CLARK COUNTY CORRESPONDENCE

ADDENDUM #2 – ISSUED TUESDAY, MAY 30, 2023

RFP #858
TRIENNIAL TRANSFER STATION INSPECTIONS

Proposers shall acknowledge receipt of the Addenda by checking the appropriate box where indicated, on Attachment "A" – Cover Sheet

Failure to do so, shall render the proposer non-responsive and therefore be rejected

THE FOLLOWING CHANGES, ADDITIONS, AND DELETIONS TO THE CONTRACT HEREBY BECOME A PART OF THE CONTRACT DOCUMENTS.

The Table of Contents, "Attachments" has modified as follows:

- **Item "G" – Regional Solid Waste System Study – Phase 1 Report has been added**
  - The report labeled Attachment G, is included.

End of Addendum 2

FOR

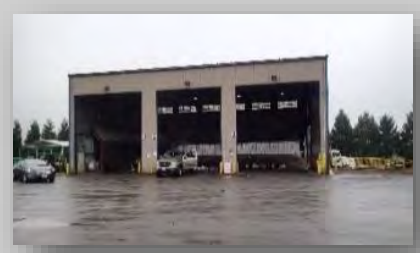
Priscilla Ricci, C.P.P.B.
Purchasing Agent of Record

Attachment G

Regional Solid Waste System Study

Phase 1 Report

8/20/20



Prepared for

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Chapter 1

Introduction

1.1 Background

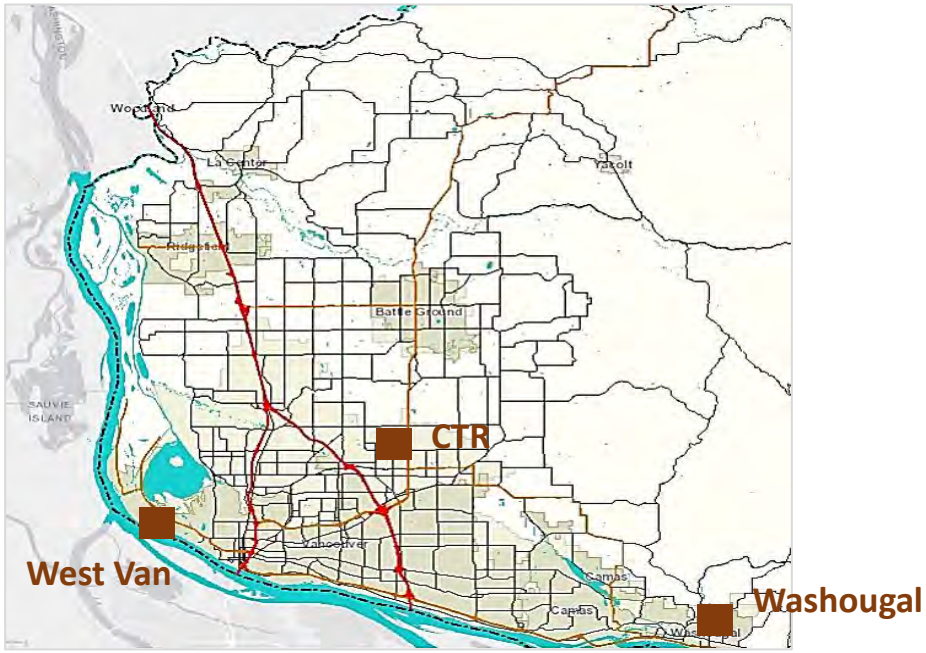
Clark County (County) is a dynamic, fast growing area in southwestern Washington; the County population has increased 14.8% since 2010. Since the first transfer stations (i.e., West Vancouver Material Recovery Facility and Transfer Station and Central Transfer and Recycling Center) were opened in the County in 1991, the County population has increased by 105%. There have been no major improvements to these facilities over this period. The Washougal Transfer Station was opened in 2009.

1.1.1 – Transfer Station System Summary

The transfer stations locations and a map are below:

1. **West Vancouver Material Recovery Facility and Transfer Station (West Van)**, located at 6601 N.W. Old Lower River Road at the Port of Vancouver
2. **Central Transfer and Recycling Center (CTR)**, located at 11034 N.E. 117th Avenue, Vancouver
3. **Washougal Recycling and Transfer Station (Washougal)**, located at 4020 S. Grant Street, Washougal

Figure 1.1: Facility Map



All three facilities accept waste from private commercial haulers, route collection trucks, and public (including commercial) self-haulers. Two of the facilities, CTR and West Van, use preload compactors to transfer waste into intermodal containers. The containers are transported by semi-tractor to the Tidewater barge terminal west of the Port of Vancouver. Tidewater transports the containers up the Columbia River to the Finley Buttes Landfill near Boardman, Oregon. Waste from the Washougal Transfer Station is transported via semi-tractor-trailer to the Wasco County Landfill near The Dalles, Oregon. Both Finley Buttes and Wasco County landfills are owned and operated by Waste Connections (WCW).

