions related to recycling contamination should represent best practices, such as cart tagging, color-coding and co-locating recycling containers, regionally harmonized messaging, and direct personal contact with customers. The contract provisions should also align with the hauler's collection operations. If there is no alignment, other provisions should be added to bridge the gap between collection operations and provision requirements. For instance, if a contract demands that contaminated carts be tagged, but all collection routes are automated, the contract should include supplementary provisions either describing how additional staff will be recruited to tag carts or requiring collection trucks to have on-board computer systems that can easily document contaminated containers and communicate the information in real-time to customer service representatives. Even though "there is no single contract that is

‘right’ for everyone” (Kinsella & Gertman, 2007, p. 52), contracts and their contamination provisions will have more power if contracts incorporate these practices.

Other conditions must be in place for contracts to effectively address recycling contamination. For one, cities must provide staff tasked with contract implementation sufficient time to monitor solid waste issues and engage with their hauler. Haulers should also regularly collect data about municipal contamination levels and actions taken to reduce contamination, and haulers should share this information frequently with municipal staff. One avenue for gathering this data would be including contract provisions that mandate semi-regular waste composition studies. Haulers should also adapt their collection processes where necessary to accommodate the contamination reduction work specified in contract provisions. Cities with large populations should also lead the way in fighting contamination by including both established and innovative contamination reduction practices in their contracts.

My study documented the diversity of recycling contamination provisions in municipal solid waste contracts from western Washington. As such, my research is unique; it examined the intersection between municipal solid waste contracts and recycling contamination, and it used these contracts as the unit of analysis. Little research has been done on the content of these contracts, even though they represent significant investments for cities. Given the indirect relationship I discovered between contamination provision effectiveness and frequency in contracts, I encourage further research into the impacts of contamination provisions frequently included in contracts. I also recommend investigating other aspects of municipal solid waste contracts, as I discovered many other provisions worthy of study in the course of my analysis. The contracts I analyzed

contained provisions related to reducing greenhouse gas emissions, worker rights, and equitable service delivery, all rich topics deserving further inquiry.

Now that recycling contamination is having a greater impact on municipalities, haulers, and processors, solid waste professionals need to employ a multi-faceted approach to improving the quality of municipal recyclables. Even though contamination cannot be solved solely through contracts, contracts are part of the solution. I hope that my research encourages further study of municipal solid waste contracts and provides contract managers with more guidance as they develop contracts with stronger contamination mitigation potential.

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Appendix A

Western Washington Cities Included in Sample

City	Population¹	Contracts Sampled
Seattle	730,400	3
Vancouver	183,500	1
Bellevue	142,400	1
Kent	128,900	1
Renton	104,100	1
Federal Way	97,440	1
Kirkland	87,240	1
Auburn	80,615	1
Marysville	67,040	1
Redmond	64,050	1
Sammamish	63,470	1
Lakewood	59,350	1
Shoreline	55,730	1
Burien	51,850	1
Bothell	45,260	1
Bremerton	41,500	1
Puyallup	41,100	1
Longview	37,710	1
Issaquah	37,110	1
Mount Vernon	35,180	1
University Place	32,820	1
Lake Stevens	32,570	1

¹ 2018 estimate (Office of Financial Management, n.d.)

City	Population¹	Contracts Sampled
Des Moines	31,140	1
SeaTac	29,130	1
Maple Valley	25,280	1
Mercer Island	24,270	1
Camas	23,770	1
Mountlake Terrace	21,560	1
Mukilteo	21,320	1
Bonney Lake	20,940	1
Battle Ground	20,890	1 ²
Mill Creek	20,470	1
Covington	20,080	1
Tukwila	19,800	1
Port Angeles	19,370	1
Arlington	19,300	1
Monroe	18,860	1
Centralia	17,060	1
Anacortes	16,990	1
Aberdeen	16,760	1
Washougal	16,020	1
La Center	3,320	1 ²
Yacolt	1,780	1 ²

² Contract shared with Battle Ground, La Center, and Yacolt

Appendix B

Contract Provisions and Their Frequency in Contracts

Provision	Sample Contract Language	Contracts with this Provision
Reject contaminated containers for collection	Obvious contaminants included with either Source-Separated Recyclables or Compostables shall not be collected (City of Federal Way, 2010, p. 18).	31
Tag contaminated containers	Obvious contaminants included with either Source-Separated Recyclables or Compostables shall...be left in the Customer's Container with a prominently displayed notification tag explaining the reason for rejection (City of Federal Way, 2010, p. 18).	29
Recycle carts must have materials prep labels	All Recycling Carts shall be labeled with materials preparation instructions that visually depict allowed and prohibited materials suitable for the designated Cart (City of Federal Way, 2010, p. 24).	28
Residential carts set down with lids closed	The Contractor's crews shall make collections in an orderly and quiet manner and shall return [residential recycling] Containers with their lids closed and attached to their set out location in an orderly manner (City of Burien, 2014, p. 29).	28
Hauler website describes how to prepare materials	The Contractor shall provide a Customer-friendly Internet website...containing information specific to the City's collection programs, including at a minimum, contact information, collection schedules, material preparation requirements...(City of Kirkland, 2011, p. 54).	26
City and/or hauler monitors set-out recyclables or waste composition	The City and Contractor shall cooperate on monitoring the quality of Recyclables set out for collection. Either party may inspect or sample set-out or collected Recyclables (City of Federal Way, 2010, p. 39).	25
Customer service reps trained to inform customers about recycling properly	Customer service representatives shall be trained to inform Customers of all recycling, Compostables and Food Scrap preparation specifications (City of Federal Way, 2010, p. 62).	25

Provision	Sample Contract Language	Contracts with this Provision
Fee (\$15-100) for not notifying customer why container rejected	Rejection of Garbage, Recyclables or Yard Debris without providing documentation to the Customer of the reason for rejection. \$25 dollars per incident (City of Federal Way, 2010, p. 75).	25
Monthly report shows residue disposed	A summary of Recyclables quantities by collection sector and by commodity, including processing residues disposed and market prices (City of Federal Way, 2010, p. 65).	24
Labels should be replaced when damaged, out-of-date, or periodically	[Cart] Labels shall be replaced by the Contractor at no additional charge when faded, damaged, out-of-date, or upon City or Customer request (City of Federal Way, 2010, p. 26).	19
Annual recycling contact for each multifamily (MF) complex	The Contractor shall work with the City to ensure communication with each [multifamily] complex by April 30th of each year of the contract. This might be through a mailing or on-site visit...The Contractor shall provide information about the City's recycling programs...(City of Federal Way, 2010, p. 30).	19
Recycle dumpsters must be blue	All Detachable Containers used for Recyclables shall be blue...for Multi-Family and Commercial Customers. The color requirements apply to both Cart bodies and lids (City of Kirkland, 2011, p. 20).	18
Contamination in residential containers must have educational follow-up	Any deficiencies in Recyclables quality observed by City or Contractor's staff shall require educational follow-up by the Contractor (City of Federal Way, 2010, p. 39).	16
Annual mailing to all customers	The Annual Service Update shall be mailed to all Customers and, at a minimum, shall include an informational brochure indicating rates, all services available, preparation and other service requirements (City of Kirkland, 2011, p. 62).	16
Disposal of contaminants at MRF should meet industry standards	The disposal of contaminants separated during processing is acceptable to the extent that it is unavoidable and consistent with industry standards (City of Federal Way, 2010, p. 18).	13
Dumpsters & drop boxes must have materials prep labels	All Detachable Containers and Drop-box Containers to be used for Garbage, Recyclables, and Organics collection shall have materials preparation instructions (City of Bellevue, 2014, p. 21).	13

Provision	Sample Contract Language	Contracts with this Provision
Mailing to all new customers	Materials shall be mailed to every new Customer prior to the Customer's first billing and shall, at a minimum, include a statement of applicable rules and service policies, rates, services and preparation requirements (City of Federal Way, 2010, p. 68).	13
Technical/ educational assistance & signage for special events	The Contractor shall provide such Customers [sponsoring special events within the City Service Area] with assistance in determining Container needs and signage for Garbage, Recyclables, and Organics at the special events, including site visits and technical assistance to ensure that the maximum Recyclables and Organics diversion is achieved (City of Bellevue, 2014, p. 45).	13
Tag contaminated MF containers	The Contractor will tag contaminated Containers, but will not collect the contaminated load as Garbage and not charge the resident or property manager a fee for contamination unless notification and correction procedures as specified by the City are completed (City of Federal Way, 2010, p. 44).	12
Limits on % of residuals at MRF	The Contractor's residuals from the overall processing operations at the facility (including both City and non-City material) shall not exceed 2% of the inbound Recyclables (City of Federal Way, 2010, p. 18).	12
Recycle carts must be blue	Contractor-provided Carts... for Recyclables shall be blue (City of Mukilteo, 2019, p. 16).	12
Fee (\$50-100): Failure to include instructional materials when delivering recycle carts	Failure to include instructional/promotional materials when Garbage, Recycling and/or Compostables Carts are delivered. Fifty Dollars (\$50) per incident (City of Burien, 2014, p. 63).	12
Commercial (COMM) customers contacted & instructed to remove contaminants or pay for garbage pickup	In the event of noticeable contaminated materials, the Contractor shall contact the [Commercial] Customer with specific instruction for the Customer to prepare the rejected materials for collection service or authorization to collect the material as Garbage for the regular Garbage collection fee (City of Redmond, 2016, p. 24).	11

Provision	Sample Contract Language	Contracts with this Provision
On-board computer & data-tracking system incorporates photo documentation of route exceptions	All collection vehicles shall be equipped with global positioning systems (GPS), as well as an on-board computer and data tracking system to track route progress and log non-set-outs, extras, and other service issues. The system shall incorporate photo documentation of route exceptions (City of Anacortes, 2015, p. 11).	11
City staff can access MRFs at any time to monitor processing	City staff shall be provided access to the Contractor's processing facilities at any time for the purposes of periodically monitoring the facilities' performance under [the Requirement to Recycle and Compost] Section (City of Federal Way, 2010, p. 18).	11
When monitoring MRFs, city staff may sample unprocessed recyclables or break bales	Monitoring may include, but [is] not limited to, taking samples of unprocessed Recyclables, breaking selected bales and measuring out-throws and prohibitives by weight, taking samples of processed glass and metals, reviewing actual markets and use of processed materials, and other activities to ensure the Contractor's performance under this Section and to ensure that misdirected Recyclables and contamination are minimized (City of Federal Way, 2010, p. 18).	11
Transition & Implementation Plan for introducing revised services to all customers	The Contractor shall develop...a Transition and Implementation Plan for introducing any new and revised services to the different Customer sectors (City of Redmond, 2016, p. 15).	11
Contact all COMM customers every 1 or 2 years	The Contractor shall every two (2) years during the duration of the Contract...follow-up with each Commercial Customer by telephone or in person to address additional concerns, space or contamination problems, and offer additional education or training to tenant businesses (City of Bellevue, 2014, p. 63).	11
COMM site visits on request	The Contractor shall, upon request of a Commercial Customer or a tenant business, and at the Contractor's expense, conduct a site visit within one week of the request to review existing services, determine recycling potential, and assess space constraints for additional Containers (City of Sammamish, 2016, p. 40).	11

Provision	Sample Contract Language	Contracts with this Provision
Recycle carts always distributed with brochure/info pack	Recycling Carts shall include a recycling/program brochure when distributed (City of Federal Way, 2010, p. 38).	11
Fee (\$500-1000) for failing to meet general recycling standards	Failure to meet recycling processing performance requirements of Section 2.1.12 [Requirement to Recycle and Compost: contamination % limits, City access to MRF for monitoring, tagging and not collecting contaminated containers]; \$1,000 per month, for any occurrence that month (City of Federal Way, 2010, p. 76).	11
Contaminated MF containers not collected as garbage or fined unless notification & correction procedures followed	The Contractor will tag contaminated Containers, but will not collect the contaminated load as Garbage and not charge the resident or property manager a fee for contamination unless notification and correction procedures as specified by the City are completed (City of Kirkland, 2011, p. 38).	10
90% of inbound contaminants must be removed	The Contractor shall remove 90% or more of the inbound contaminants for disposal (City of Federal Way, 2010, p. 18).	10
Dumpster & drop-box container color must be consistent with container program	Each type of container (i.e. Recyclables, Yard & Food Waste or Garbage) shall be painted a color consistent with the program it is used for (City of Kent, 2016, p. 15).	10
MF &/or COMM containers set down with lids closed	The Contractor's crews shall make collections in an orderly, non-disruptive, and quiet manner, and shall return [multifamily and commercial recycling] Containers after emptying to the same location as found, with their lids closed (City of Bothell, 2014, p. 31).	10
Track & report outcomes & results of MF education	The outcomes and results of these [multifamily recycling public education campaign] efforts will be tracked and reported to the City by the Contractor (City of Kirkland, 2011, p. 40).	10
Locks can be provided at no charge to MF customers to limit contamination	The City may require that combination or common-keyed locks and multiple keys be provided by [the] Contractor at no extra charge to limit contamination of Recycling Carts or Recycling Detachable Containers (City of Federal Way, 2010, p. 44).	10

Provision	Sample Contract Language	Contracts with this Provision
City notified if repeated contamination by COMM or MF customer	Contractor shall notify the City immediately, through use of dispatch or route management staff, if repeated contamination occurs in Recyclables set out by any Commercial or Multi-Family Customer (City of Federal Way, 2010, p. 46).	9
Contractor must identify contaminating customers & create public education program to fix problem if inbound recyclables > 2-10% contaminants	If more than 2% of inbound materials are found to be contaminants, the Contractor will develop a plan to determine which Customers are adding contaminants in their Recyclables and then provide a public education program to remedy the situation (City of Federal Way, 2010, p. 18).	9
COMM recycle carts & dumpsters must have materials prep labels	[Commercial] Recycling carts and Recycling Detachable Containers shall...include prominent identifying labels that provide directions for the preparation of the materials to be placed in the Cart or Container (City of Kirkland, 2011, p. 41).	9
Educational packets to COMM customers on request	New Commercial Recycling Program Packets and, as needed, desktop containers for the collection of recyclables for distribution to tenants will be delivered to the commercial customer owner/manager and/or directly to tenants (City of Mercer Island, 2009, p. 9).	9
Provide guidelines for MF customers on request	The Contractor shall provide ample copies of current recycling guidelines upon request of the City or Customer (City of Kirkland, 2011, p. 39).	9
Annual MF outreach plan	The Contractor shall assist the City in the development and implementation of an annual recycling outreach and incentive plan [for multifamily customers] (City of Federal Way, 2010, p. 45).	9
Monthly report describes all education & outreach	[The Contractor shall provide a report containing] a description of any promotion, education, and outreach efforts, including where possible, samples of materials, and summary of any feedback or response received from Customers (City of Bellevue, 2014, p. 60).	9

Provision	Sample Contract Language	Contracts with this Provision
Fee (\$50): Failure to include instructional materials when delivering residential recycle carts, or failure to affix required container labels	Failure to include City authorized instructional/promotional materials when Garbage, Recycling, and/or Organics Containers are delivered to Single-Family Residences, or failure to affix required City authorized stickers on Containers; Fifty dollars (\$50) per incident, with no maximum (City of Bothell, 2014, p. 53).	9
Fee (\$50) for wrong or missing container labels	The use of outdated, or unauthorized stickers, or lack of required stickers on Contractor provided Containers; Fifty dollars (\$50) per Container (City of Bellevue, 2014, p. 75).	9
Vehicles & processing systems should minimize cross-contamination	The Contractor shall use vehicles and processing systems that minimize unnecessary breakage and cross-contamination of materials (City of Bellevue, 2014, p. 13).	8
Process recyclables to meet market standards	The Contractor shall process Recyclables in such a manner as to meet market specifications and to minimize out-throws and prohibitives in baled material (City of Tukwila, 2012, p. 12).	8
COMM recycle drop boxes must be distinct from garbage containers & have identifying labels	At larger businesses, the Contractor may use Detachable Containers or Drop-Box Containers for Recyclables collection provided that they are distinguished from Containers used for Garbage collection and are equipped with prominent identifying labels (City of Auburn, 2011, p. 38).	8
Interior signage for COMM containers on request	The Contractor's educational efforts to Commercial Customers shall include performing waste audits to determine areas that need improvement, developing and covering the cost of stickers or signage for interior collection containers, and delivering Commercial Customer program packets to the Commercial Customers or their tenants, as requested by the Commercial Customer, a commercial tenant, or the City (City of Maple Valley, 2014, p. 44).	8
Monthly report shows contamination levels	[Monthly report shall contain] a summary of Recyclables market prices, contamination levels and processing residues disposed as Garbage (City of Sammamish, 2016, p. 38).	8

Provision	Sample Contract Language	Contracts with this Provision
Residential customers with constant contamination may have recycling cut	If the contamination is not corrected after numerous attempts to educate and help the Customer, then the Contractor may request in writing from the City permission to remove the Customer from Recycling service (City of Mukilteo, 2019, p. 31).	7
All recycle carts relabeled at start of contract	The Contractor agrees to place new recycling and yard debris instructional decals on all customer carts within six (6) months of the full execution of this Agreement and again the fourth (4th) year of this Agreement (City of Mercer Island, 2009, p. 15).	7
MF & COMM containers relabeled every 2 or 5 years	Containers used for the collection of Recyclables and Organics from Multifamily Complex and Commercial Customers shall be relabeled by the Contractor once every two (2) years or upon Customer or the City's request (City of Bellevue, 2014, p. 21).	7
Replacement carts & carts for new customers must have new or near-new materials prep labels	Replacement Carts and Carts provided to new Customers during the term of the Contract may be previously used, but shall be clean, in good condition and with new or near-new instructional decals in-place prior to Cart distribution (City of Sammamish, 2016, p. 14).	7
Fee (\$25) for delivering or using incorrectly labeled or colored container	Delivery or use of incorrectly labeled or colored Container; Twenty-five Dollars (\$25) per Container per day (City of Kirkland, 2011, p. 68).	7
Residential customers contacted & can remove contaminants or pay for garbage pickup	Customers [single-family] shall be contacted and provided the opportunity to either remove the contamination and have the materials collected the following collection cycle or, alternatively, have the materials collected as Garbage at the regular extra fee (City of Covington, 2013, p. 27).	6
All customers can remove contaminants or pay for garbage pickup	The Customer shall be provided the option of cleaning the rejected materials to meet the standards for that material or requesting that the material be collected as Garbage as an "extra" (City of Bellevue, 2014, p. 13).	6

Provision	Sample Contract Language	Contracts with this Provision
Drivers notify dispatch for contaminated COMM recyclables	In the event of contaminated materials, the driver shall notify their dispatcher, and the dispatcher shall contact the Customer with specific instructions for Customer to prepare the rejected materials for collection service or authorization to collect the material as Garbage for the regular Garbage collection fee (City of Federal Way, 2010, p. 46).	6
Materials quality assurance program to reduce contamination	The Contractor shall maintain a quality assurance program to ensure that collected materials from Residential sources are as clean as reasonably possible and that Customers are continually educated and provided feedback by the Contractor on the quality of their Recyclables and Compostables set out for collection (City of Sammamish, 2016, p. 11).	6
Max. 8% by weight for out-throws in bales	Out-throws shall be less than 8%...by weight of outgoing materials (City of Federal Way, 2010, p. 18).	6
Max. 1-2% by weight for prohibitives in bales	Prohibitives [shall be] less than 1%-2% by weight of outgoing materials (City of Federal Way, 2010, p. 18).	6
All recycle containers must have materials prep labels	All Contractor-provided Containers shall be permanently, clearly, and prominently screened, molded-in, molded-on, imprinted, or otherwise labeled in a fashion that any reasonable person can readily determine the size capacity and material preparation requirements of the Container (City of Bellevue, 2014, p. 17).	6
Mailing to all residential customers at start of contract	Eight (8) weeks prior to the Date of Commencement of Service, directly mail to all Single-family Residences a New Single-family Program Announcement Brochure introducing the new services available, reminding Customers of continuing services...(City of Bellevue, 2014, p. 27).	6
Slotted lids for MF dumpsters on request	Upon notice, the Contractor shall equip Detachable Containers with special slotted recycling lids provided by the City (City of Auburn, 2011, p. 35).	6
Tag residential carts with \geq 10-20% contamination	Contractor's Drivers will leave "oops tags" on Recycling Carts contaminated with 20% or more unrecyclable materials based on a visual audit (City of Issaquah, 2011, p. 35).	5