These facilities are operated under an agreement between Clark County and Columbia Resource Company (CRC), a wholly owned subsidiary of Waste Connections. The Contract with CRC was first entered into on April 11, 1991. The contract has been amended six times, most recently in 2006. The contract includes provisions for transfer, transportation, and disposal of municipal solid waste generated in the County.

In 2006, Clark County renewed the operating contract with CRC for solid waste, transfer, transport, and out-of-county disposal services. The Agreement also includes the processing of commingled recyclables utilizing the West Van MRF. The contract term was for ten (10) years, until December 31, 2016. The 2006 Agreement contained two five-year extension options and a purchase option. The first option was granted and extended the Agreement through December 31, 2021 (“First Extension” of 2006 Agreement). The County has the right to extend the Agreement (“Second Extension” of 2006 Agreement) for another five years through December 31, 2026 subject to providing formal notice to CRC by December 31, 2020. It should be noted that the “First Extension” was more of an automatic extension triggered if CRC implemented specified capital improvements detailed in Section 10.1 and 23.5 of the Agreement. A provision in the Agreement permits the County to exercise an option to purchase all transfer stations by notifying CRC no later than December 31, 2025.

1.1.2 – Regional Solid Waste System Study

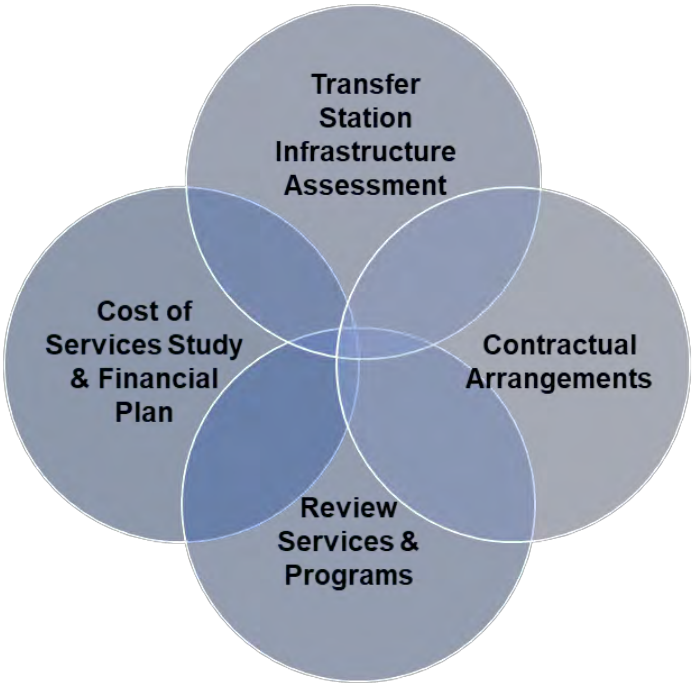
The County’s population growth coupled with the need for modernized solid waste facility infrastructure, expanded programs and services, and updated institutional (contractual) arrangements led the County to launch this Regional Solid Waste System Study (Study).

The need for the Study is also driven by state requirements (i.e., Washington Solid Waste Management, Reduction and Recycling Act (Revised Code of Washington [RCW] 70.95) to prepare a 20-year Comprehensive Solid Waste Management Plan (the Plan). The Plan must be developed in association with cities and towns located in the county and reviewed (and revised if necessary) at least every 5 years. The County’s last Plan update was in 2015 (see https://www.clark.wa.gov/publichealth/solid-waste-management-plan).

Figure 1.2 on the next page captures the inter-relationships of the key components of the Study. These critical, inter-related components include:

- Transfer Station Infrastructure Assessment
- Cost of Services Study & Financial Plan
- Review of Services and Programs
- Contractual Arrangements

Figure 1.2: Regional Solid Waste System Study Components



There will be three phases to the Study with this report capturing phase 1. Phase 1 focuses on evaluating the financial position of the system, use of various rate and planning strategies to reduce traffic congestion at the transfer station facilities, completing a conditions assessment of the current transfer station, and identify infrastructure needs and options for future public ownership of the system. The goal of phase 2 is to complete facilities planning services to determine investments needed and prepare a plan for capital improvements to the system. Phase 3 includes incorporating findings and recommendations of this study into an update of the County's Comprehensive Solid Waste Management Plan in 2021.

The Clark County Environmental Health Department is responsible for oversight and management of the regional solid waste system per state laws. The County has engaged a consultant team led by J.R. Miller and Associates for completion of the Study. The Study also reflects guidance and direction from the City of Vancouver Public Works, Solid Waste Division. The County, through interlocal agreements, has formed a Regional Solid Waste System Steering Committee (RSWSSC) made up of the Public Works Directors of each city to advise the County on solid waste issues and planning. The RSWSSC will be reviewing the Study findings along with the Solid Waste Advisory Commission (SWAC).