Provision	Sample Contract Language	Contracts with this Provision
Residential customers with \geq 3 oops tags in 3 months contacted by phone	Customers that receive three (3) or more written notice tags or "oops tags" per quarter (three months) shall be contacted by phone to resolve the issues as described above [cart may be removed if no correction made] (City of Bellevue, 2014, p. 36).	5
Residential customers with consistent or significant contamination contacted by phone	Customers with Recyclables consistently or significantly contaminated will be contacted by phone to provide additional education and to resolve the issue (City of Anacortes, 2015, p. 19).	5
Limit on recyclables in residuals (2-5%)	Recyclables in residual stream shall not exceed 5% of the inbound Recyclables (City of Auburn, 2011, p. 12).	5
New & replacement recycle carts must be blue	New and replacement Contractor-provided Recycling Carts shall be blue (City of Kirkland, 2011, p. 20).	5
Regularly report on quality of collected recyclables	The Contractor shall...regularly report to the City the quality of collected Recyclables (City of Bellevue, 2014, p. 26).	5
Residential customers with \geq 20-25% contamination get letter	[Residential] Customers with significant levels of contamination (25% or more) will receive a letter and instructions from the Contractor about proper Recycling (City of Bothell, 2014, p. 27).	4
Visual recycle cart audits every other month	Every other month, Contractor's staff shall conduct visual audits of Carts on select routes. Customers with significant levels of contamination (25% or more) will receive a letter and instructions from the Contractor about proper Recycling (City of Bellevue, 2014, p. 36).	4

Provision	Sample Contract Language	Contracts with this Provision
MRFs: process materials to high standard to maximize recovery & recycling, minimize residuals & have enough staff to separate cross-contaminants	The Contractor shall use facilities that: Process materials to a high standard to maximize the recovery and recycling of all incoming recyclable and compostable materials; Are operated to minimize cross-contamination of materials that would result in otherwise Recyclable or Compostable materials being misdirected to a market or disposal where they would not be recovered; Are designed and operated to minimize the residual stream of otherwise Recyclable or Compostable materials destined for disposal; and Have sufficient preprocess and screening staff and equipment to ensure that otherwise recoverable materials do not cross-contaminate other separated Recyclable materials that are incompatible for the intended market consumer, rendering materials non-recyclable (City of Sammamish, 2016, p. 11).	4
95% of outbound recyclables must meet ISRI standards	The Contractor shall provide at least ninety-five percent (95%) of the collected Recyclables to the recyclable buyers with no greater out-throws, prohibited materials, and allowable contamination as defined in the Institute of Scrap Recycling Industries "Scrap Specifications Circular 2013 Guidelines for Nonferrous Scrap, Ferrous Scrap, Glass Cullet, Paper Stock, Plastic Scrap, Electronics Scrap, Tire Scrap" or successor circular or guidelines (City of Bellevue, 2014, p. 13).	4
Recycle containers must be blue	Contractor-provided Containers used for the collection of Recyclables shall be blue (City of Maple Valley, 2014, p. 17).	4
All COMM customers must receive brochures & posters about proper recycling	All participating Commercial Customers shall be provided with brochures and posters about proper recycling techniques (City of Federal Way, 2010, p. 29).	4
Establish recycling champions at MF properties	Contractor shall work with property managers at Multi-Family Complexes across the City to identify recycling "champions" in multi-family buildings to monitor recycling and waste collection activities, provide ongoing education to tenants, and communicate with the property manager about key issues (City of Federal Way, 2010, p. 30).	4

Provision	Sample Contract Language	Contracts with this Provision
Annual recycling outreach plan	Each year, the Contractor will implement a reduction, reuse and recycling education and outreach program that encourages Single Family, Multifamily and/or Commercial customers utilizing cart-based service to increase recycling or composting or decrease contamination. The program will be designed each fall with feedback and approval from the City (City of Bremerton, 2018, p. 21).	4
Recycling public education plan	Working collaboratively with the City, the Contractor will develop and implement a public education plan to include the strategy and development of materials to support the roll-out of the new collection and recycling services program, with a special emphasis on new recycling programs and sustainability initiatives (City of Kent, 2016, p. 45).	4
Can reject MF & COMM containers if contaminated	The Contractor may decline to collect Recyclables if the Container in which they are placed by the Customer contains Excluded Materials or other materials that do not conform to the definition of Recyclables or that do not meet specifications (City of Mukilteo, 2019, p. 29).	3
Regular recycling characterization studies	The Contractor agrees to participate, at no additional compensation, in special studies scheduled by the County, the Contractor and the Processor to include at least recyclable commodity allocation and glass breakage studies...The study will be conducted on a quarterly basis, or as mutually agreed upon and approved by the [Public Works] Director (Clark County, 2009, p. 24).	3
Dumpster color must be consistent with container program	Each type of Detachable Container (i.e. Recyclables, Compostables or Garbage) shall be painted a color consistent with the program it is used for (City of Des Moines, 2011, p. 17).	3
Site visits to all COMM customers at start of contract	By March 30, 2010 the Contractor shall have visited all the Commercial Customers in the City to provide information on the City's new commercial recycling program (City of Federal Way, 2010, p. 29).	3

Provision	Sample Contract Language	Contracts with this Provision
Material prep mailing to all customers at start of contract	Prior to February 15, 2019, the Contractor shall deliver to all Residential Structures and Commercial Establishments receiving service under this Contract, at least the following information...material to be collected and how such material is to be prepared (City of Seattle, 2019a, p. 63).	3
Contact COMM customers on request	The Contractor shall, at the City's request, address concerns, space or contamination problems, and offer additional education or training to tenant businesses. The Contractor's educational efforts to Commercial Customers shall include offering to perform no-cost waste audits to determine areas that need improvement, developing and covering the cost of stickers or signage for interior collection containers, and delivering Commercial Customer program packets to the Commercial Customers or their tenants, as requested by the Commercial Customer, a commercial tenant, or the City (City of Shoreline, 2016, p. 41).	3
Contact MF complexes at city's request	The Contractor shall contact, at the City's request, the manager or owner of Multifamily Complex sites to encourage recycling participation, address concerns, space or contamination problems, provide outreach to residents, and inform the manager or owner of all available services and ways to decrease Garbage generation (City of Mukilteo, 2019, p. 41).	3
Annual on-site technical assistance to MF complexes	Provide onsite technical assistance by Zero Waste Specialists or consultants for 30-50 targeted buildings per year, including container improvements, onsite presentations to residents, and distribution of materials (City of Seattle, 2019a, p. 64).	3
Recycling education center at contractor store	The store shall provide customers with the following...a recycling education center with information on how to decrease waste including posters and brochures (City of Bothell, 2014, p. 38).	3
Locks can be provided for dumpsters	The Contractor, within seven (7) days after receipt of notice from the City shall supply to each Customer designated in such notice a Detachable Container fitted with a lid lock mechanism (a "lid lockable Container"), along with one padlock and one key, or a combination lock (City of Kent, 2016, p. 15).	3

Provision	Sample Contract Language	Contracts with this Provision
Annual mailing to residential customers	Every year...the Contractor shall provide a service update for Single-family Customers. The service update shall be mailed to all Single-family Customers and, at a minimum, shall include an informational brochure with updated rates, services available, preparation and other service requirements (City of Redmond, 2016, p. 36).	3
Residential customers with \geq 3 oops tags in 3 months contacted	Customers that receive three (3) or more written notice tags or "oops tags" per quarter (three months) shall be contacted to resolve the issue (City of Mountlake Terrace, 2014, p. 31).	2
Report contaminated residential & MF containers to city within 2 hours	The Contractors will leave a customer notice on any non-compliant container and report to the City within two hours (City of Seattle, 2019a, p. 42).	2
Tag & refuse to collect contaminated missed containers	If the Contractor's collection personnel return to collect a miss and the Contractor has reason to refuse the miss consistent with this Section, the Contractor shall leave a City printed tag, explaining why the material was not collected (City of Seattle, 2019b, p. 47).	2
Contaminated loads may be rejected and/or charged extra fees	In the event of visually observed contaminants, the load may be rejected and/or Customers may be charged additional processing, return or disposal costs (City of Bremerton, 2018, p. 17).	2
MF customers contacted & instructed to remove contaminants or pay for garbage pickup	Contractor will contact [multifamily] Customer and provide the opportunity to (1) remove the contamination and have the materials collected the following collection cycle, or (2) have the materials collected as Garbage at the regular multifamily garbage rate for like size container multiplied by .231 (equaling one weekly collection service), plus the appropriate return trip fee, as provided in Attachment B (City of Kent, 2016, p. 29).	2

Provision	Sample Contract Language	Contracts with this Provision
Develop protocol for MF & COMM contamination	The Contractor and City shall jointly develop a protocol to address Multifamily Complex and Commercial recycling contamination issues. The protocol will address thresholds for when contamination levels trigger Customer contact, when to put a Customer on "probation" for possible discontinued collection, when to suspend collection service and remove the subject Container, and finally, procedures for allow [sic] a Customer to resume service after it has been suspended due to contamination. The Contractor shall implement the protocol consistently for all Customers and shall notify the City via e-mail of any Customer being handled under the protocol (City of Shoreline, 2016, p. 29).	2
Notify resident if recyclables not collected because of contamination	In the event that some recyclables are not collected, the Contractor shall notify the property resident of the reason so that the problem can be corrected (City of Bonney Lake, 2004, p. 3).	2
Proactively monitor for contamination	The Contractor shall proactively...monitor Recycling and Compost Containers for non-conforming materials (City of Seattle, 2019a, p. 51).	2
Not knowingly put contaminants in collection truck	The Contractor shall exercise good faith to ensure that non-Recyclable material is not knowingly placed in the collection truck (City of Seattle, 2019b, p. 42).	2
Collection vehicles have digital cameras to record specific collections	All collection vehicles shall be equipped with digital cameras so that upon a specific request from the City, collection personnel can record collection at a location (City of Seattle, 2019a, p. 58).	2
Annual review of quality assurance program	The Contractor and City shall annually review and update these procedures via mutual agreement to ensure that contamination problems are addressed promptly, fairly and consistently for all sectors (City of Shoreline, 2016, p. 11).	2
City goal is \leq 10% contamination in inbound recyclables	The City's goal is to maintain a contamination level of no greater than ten percent (10%) by volume for collected Recyclables (City of Shoreline, 2016, p. 10).	2

Provision	Sample Contract Language	Contracts with this Provision
If inbound recyclables > 5-10% contaminants, contractor develops corrective plan	If more than 10% of inbound materials are found to be contaminants, the Contractor shall develop an action plan which will determine which Customers are adding contaminants in their Recycling and provide a public education and technical assistance program to remedy the situation. The action plan shall include provisions for random or targeted monitoring of set-out quality and correction notices to customers and other measures necessary to reduce inbound contamination levels to less than 10% (City of Issaquah, 2011, p. 13).	2
Recycle bags are blue	Pre-paid recycle bags shall be 35 gallon blue bags, for relevant multifamily and commercial accounts (City of Seattle, 2019a, p. 67).	2
Relabel containers if changes made to recycle program	Should any changes be made to the Garbage, Recycling, or Compostables collection program, the Contractor at their sole expense shall reproduce and reaffix labels on all Containers (City of Mukilteo, 2019, p. 16).	2
All recycle containers relabeled at start of contract	All Recycling Containers shall be re-labeled by March 31, 2012 (City of Auburn, 2011, p. 24).	2
Relabel MF & COMM containers if labels fade, illegible or city request	Containers used for the collection of Recyclables from Multifamily Complex and Commercial Customers shall be relabeled by the Contractor if labels fade or are unreadable, or upon City's request for any individual Container (City of Mukilteo, 2019, p. 16).	2
Info on labels should be easy to read	Information [on labels] shall be printed in a size that is easily read by the users (City of Mukilteo, 2019, p. 16).	2
Site visits to all MF complexes at start of contract	By April 30, 2010, the Contractor shall have visited each Multi-Family Complex in the City (City of Federal Way, 2010, p. 29).	2
Annual performance audits of COMM sites	Perform Performance Audits for up to 20 sites per year, at the direction of the City, including physical sort of 30% of materials produced in 24-hour period, with written report and recommendations (City of Seattle, 2019a, p. 64).	2

Provision	Sample Contract Language	Contracts with this Provision
Proactive COMM container audits	Perform 50 proactive Container audits per quarter to identify contamination, tag relevant Containers, send follow-up post cards, and contact problem sites (City of Seattle, 2019a, p. 64).	2
Contractor will develop MF educational materials	By July 1, 2011, WM will develop specific public education materials for Multi-Family Complexes (City of Kirkland, 2011, p. 24).	2
Produce & deliver signage for MF complexes	Produce and deliver posters, labels, and signage for all multifamily Residential Structures, translated into the languages most relevant to the tenants (City of Seattle, 2019a, p. 64).	2
Flyers for managers to give to MF residents	Produce and deliver instructional flyers for building owners and managers to distribute to their tenants, with culturally appropriate languages, messages, and images (City of Seattle, 2019b, p. 66).	2
Annual property manager trainings	Lead 2-4 property manager group trainings per year (City of Seattle, 2019a, p. 65).	2
Proactive MF container audits	Proactive Container audits of 50 sites per quarter to identify contamination, tag relevant Containers, and engage the customer to resolve (City of Seattle, 2019a, p. 65).	2
Contractor & city/county evaluate public education plan quarterly or annually	Over the course of the Contract on at least a quarterly basis, the Contractor shall meet regularly with City staff to review and discuss progress on the plan to determine effectiveness of the outreach strategy and educational materials (City of Kent, 2016, p. 45).	2
Contractor & city annually plan contractor's education program for next year	Each September, the City and Contractor shall jointly plan the Contractor's specific promotion and education program for the following year, including adjustments in materials and/or targeted audiences (City of Shoreline, 2016, p. 41).	2
Tabling at community events	Community outreach and support including, but not limited to, outreach and tabling at 10-12 SPU [Seattle Public Utilities] and community events per year (City of Seattle, 2019a, p. 65).	2

Provision	Sample Contract Language	Contracts with this Provision
Training for drivers	Contractor personnel involved in the collection of Compostables and/or Recyclables shall be required to attend a minimum of two (2) trainings per year to allow the City and Contractor representatives to present highlights of promotional and service initiatives, while providing personnel an opportunity to offer feedback or suggest improvements based on their own observations (City of Federal Way, 2010, p. 32).	2
Exclude items from public place recycling	The City shall have the option to exclude any Recyclable Material (such as glass) from collection from Public Place Recycling Containers (City of Seattle, 2019a, p. 55).	2
Contaminated public containers collected as garbage	Any Public Place Recycling Containers that are contaminated with unacceptable material shall be collected and billed as Street Side Litter Collection (City of Seattle, 2019a, p. 55).	2
Report monthly on contaminated public recycling containers collected as garbage	The Contractor shall provide the City on a monthly basis...the number, location and date of any Public Place Recycling Containers collected as Street Side Litter Collection Containers (City of Seattle, 2019a, p. 55).	2
Contractor should proactively install locks	The Contractor shall proactively identify containers that are accessible to the public and install locks to reduce related scatter and debris (City of Seattle, 2019a, p. 61).	2
Experienced education staff dedicated to outreach	The Contractor shall provide an experienced education and outreach staff person dedicated to ongoing outreach in the City of Issaquah in order to help individual customers meet goals for diversion and waste reduction (City of Issaquah, 2011, p. 68).	2
Hourly report on residential & MF contaminated containers not collected	The Contractor shall provide an hourly electronic file...with...collection exceptions within 2 hours of any Residential Structure collections the Contractor has refused or been unable to make. This input shall include the service address, account number and the reason for non-collection (City of Seattle, 2019a, p. 74).	2

Provision	Sample Contract Language	Contracts with this Provision
Monthly report describes how contamination & residuals measured	[The monthly report contains] a description of the methodology used to determine contamination or residual levels (e.g. sample loads from an individual route truck, aggregate samples from all loads delivered to a facility, etc.) (City of Sammamish, 2016, p. 38).	2
Monthly list of contaminated COMM accounts	The Contractor shall provide a monthly list of non-compliant Commercial establishments (City of Seattle, 2019a, p. 51).	2
Quarterly report on residuals	The Contractor shall submit a quarterly report within fifteen (15) working days of the close of the quarter, which shall include...[a] summary of monthly outbound commodities and residuals for contract year to date (City of Seattle, 2016, p. 8).	2
Quarterly outreach report	The Contractor shall provide a quarterly report...will shall include...[a] Quarterly Outreach Summary Report covering recent education and publicity efforts and their results (City of Seattle, 2019b, p. 76).	2
Report to city within 2 hours uncollected residential & MF contaminated containers	The Contractor shall notify the City within two hours of the collection [of non-compliant containers] at Residential Structures (City of Seattle, 2019b, p. 51).	2
Rates adjusted if city starts program to penalize customers for waste composition	Should the City initiate any program that bans materials (other than Yard Debris) or penalizes the customer for the composition of his waste stream, the rates shall be adjusted to make the effect on revenue neutral to the Contractor (City of Kirkland, 2011, p. 64).	2
Recyclables can be landfilled if contractor can prove high contamination	Recyclables and yard waste collected within the City limits pursuant to this Agreement will be processed and marketed and will not be disposed of in any solid waste landfill. The City will approve Contractor's request to waive this condition if the Contractor convincingly demonstrates the material's condition precludes recycling due to contamination (City of Mercer Island, 2009, p. 23).	2

Provision	Sample Contract Language	Contracts with this Provision
Fee (\$15-50) for not giving instructional materials to new customers	Failure to provide instructional/promotional materials to new Customers, unless refused by Customer; Fifty dollars (\$50) per incident, with no maximum (City of Redmond, 2016, p. 42).	2
Fee (\$1,000) for disposing residuals > 5%	Liquidated damages are as follows...Disposal of Recyclables or Yard & Food Waste residuals in an amount greater than five (5) percent; One thousand dollars (\$1,000) per month (City of Kent, 2016, p. 53).	2
Rate increase for processing recyclables & educating customers about new materials prep requirements	Certain customer rates set forth on Attachment B of the Contract shall be adjusted to reflect the Contractor's increased cost of processing recyclable materials due to changes in the commodity market and the cost of reeducating customers as to new preparation requirements (City of Burien, 2018, p. 1).	2
Recycle containers always distributed with brochure/info pack	Container delivery by the Contractor shall be coordinated with delivery of the promotional information described in Section 3.10. (Clark County, 2009, p. 14).	2
Processor rejects hazardous/ infectious waste & contractor returns or disposes it	Unacceptable materials, such as hazardous or infectious waste, will be rejected by the Processor and shall be returned to the generator by the Contractor, if possible, or lawfully disposed at another properly permitted location if not accepted for disposal at the designated Processing site (Clark County, 2009, p. 23).	2
Inbound recyclables meet industry standards	The Contractor shall deliver Recyclables that meet industry standards for quality, free from unacceptable levels of contamination, subject to the standard described below (Clark County, 2009, p. 23).	2
Processor documents & reports contamination	If the Processor experiences contamination problems, it will photograph or otherwise document the contamination, and report the problem to the Contractor and the County within one working day (Clark County, 2009, p. 23).	2

Provision	Sample Contract Language	Contracts with this Provision
City/county can inspect trucks on route/at MRF any time to check material quality	To the extent practicable and without unreasonably disrupting on-going transportation activities, the County reserves the right to inspect at any time Contractor collection vehicles both on route and at the Processor to confirm Recyclable material source, quantity and quality (Clark County, 2009, p. 23).	2
Customers with \geq 3 oops tags in 3 months contacted by phone or in person	Customers that receive 3 or more "oops tags" per month will be contacted in by [sic] phone or in person to resolve the issue or to remove service for repeated contamination (City of Issaquah, 2018, p. 2).	1
Customers with consistent or significant contamination contacted by phone or in person	Customers whose Recycling continues to be significantly contaminated will be contacted by phone or in person to resolve the issue (City of Issaquah, 2018, p. 2).	1
Customers with \geq 3 oops tags may be charged contamination fee and/or have container removed	If the Contractor identifies repeated contamination by a Customer despite Contractor's tagging and educational efforts, the Contractor may charge the Customer the Contamination Fee...and/or remove the Customer's Recyclables and/or Compostables Container...Contamination Fee (chargeable on 3rd and any subsequent occurrence of contamination >5% for Recyclables or >3% for Compostables, provided warning tags and outbound calls to impacted customers were provided for first 2 occurrences; \$20 per cart for Single-Family Residence Customers \$25 per cubic yard of Container size (or per cart, for cart Customers) for Multifamily Complex or Commercial Customers (City of Burien, 2018, p. 2-3).	1
Customers with \geq 20% contamination get letter	Customers with significant levels of contamination (20% or more) will receive a letter and instructions about proper recycling (City of Issaquah, 2018, p. 2).	1
Must take pictures of contaminated containers	Notification of contamination fees to the customer shall occur via Oops tag, contractor will also take pictures accordingly, showing the cart of customer (City of Kent, 2016, p. 23).	1

Provision	Sample Contract Language	Contracts with this Provision
Report contamination on select routes	Contractor's staff shall report any reasonably observed contamination of Carts on select routes (City of Anacortes, 2015, p. 19).	1
MF complexes can become ineligible for recycling if high contamination level	Multi-family complexes can become ineligible as a result of high levels of contaminated materials (City of Marysville, 2012, p. 19).	1
Only terminate MF recycling after 3 warnings	The Contractor agrees to provide at least three warnings before terminating service (City of Marysville, 2012, p. 19).	1
Contamination fee (\$10/CY) for MF & COMM	The Director of Public Works is hereby authorized to approve the protocol and procedures on behalf of the City, including a contamination fee for each occurrence of a contaminated container in an amount not exceeding Ten Dollars (\$10.00) per cubic yard of container size for Multi-Family Complex and Commercial Customers (City of SeaTac, 2018, p. 3).	1
Regularly monitor MF contamination	The Contractor shall be required to monitor contamination at Multifamily Complexes on a regular basis and shall outline procedures and corrective action plans in the Outreach and Incentive Plan as approved by the City (City of Issaquah, 2018, p. 2).	1
Notify customer in writing if recyclables not collected	In the event that some recyclables are not collectible, Contractor shall give the Customer notice in writing of the reason so that the problem can be corrected (City of Puyallup, 2017, p. 8).	1
Drivers notify customer service for follow-up for containers \geq 20% contamination	Contractor's Drivers will notify customer service for follow-up for Containers contaminated with 20% or more unrecyclable materials based on on-route visual observation (City of Issaquah, 2018, p. 2).	1
Customers with constant contamination may have recycling cut	If the contamination is not corrected after numerous attempts to educate and help the Customer, then the Contractor may request in writing from the City permission to remove the Customer from Recycling service (City of Bellevue, 2014, p. 36).	1
Can reject curbside glass not	The Contractor may decline to collect...any glass recyclables not properly source separated (City of Camas, 2009, p. 7).	1

Provision	Sample Contract Language	Contracts with this Provision
separated from other recycling		
City responsible for coordinating education with haulers to minimize contamination	The City shall be responsible for...coordinating recycling education efforts with City-contracted haulers to ensure Recyclables are delivered to the Processing Facility with minimal contamination (City of Seattle, 2016, p. 2).	1
MRF operated so bales meet industry (ISRI) standards	The Contractor shall operate its materials recovery facility in a manner to ensure that processed recyclables destined for market have no greater outthrows, prohibited materials or contamination than allowed under current industry [ISRI] standards (City of Lake Stevens, 2008, p. 10).	1
City pays for disposal of residuals	The Contractor will be allowed to dispose of City-generated contamination at no cost to the Contractor (City of Seattle, 2016, p. 6).	1
City disposes of hazardous contaminants	In the event that the Contractor identifies any hazardous materials, or other materials not suitable for disposal at a City transfer station or rail yard, in contamination received or residuals produced from loads delivered to the Contractor under the Contract, the Contractor shall immediately notify the City and segregate those materials, and the City shall be responsible for making arrangements for their proper disposal (City of Seattle, 2016, p. 6).	1
Prepare recycling monitoring & sampling plan	The Contractor shall prepare and implement, subject to the City's prior authorization, a Recycling and Compost Monitoring and Sampling Plan in order to determine residual and inbound contamination levels, which shall be reported to the City quarterly (City of Issaquah, 2011, p. 13).	1
Contractor provides contamination data to city on request	Contractor shall provide such information as the City may request regarding aggregate contamination data that is collected and maintained by the Contractor on a quarterly basis (City of Burien, 2018, p. 3).	1

Provision	Sample Contract Language	Contracts with this Provision
Annual test of contamination weight in individual loads	The [monthly] report shall contain...summaries of weights of non-recyclables and contaminants, as estimated by applying the results of an annual test conducted by [the] Contractor in which non-recyclables and contaminants from individual loads are weighed (City of Mount Vernon, 2009, p. 14).	1
Build education center at MRF	The Contractor will build an onsite education center available as requested to City groups and to be completed by September 1, 2017, unless delayed due to factors beyond the Contractor's control (City of Seattle, 2016, p. 7).	1
COMM recycle drop boxes must be blue	At larger commercial sites, the Contract may use detachable containers or drop-box containers for the collection of recyclables provided that they are painted blue (City of Mercer Island, 2009, p. 9).	1
Container color must be consistent with collection stream	Each type of Container (i.e., Garbage or Recyclables) shall be painted a color consistent with the collection stream it is used for (City of Maple Valley, 2014, p. 16).	1
Cart color must be readily identifiable & help identify program	All carts shall be in a readily identifiable color to help identify the program (City of Marysville, 2012, p. 16).	1
Recycle carts must be gray	New and replacement Contractor-provided Recycling Carts shall be grey (City of Lakewood, 2015, p. 15).	1
Recycle carts & tubs must be brown	All recycling tubs and carts shall be brown in color (City of Longview, n.d., p. 17).	1
COMM recycle drop boxes must have materials prep labels	At larger commercial customer sites, the Contractor may use detachable containers or drop-box containers for the collection of recyclables provided that they are painted blue, and are equipped with City-approved prominent identifying and instructional screens, imprints or labels (City of Mercer Island, 2009, p. 9).	1

Provision	Sample Contract Language	Contracts with this Provision
MF dumpsters must be distinguished from garbage containers	At larger Multifamily Complexes, the Contractor may use Detachable Containers for recycling collection provided that they are clearly distinguished from containers used for Garbage collection and are equipped with City-approved, prominent identifying and instructional labels (City of Lake Stevens, 2008, p. 23).	1
Recycle carts should be marked to easily identify waste type	Contractor-provided Recycling Carts, Yard Debris Carts, and Garbage Carts shall be marked so as to be easily identified by waste type and shall include waste-specific collection instructions (City of Monroe, 2016, p. 12).	1
Residential containers relabeled when faded, damaged, or by request	Labels and molded or screened information on Single-family Containers shall be redone by the Contractor when faded, damaged, or upon City or Customer request (City of Bothell, 2014, p. 17).	1
All recycling cart labels replaced 4 years into contract	The Contractor agrees to place new recycling and yard debris instructional decals on all customer carts within six (6) months of the full execution of this Agreement and again the fourth (4th) year of this Agreement (City of Mercer Island, 2009, p. 15).	1
Regularly label MF containers	Contractor shall regularly label containers to ensure good visibility of various [multifamily] recycling, compost and garbage containers (City of Issaquah, 2011, p. 42).	1
Periodically relabel MF carts	Multifamily Complex Recycling Carts shall be relabeled periodically (City of Lake Stevens, 2008, p. 23).	1
Desk-side containers have materials prep labels	Desk-side containers to be distributed by the Contractor to Commercial Customers or their tenants shall be screened or labeled with instructional information (City of Bellevue, 2014, p. 21).	1
Contractor will work with state & regional partners to make standard recycle labels	Recology will participate in state and regional efforts to address the following issues and report yearly on their progress to...create standard recyclable labels (City of SeaTac, 2018, p. 3).	1

Provision	Sample Contract Language	Contracts with this Provision
Drivers must close container lids	The Contractor is responsible for providing the supervision necessary to ensure that collection employees...replace lids on collection Containers and firmly close them (City of Seattle, 2019a, p. 52).	1
Daily report on missing lids	The Contractor shall inform the City, on a daily basis, of damaged or missing containers...information shall include missing lids and/or liners (City of Seattle, 2019a, p. 55).	1
Drivers immediately report containers with missing or damaged lids	The driver of the collection vehicle shall immediately alert the Contractor's supervisor(s) of containers appearing to be damaged. This includes any container that is split, has a hole, has a missing or broken lids (both the small and large lid), or a lid that is not attached properly (City of Longview, n.d., p. 20).	1
Mailing to all MF complexes at start of contract	By December 31, 2011, the Contractor will have contacted, by direct mail, telephone or site visit, each Multi-Family Complex and/or property manager in the City (City of Kirkland, 2011, p. 23).	1
Contact all MF complexes at start of contract	By December 31, 2011, the Contractor will have contacted, by direct mail, telephone or site visit, each Multi-Family Complex and/or property manager in the City (City of Kirkland, 2011, p. 23).	1
Site visits to MF complexes not responding to mailing at start of contract	Four (4) weeks prior to the Date of Commencement of Service, [the Contractor shall] conduct site visits to all Multifamily Complex Customers to determine that Multifamily Complex Customer has not responded to the New Multifamily Program Announcement Brochure, and provide each Multifamily Complex Customer, as needed, with New Multifamily Recycling Posters for posting in common areas and New Multifamily Program Brochures for distribution to tenants (City of Bellevue, 2014, p. 27).	1
Mailing to all COMM customers at start of contract	Five (5) weeks prior to the Date of Commencement of Service, directly mail to all Commercial Customers a New Commercial Program Announcement Brochure announcing the new and continuing services available and options for service levels and Container sizes, along with rates, that includes a postage-prepaid mail-back card and an Internet web address for Customers to change service	1

Provision	Sample Contract Language	Contracts with this Provision
	levels and order new or replacement Containers (City of Bellevue, 2014, p. 27).	
User guide taped to all new carts delivered at start of contract	The Contractor will deliver with the new Carts a User Guide in a plastic bag taped to the Cart that includes information on Container placement, available service levels and rates, Recyclables and Compostables preparation and collection requirements, restrictions on disposal, bulky waste recycling and disposal opportunities, day of collection and other pertinent information (City of Des Moines p. 23).	1
Weekly reports on outreach at start of contract	The Contractor shall report weekly to the City in writing on each of the transition and implementation requirements, including a spreadsheet that includes at a minimum the transition and implementation requirements, when they are to be completed, whether they have been completed, if not – why not, if not – when the Contractor expects to have completed the requirement, and comments noting challenges, successes, and other items the Contractor and/or the City would like highlighted (City of Bellevue, 2014, p. 29).	1
At transition, contractor reviews service, waste reduction & new recycle program with COMM & MF customers	The Contractor shall review the received Commercial and Multifamily data with Customers to confirm collection service levels and frequency, collection locations, and access issues. During the reviews, the Contractor shall introduce the benefits of waste reduction to the customer and inform them of the new embedded recycle program (City of Des Moines, 2011, p. 22).	1
At transition, explain expanded commingled system to customers	The Contractor shall work with the City to explain to the customers the expanded commingled recycling collection system and Garbage collection service placement requirements, container sizes and rates (City of Lake Stevens, 2008, p. 15).	1
Annual contact by mail for all COMM & MF sites	The Contractor shall annually contact by mail the manager or owner of each [multifamily or commercial] site to encourage participation and inform the manager or owner of all available services and ways to decrease Garbage generation (City of Arlington, 2010, p. 20).	1

Provision	Sample Contract Language	Contracts with this Provision
Annual workshops for business groups	Conduct outreach partnerships with 6-9 local business groups and 2-4 lunch and learn programs per year (City of Seattle, 2019a, p. 64).	1
Annual workshops for managers and employees	Host up to 50 on-site recycling and composting workshops or brown bag lunches per year for managers and employees (City of Seattle, 2019b, p. 65).	1
Recycling interns do 1-2 weeks of door-to-door COMM or MF outreach each year	Provide 1-2 weeks per year of recycling interns for door-to-door business or multifamily outreach visits (City of Seattle, 2019b, p. 65).	1
Education & incentive plan for COMM services	Contractor shall develop, regularly update and implement an Outreach, Education and Incentive Plan for commercial services in coordination with the City, and which shall be subject to City's prior approval. The Plan shall identify specific, measurable goals, and planned activities and timelines for meeting those goals (City of Issaquah, 2011, p. 45).	1
Annual door-to-door MF outreach	Conduct up to 20 door-to-door tenant assistance site visits per year with an emphasis on multilingual, multicultural and millennial populations (City of Seattle, 2019b, p. 66).	1
Door-to-door MF outreach program about reducing contamination	Contractor agrees to implement a "Waste Wise" program to educate Multifamily Customers, which entails door-to-door Customer education in Multifamily complexes for the purpose of educating residents and property managers on the importance of reducing contamination (City of Burien, 2018, p. 3).	1
Annual intensive outreach to low-performing MF buildings	Deliver the Waste Wise Program to 5 buildings per year with low diversion rates and/or high contamination levels. These targeted buildings will be contacted by the Contractor for detailed site assessment and more extensive assistance that includes: on-site waste consultation, compostable bag dispenser (including case of 1,300 bags), door-to-door outreach to tenants, reusable recycling tote bags and compost containers for each unit, additional educational posters (City of Seattle, 2019a, p. 65).	1

Provision	Sample Contract Language	Contracts with this Provision
Weather resistant MF signage	Contractor shall make available, at no charge, durable, weather resistant signage for enclosure areas to help increase visibility of containers and to help minimize contamination (City of Issaquah, 2011, p. 42).	1
Annual MF lobby events	Host up to 10 multifamily lobby events, including social networking and happy hour events (City of Seattle, 2019b, p. 66).	1
Social media outreach to MF tenants	Social media outreach including Recycling Coach Academy for tenants and other effective behavior incentives through online leverage (City of Seattle, 2019a, p. 65).	1
Outreach campaign for millennials & multicultural MF residents	Develop and implement outreach campaign targeting millennials and multicultural populations. Work closely with the City and community liaisons to craft messages appropriate for the communities served (City of Seattle, 2019b, p. 66).	1
Hire staff just for MF outreach	Hire and support two "Outreach Specialists" as Contractor employees dedicated full-time to improving the success of Recyclables and Compostables services and diversion at multifamily Residential Structures and Commercial Establishments (City of Seattle, 2019b, p. 66).	1
MF education & incentive plan	Contractor shall develop, regularly update and implement an Outreach, Education and Incentive Plan for multi-family services in coordination with the City, and which shall be subject to City's prior approval. The Plan shall identify specific, measurable goals, and planned activities and timelines for meeting those goals (City of Issaquah, 2011, p. 42).	1
City & contractor periodically evaluate MF outreach program	The City and Contractor shall meet periodically to evaluate the effectiveness of the Multi-Family Complex education and outreach program (City of Kirkland, 2011, p. 61).	1
City & contractor periodically evaluate MF & COMM outreach program	The City and Contractor shall meet periodically to evaluate the effectiveness of the [multifamily and commercial] education and outreach program (City of Auburn, 2011, p. 56).	1
MF owners must train custodial staff, help	Owners will be required to provide...training of custodial staff to support recycling effort, assistance to distribute educational materials to tenants,	1

Provision	Sample Contract Language	Contracts with this Provision
distribute education materials & monitor & maintain collection site	monitoring and maintaining the recycling containers and site (City of Marysville, 2012, p. 19).	
Neighborhood meetings on recycling	At the City's option, the Contractor shall be available at the City's direction to coordinate and conduct Single-family Recycling meetings in each of the City's identified neighborhoods to explain the various programs and service options available, and to highlight the benefits of participating in the Recyclables and Organics program (City of Bellevue, 2014, p. 63).	1
Provide community outreach	Community outreach and support [includes] Touch-a-truck, Zero Waste events, and other community outreach and support (City of Seattle, 2019b, p. 67).	1
Funding for community organization projects	Award in total \$10,000 annually to one or more community based organizations for a project or event related to waste prevention or reduction, increased recycling and composting, or neighborhood clean-up (City of Seattle, 2019b, p. 67).	1
Store staff answer recycling questions & give recycle guides	The Storefront Customer Service Center shall...provide customers with the same customer service assistance normally provided by the Recology CleanScapes Call Center, including...answer questions about what can be recycled in which cart, and distribute recycling guides to subscribers, and educational posters to schools, businesses and multi-family facilities (City of Shoreline, 2016, p. 70).	1
Community MRF tours	Community outreach and support [includes] recycling plant tours and education center (City of Seattle, 2019a, p. 65).	1
Proactive daily cart audits	[Outreach activities include] proactive curb Cart tagging, including, but not limited to...proactive curb Cart audits at 1-2% of households per day, based on tablet prompts, to identify contamination, tag relevant Containers, and report to the City (City of Seattle, 2019b, p. 65).	1

Provision	Sample Contract Language	Contracts with this Provision
Saturation tagging of neighborhoods or routes	Proactive curb Cart tagging, including, but not limited to...twice per year saturation tagging of 1-2 select neighborhoods or routes at a time, with behavioral prompts on Carts at Residential Structures (City of Seattle, 2019b, p. 65).	1
Annual recycling presentations to schools	The Contractor agrees to make recycling presentations to all seven (7) schools. The content of the presentations will be developed jointly by the City and the Contractor (City of Mercer Island, 2009, p. 15).	1
Outreach to schools	[Outreach activities include] community outreach and support including, but not limited, to...school outreach programs (City of Seattle, 2019a, p. 65).	1
4 annual recycling workshops at store	The Contractor agrees to hold quarterly "Where Does It Go Workshops" at its Burien retail location to provide instruction for interested residents and businesses on the proper ways to recycle material (City of Burien, 2018, p. 3).	1
Co-locate MF and COMM containers	The Contractor shall...attempt to co-locate Garbage Containers with Recycling Containers whenever feasible (City of Redmond, 2016, p. 23).	1
Recycling incentive program for clean containers	The Contractor shall implement and manage a recycling incentive program...the Contractor shall award a total of \$17,500 each year to Customers whom the Contractor determines have demonstrated strong compliance with recycling and contamination standards. The awards may take the form of credits or discounts to the Customer's bill (City of Burien, 2018, p. 2).	1
Monthly report shows contamination monitoring results	At a minimum, [monthly] reports shall include...a summary of contamination monitoring results, including customers 'contaminated and collected,' customers 'tagged and not collected,' repeat contamination customers and results of every other month route visual auditing (City of Issaquah, 2011, p. 66)	1

Provision	Sample Contract Language	Contracts with this Provision
Monthly report has log of contaminated containers	At a minimum, [monthly] reports shall include...log of locations of contaminated garbage, recycling or yard and food waste carts or containers. The log shall identify the address, be sorted by the sector (single-family residential, multi-family or commercial), and include a table with monthly breakdown of the number of contaminated occurrences separated by sector (City of Kent, 2016, p. 43).	1
Quarterly report on contamination levels	The Contractor shall prepare and implement, subject to the City's prior authorization, a Recycling and Compost Monitoring and Sampling Plan in order to determine residual and inbound contamination levels, which shall be reported to the City quarterly (City of Issaquah, 2011, p. 13).	1
Annual report shows residue disposed	At a minimum, [annual] reports shall include...a summary of Recyclables quantities by collection sector and by commodity, including processing residues disposed and market prices (City of Lakewood, 2015, p. 41).	1
Annual report describes all education & outreach	On an annual basis...the Contractor shall provide a report containing the following information from the previous year: A description of any promotion, education, and outreach efforts, including where possible, samples of materials, and summary of any feedback or response received from Customers (City of Anacortes, 2015, p. 26).	1
Contractor keeps records of all contamination incidents	The Contractor shall keep records of all contamination incidents and make them available to customer service representatives and the city upon demand (City of Kent, 2016, p. 23).	1
Ad hoc report could have summary of contamination levels, residues & outreach	The City may request from the Contractor up to six (6) ad-hoc reports each year, at no additional cost to the City...The reports may include, but are not necessarily limited to...a summary of Recyclables market prices, contamination levels and processing residues disposed as Garbage...A description of any promotion, education, and outreach efforts, including where possible, samples of materials, and summary of any feedback or response received from Customers (City of Mill Creek, 2015, p. 47).	1

Provision	Sample Contract Language	Contracts with this Provision
Annual mailing to MF property managers	An annual mailing will be made to all property managers promoting recycling and compost, and offering educational resources and onsite assistance (including Recycling posters for common areas, recycling guidelines for residents, improved signage on recycling containers, web content, etc.) (City of Issaquah, 2011, p. 42).	1
Signage for special events	The Cart service shall include the provision of event stations, which shall comprise [sic] of color-coded and properly labeled Garbage, Recycling and Compost Carts, or other appropriate containers as approved by the City, along with associated signage designed to help ensure proper disposal of materials in the containers by event participants (City of Issaquah, 2011, p. 5).	1
Plastic bags & films removed from list	"Plastic Bags & Films" is hereby deleted from the list of Recyclables (City of SeaTac, 2018, p. 3).	1
Fee (\$100) for wrong container color	Failure to comply with Container colors and labeling per Section 2.1.15.5; One hundred dollars (\$100) per incident (City of Redmond, 2016, p. 41).	1
Fee (\$100) for not contacting all MF & COMM customers before start of contract	Failure to contact or provide site visits to all Multifamily Complex and Commercial Customer owners or managers prior to the Date of Commencement of Service; One hundred dollars (\$100) per incident, with no maximum (City of Bellevue, 2014, p. 74).	1
Fee (\$50) for not closing lids after collection	Failure to place Containers, lids and locks back in original location; \$50 per incident \$500 per route per day (City of Seattle, 2019a, p. 18).	1
Fee (\$50) for not replacing lids	Failure to deliver, pick-up or replace Cans, lids, locks, Detachable or Drop Box Containers within 5 business days of notification, including any identified needing repair or replacement and those for new or increased recycling or compost service; \$50 per Can, bin, lid or lock per day, \$100 per Detachable or Drop Box Container per day (City of Seattle, 2019a, p. 19).	1
Before applying fees, city and contractor should	If Contractor fails to meet the targets set forth in this Section due to the composition of materials being provided by Customers, then before the City imposes	1

Provision	Sample Contract Language	Contracts with this Provision
meet about solutions to reducing contamination when contamination limits exceeded	any performance fees under Section 4.1, the Parties shall meet and confer in good faith on potential solutions to reduce contamination from Customers (City of Kirkland, 2011, p. 13).	
Public Works Director notified of customer address after 3 rejected collections	After three successive denied collections, the Contractor shall also notify the Director [of Public Works] of the address where the material was not collected (Clark County, 2009, p. 11).	1
Rejected materials returned to customer container	Rejected materials shall be returned to the Customer's Container (Clark County, 2009, p. 12).	1
Recycling & garbage cannot go into same truck	Recyclables and garbage/solid waste may not be intentionally or negligently commingled by the Contractor in the same vehicle at the same time under any circumstances (Clark County, 2009, p. 13).	1
Education info delivered with containers should be kept dry	Reasonable provisions shall be made for keeping accompanying promotional materials dry in the case of precipitation on Container delivery days (Clark County, 2009, p. 14).	1
Locks available to MF customers to limit contamination/ theft (charge up to \$10)	Multifamily Residence owners/managers shall be provided with lockable Containers where contamination/theft is a problem...The price to be paid by such owners/managers for the locks shall be no more than \$10 per lock (Clark County, 2009, p. 15).	1
Technical assistance to MF sites requesting service	When a Multifamily Residence that has not previously been served requests service, the Contractor shall visit the Multifamily Residence within seven days to determine the service necessary, and shall deliver Containers and promotional materials to that Multifamily Residence within ten business days (Clark County, 2009, p. 16).	1

Provision	Sample Contract Language	Contracts with this Provision
Keep special & commingled recyclables separate during collection	The Contractor shall collect, and keep separate during transport and delivery, Glass, Antifreeze, Used Motor Oil and alkaline batteries from Comingled Recyclables (Clark County, 2009, p. 21).	1
Hire staff just for recycling education	The Contractor shall designate and commit no less than three full-time equivalent "Recycling Coordinator" positions plus one manager position with an additional annual budget of \$80,000 dedicated to the promotion and education functions of this Contract, exclusive of any Contractor staff assigned to Customer recruitment and sales (City of Vancouver, 2019a, p. 48).	1
Annually review & update contamination reduction plan	Concurrently with the start of this Contract, the Contractor shall implement a Contamination Reduction Plan for Recyclables and Organics consistent with industry best management practices, as described in Exhibit E for tagging, probationary periods, material rejection, and suspension of service...The Contractor and City shall annually review and update these procedures to ensure that contamination problems are addressed promptly, fairly and consistently for all sectors (City of Vancouver, 2019a, p. 15).	1
Processor may reject contaminated loads	Portions of loads in excess of permissible contamination levels may be rejected upon delivery (City of Vancouver, 2019a, p. 27).	1
Processor segregates rejected loads	Rejected loads will be segregated by the Processor (City of Vancouver, 2019a, p. 27).	1
Contractor processes, redelivers, or pays to dispose rejected loads	The Contractor will process the load and re-deliver or will pay disposal fees at the normal rate charged by the Processor for the portion of the load rejected (City of Vancouver, 2019a, p. 27).	1
Contract may be terminated if consistently contaminated loads	Consistent delivery of loads in excess of permitted contamination levels may be grounds for Contract termination (City of Vancouver, 2019a, p. 27).	1

Provision	Sample Contract Language	Contracts with this Provision
Annual mailing to MF customers	Each year, the Contractor shall print and deliver an annual comprehensive service guide to each Single-Family Residential and Multifamily Complex customer which shall include, at a minimum, information on the proper disposal of Garbage, Recyclables, and Organics; disposal options for difficult-to-recycle items and hazardous wastes; collection guidelines; contact information; and any other pertinent information (City of Vancouver, 2019a, p. 48).	1
Recycling processing surcharges may appear on customer bills	Recyclables processing surcharges (as applicable) shall be itemized on the Customer invoices separately by the Contractor, and may at no time exceed the charges set forth in Exhibit B (City of Vancouver, 2019a, p. 50).	1
Work with nearby areas to deliver consistent monitoring & messaging	There is an expectation that WCW [Waste Connections of Washington] and the City will work closely with Clark County and other partner cities to deliver consistent monitoring and messages region-wide to both assess and communicate on how all households can improve practices targeting "Recycle Right" behaviors (City of Vancouver, 2019b, p. 1).	1
Customer service reps talk to new customers about what goes in recycle cart	Education to the customer with initiation of a new account or in response to general inquiries on proper recycling practices will include an initial conversation with Customer Service about what materials can go in the recycling cart and what can go in the Organics cart (City of Vancouver, 2019b, p. 1).	1
Social media posts about recycling education	Education Pieces and Activities [include] Social Media posts addressing recycling education (City of Vancouver, 2019b, p. 2).	1
Inspect 1/2 of residential recycle carts each year	Members of the Education Team will undertake an annual plan to routinely inspect carts along selected routes in the City to both address known problem areas and provide rotating inspections across all areas of the city on a two year cycle – with the goal of looking into carts of roughly half the City's curbside recycling/organics customers each year (about 25,000 +/- single family set outs) (City of Vancouver, 2019b, p. 2).	1

Provision	Sample Contract Language	Contracts with this Provision
Hire full-time staff dedicated to inspecting carts	One position (FTE) will be dedicated to the City's contract to compose the Education Cart Tagging team (City of Vancouver, 2019b, p. 2).	1
PR to explain new cart tagging process before rollout	Before the Education Cart Tagging team (CT) starts inspections there will be PR sent out from WCW [Waste Connections of Washington] and City of Vancouver/Clark County in regards to the new [cart tagging] process and why we are doing it. This can include explanations of why materials are targeted for collection in the program and why some non-target materials are serious contaminants and harm the system. PR may include a press release, bill insert, website, Facebook and a possible call blast as CT inspections are planned for particular routes (City of Vancouver, 2019b, p. 3).	1
Drivers report contamination on route notes	These [driver] observations [of contamination] will be reported on route notes (City of Vancouver, 2019b, p. 3).	1
Quarterly visual inspections of inbound loads at MRF	Once a quarter, visual inspections of loads arriving at the processing center will take place and targeted education to specific routes may occur (City of Vancouver, 2019b, p. 3).	1
Very thorough cart inspections for problem routes	Problem routes will get a more thorough inspection by this new staff member(s)/CT [cart tagging team] multiple times during the year and after they are identified by either visual load inspections at the transfer station, or by feedback from ride-alongs and drivers (City of Vancouver, 2019b, p. 3).	1
Residential customers with 4 oops tags may be charged for garbage pickup	The fourth tag may result in the [residential] customer's cart being charged as garbage (City of Vancouver, 2019b, p. 3).	1
Residential customers with cut service can restart if they watch online video & take quiz and/or attend recycle class	[Single-family] Customers that have had their cart removed due to contamination may get the cart returned if they have: watched an online video and taken a quiz with satisfactory results and/or attended a Recycling 101 class (City of Vancouver, 2019b, p. 4).	1

Provision	Sample Contract Language	Contracts with this Provision
Residential cart inspectors track contamination instances, contamination type & cart fullness	CT [cart tagging team] will track: occurrence of contamination (recycling carts, glass bins, organics carts and target liquids), occurrence of contamination by type of material (film plastic, wood, clothing, etc.), fullness of carts, glass bin set outs, 25,000 customers or half the city population will receive one cart inspection per year (City of Vancouver, 2019b, p. 4).	1
Driver leaves MF/COMM tag with property manager or contacts dispatch so education team can follow up	If [multifamily] carts are contaminated, drivers will tag the customer noting the type of contaminant and leave the tag while on site with the property manager or radio dispatch with the information. Dispatch will promptly notify the CT [cart tagging team]/Education Team so that the customer can be notified (that same day or next day) by phone call or in-person site visit that there is an issue to correct (City of Vancouver, 2019b, p. 4).	1
Education team develops site-specific outreach for MF sites with consistent contamination	If a property has continued contamination in their cart/container(s) after being charged for extra garbage pickup, then the Education Team will work with the property to develop a site specific outreach effort. The site specific outreach could include additional training and education for their tenants and/or staff (City of Vancouver, 2019b, p. 4).	1
Possible fee for MF sites with consistent contamination	When a [multifamily] property is noncompliant and contamination continues, a contamination fee may be assessed to the account (City of Vancouver, 2019b, p. 4).	1
MF enclosures inspected for best management practices	CT [cart tagging team] will assess enclosures/recycling areas for Best Management Practices as part of annual inspection schedule: all commingled recycling in clearly labeled blue 95 gallon carts, dumpster(s) or cage(s) and glass recycling in clearly labeled 65 gallon green carts. As needed, carts will be swapped and labeled correctly and new enclosure signs will be delivered (City of Vancouver, 2019b, p. 5).	1

Provision	Sample Contract Language	Contracts with this Provision
Quarterly report with recommended adjustments to contamination reduction plan	On a quarterly basis, CT [cart tagging team] staff with support of others will summarize the results and outcomes of the CRP [Contamination Reduction Plan] efforts and provide written recommendations for adjustments, if any are needed, to the plans for the following quarters (City of Vancouver, 2019b, p. 6).	1
Monthly report on contamination reduction plan outcomes	CT [cart tagging team] or other staff will take the lead in summarizing high level outcomes of the CRP [Contamination Reduction Plan] efforts in a monthly report submitted along with other reports required (City of Vancouver, 2019b, p. 6).	1

Appendix C

Interview Questionnaire for Municipal Staff

1. Some solid waste contract managers are responsible for additional programs, such as energy conservation or other public works divisions. What percentage of your position is dedicated to solid waste, on a scale of 1-100%? _____

2. How many years have you held your current position? _____

3. On a scale of 1-10, how involved were you in creating your city's current solid waste contract(s)?

1	2	3	4	5	6	7	8	9	10
Not at all									Very involved

4. If you helped create the current contract(s), what role did you play? Select all that apply.

- | | |
|---------------------------------|------------------------------|
| a. Drafted sections of contract | c. Revised part of contract |
| b. Drafted entire contract | d. Revised entire contract |
| | e. Negotiated contract terms |

5. Who was the principal writer of the contract(s)? _____

6. How often do you scan or read sections of your solid waste contract(s)? If you are in the process of renewing or implementing a new contract, please provide an answer that reflects how often you generally review contracts outside of contract transition periods.

- | | |
|--------------------------|------------|
| a. Less than once a year | e. Monthly |
| b. Once a year | f. Weekly |
| c. 2-3 times a year | g. Daily |
| d. Every 2-3 months | |

7. On a scale of 1-10, how well do you know the content of your contract?

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely well

8. How often do you review your hauler's monthly reports when you receive them?
- a. Always
 - b. Usually
 - c. Sometimes
 - d. Never

9. Do your hauler's monthly reports list instances of contaminated containers?
- a. Yes
 - b. No
 - c. Don't know

10. On a scale of 1-10, how concerned are you about recycling contamination in your service area?

1	2	3	4	5	6	7	8	9	10
Not									Extremely
at all									concerned

11. Describe the actions your hauler takes to mitigate recycling contamination.

12. Describe the actions your division or department takes to mitigate recycling contamination.

13. Do you monitor your hauler's contamination mitigation efforts?
- a. Yes
 - b. No
 - c. Don't know

14. If you answered "yes" to Question 13, please explain your monitoring efforts.

15. Some solid waste contracts have provisions about contamination mitigation, such as contamination limits for outbound bales of recyclables or guidance for what drivers should do if they see contaminants in recycling containers. Does your contract have any contamination mitigation provisions?

- a. Yes
- b. No
- c. Don't know

Appendix D

Interview Questionnaire for Waste Hauler Staff

1. How many years have you held your current position? _____
2. On average, how involved have you been in creating the solid waste contracts that you manage?

1	2	3	4	5	6	7	8	9	10
Not at all									Very involved
3. If you helped create the current contracts, what role(s) did you play? Select all that apply.
 - a. Drafted sections of contract
 - b. Drafted entire contract
 - c. Revised part of contract
 - d. Revised entire contract
 - e. Negotiated contract terms
4. How often do you scan or read sections of the solid waste contracts that you manage? If you are in the process of bidding for a new contract, please provide an answer that reflects how often you generally review contracts outside of contract transition periods.
 - a. Less than once a year
 - b. Once a year
 - c. 2-3 times a year
 - d. Every 2-3 months
 - e. Monthly
 - f. Weekly
 - g. Daily
5. On average, how well do you know the content of the contracts you manage?

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely well
6. Which cities do you have contracts with?
7. On a scale of 1-10, how concerned are you about recycling contamination in your service areas?

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely concerned

15. Please explain your answer to Question 14.

16. Is there anything else you would like to share about solid waste contracts or recycling contamination mitigation strategies?

Appendix E

Interview Questionnaire for Staff from Cities with In-house Recycling Collection

1. Some solid waste managers are responsible for additional programs, such as energy conservation or other public works divisions. What percentage of your position is dedicated to solid waste, on a scale of 1-100%? _____
2. How many years have you held your current position? _____
3. Many cities in western Washington contract out their garbage and recycling collection. Could you explain why your city does not?
4. On a scale of 1-10, how concerned are you about recycling contamination in your service area?

1	2	3	4	5	6	7	8	9	10
Not at all									Extremely concerned

5. Describe the actions your department or division takes to mitigate contamination.
6. How effective are the following contamination mitigation strategies? Rate them on a scale of 1-10, where 1 = has no effect on mitigating contamination.

1	2	3	4	5	6	7	8	9	10
No effect on reducing contamination									Extremely effective

		1-10
A	Drivers should not collect contaminated carts	
B	Drivers should tag contaminated carts	
C	Educational follow-up for customers with contaminated carts	
D	Limits on the percentage of contaminants in outbound baled recyclables	
E	Materials preparation labels on all recycling containers	
F	Periodic visual audits of residential recycling carts	
G	Annual recycling outreach to all multifamily complexes	
H	Annual training for drivers who collect recyclables	

7. Which contamination mitigation strategies are effective but have not been mentioned here?

8. Do you think solid waste contracts could be effective tools for reducing recycling contamination?
- a. Yes
 - b. No
 - c. Maybe
 - d. Don't know
9. Please explain your answer to Question 8.
10. Is there anything else you would like to share about solid waste contracts or recycling contamination mitigation strategies?

Appendix F

Informational Letter for Interview Participants

Dear _____,

I am a graduate student in The Evergreen State College's Master of Environmental Studies program. I am conducting a thesis research project titled "Municipal Solid Waste Contracts: Tools for Reducing Recycling Contamination?" The purpose of my project is to understand which contamination-mitigation provisions are in regional contracts and how these provisions are managed. I will be conducting content analysis of 45 contracts from cities in western Washington and interviewing the municipal and waste hauler staff who manage the contracts. Each interview will last 45-60 minutes, and I will record participants' answers on a questionnaire form and through audio recordings.

Any risks to you are minimal, but they could include feelings of discomfort around sharing information about your knowledge of solid waste contracts or your role in contract enforcement or compliance. To minimize risk and discomfort, I commit to keeping confidential any information which would identify a participant, municipality, or private waste hauling company. I will use numbered codes to identify all participants in my records, and I will only label interview documents and digital files from the interviews with the codes. I will keep the key, which links participants to their codes, separate from the interview questionnaires, and I will destroy the key when the project is finished. I will also present my data in aggregate, without identifying participants or their employers. If participants wish, I may also hold the interviews in a public place away from their offices, such as a café, so that participants feel freer to answer questions frankly.

There will be no compensation of any kind available for your participation, which is completely voluntary. You may withdraw your participation at any point or skip any question you do not wish to answer without penalty. You may not directly benefit from this research; however, I hope that your participation in the study will help develop better approaches for reducing contamination in municipal recycling streams.

Once my project is complete, a copy of my thesis will be available online through The Evergreen State College's library. I will also share my research through presentations at The Evergreen State College and the Solid Waste Association of North America's Western Regional Symposium. At your request, I will provide you with a copy of the completed thesis as well.

Your interview, collected as part of the research, could be used for future research studies or distributed to another investigator for future research studies, with all identifiable information removed, without additional informed consent from you.

If you have any questions about this project or your participation in it, you can call me at (425) 505-1539 or email me at heumea30@evergreen.edu. If you have questions concerning your rights as a research subject or experience problems as a result of your participation in this project, contact John McLain, IRB administrator at The Evergreen State College, Library 3207, Olympia, WA 98505; phone: (360) 867-6045.

Thank you for your participation and assistance.

Sincerely,

Meara Heubach

Appendix G

Consent Agreement for Interview Participants

I, _____, hereby agree to serve as a subject in the research project titled “Municipal Solid Waste Contracts: Tools for Reducing Recycling Contamination?” It has been explained to me that its purpose is to understand which contamination mitigation provisions are in regional contracts and how these provisions are managed. The research activity I will participate in is an interview.

I have been informed that the information I provide will only be used for further understanding how regional solid waste contracts address recycling contamination, and my identity will be kept confidential and no identifying information about me will be included. Meara Heubach has agreed to provide, at my request, a copy of her completed thesis. Meara has also informed me that her thesis will be available electronically through The Evergreen State College’s Library and that she will present her research to audiences within and outside the solid waste field.

I understand that the risks to me are minimal and would likely involve feelings of discomfort around sharing information about how I manage solid waste contracts or programs. I agree to participate in an interview and have the interview recorded for this project. The interview will not contain personally identifying information, and I have been told the key linking my identifying information to my interview will only be accessed by Meara Heubach and will be destroyed when the project is finished.

I understand that my interview, collected as part of the research, could be used for future research studies or distributed to another investigator for future research studies, with all identifiable information removed, without additional informed consent from me or a legally authorized representative.

There will be no compensation of any kind available for my participation. I have been told that I can skip any question or stop the interview and withdraw my full participation from the study at any time without penalty. If I have any questions about this project or my participation in it, I can call Meara Heubach at (425) 505-1539 or write to her at heumea30@evergreen.edu. Likewise, if I have questions concerning my rights as a research subject or I experience problems as a result of my participation in this project, I will contact John McLain, IRB administrator at The Evergreen State College, Library 3207, Olympia, WA 98505; phone: (360) 867-6045.

I understand that my participation in this project is completely voluntary and that my choice of whether to participate in this project will not jeopardize my relationship with The

Evergreen State College. I am free to withdraw at any point before or during the interview.
I have read and agree to the foregoing.

Signature _____ Date _____