1.2 Purpose of Study

The purpose of this Study is to accomplish several objectives as summarized in the graphic below.

1.3 Organization of Report

This Phase 1 Report is organized into six subsequent chapters each representing a major task in completion of the Study. It should be noted that task reports were completed, not all in sequential order as shown below, and the contents of such reports combined to make up this Phase 1 Report. A summary of each chapter can be found below.

Chapter 2 –Population and Waste Generation Projections

Summarizes population and waste generation and disposal trends and future forecasts. This data is critical to determine the facility capacity needs in the future.

Chapter 3 – Operational Efficiencies and Impacts of Self Haul Traffic

Addresses current collection services and related policies and practices that pertain to the current level of services at the transfer stations. Policy options or changes to services are analyzed that may positively influence improvements in self haul circulation and flow at the transfer stations, particularly at CTR.

Chapter 4 – Transfer Station and Materials Recovery Facility Assessments

Captures the results of assessing the current transfer station and material recovery facility infrastructure. The assessment entailed examining the physical condition of the facilities and identifying repairs and replacement needs. It also examined the operating conditions for managing both current waste volumes and customers as well as assessing improvements needed to manage growth over the next 20 years.

Chapter 5 – North Area Service Options

Details results of an analysis of capital improvement options at CTR and for a new north regional transfer station.

Chapter 6 – Summary of Findings

Summarizes the key findings of the report regarding a set of recommendations to make improvements to the regional system along with a long-term financial strategy.

Chapter 7 – Regional System Capital Improvements Plan (CIP)

Provides details on a 20-year capital improvement plan for recommended infrastructure improvements at the three-transfer stations (inclusive of the Material Recovery Facility at West Van) and new facilities such as a north regional transfer station.

1.4 Process for Preparing the Study

The process for completing such a thorough assessment of the operating and facility needs of the Clark County regional solid waste system required a dynamic and collaborative effort. In addition to the efforts of both the County and City of Vancouver solid waste departments, it required cooperation and participation by WCW's operations personnel and its regional engineering group. As the consultant team completed draft reports on elements of the system, these documents were reviewed by WCW staff for comments and clarifications. The consultant team then responded to these comments and incorporated any corrections as noted. This was a very cooperative process throughout.

The revised draft reports were then sent to the County and the City of Vancouver solid waste staff to review and provide comments. Once received these were discussed and the draft reports were finalized to be incorporated into this Phase 1 report.

In addition to the various chapters included in this Phase 1 Study, the consultant team completed two related tasks. The first was a comprehensive review of the cost of services of each transfer station. This study broke down the unit cost to operate the facility and transport and dispose of waste. It also identified the specific administrative cost elements and costs of ancillary services such as operations of HHW and recycling drop-off centers. While the complete cost of service analysis is not included in the phase 1 Study, critical cost information was used to review services and facility needs and compare options in certain cases.

The second task completed was a review of the ownership options to be provided to the County for evaluating the alternative management strategies for the future. This includes an assessment of risk of public ownership and operations of the facilities as well as different scenarios for operating the system under a public / private partnership. Also discussed is the options to establishing a special Disposal District under state laws or some alternative form of intergovernmental partnership.

Reports associated with these two tasks will be included in the Phase 2 report after findings from the Phase 1 report have been presented to the Regional Steering Committee and SWAC.

Chapter 2

Waste Generation Projections

2.1 Introduction

Clark County is one of the fastest growing areas in the State of Washington. This growth has resulted in a measurable increase in the amount of waste generated and received at the regional transfer station system. This chapter details forecasted waste generation quantities to be managed by the Clark County regional system for the next 15 years. Forecasts are based on historic and future population projections provided by both the County's growth management plan and the State Office of Financial Management (OFM).

2.2 Population Growth in Clark County

Clark County experienced a significant increase in population between 1990 and 2010. Table 2.1 summarizes the change during the 20 years from 1990 to 2010, when the population grew by almost 80%.

Table 2.1: Population in Clark County, WA for 1990 and 2010

Year	Population	Increase in Population
1990	238,053	
2010	425,363	79% (3.9% per year)
2019 (July)	481,857	13% (1.4% per year)
Sources: Clark County Growth Management Plan (1990 and 2010), Census.gov (2019)		

As a result of the closure of the Leichner Landfill in 1992, West Van and CTR transfer stations were put into service to manage all the County's waste. Waste delivered to transfer stations is transported approximately 200 miles by barge to the Finley Buttes Landfill in Boardman, Oregon. Over this period (1990-2010, the amount of waste disposed increased by 33% from 171,762 tons to 227,868 tons annually.

Table 2.2 on the next page shows the annual change in population for incorporated cities and the unincorporated area in Clark County as published by the OFM.

Since 2010 the population of Clark County grew by approximately 13%. Considering the growth over the past 29 years, when the primary transfer stations became operational, the County population has increased by 102%. There have been no major improvements to these facilities over this period.

Table 2.2: Population Estimates of Cities in Clark County, WA

		Population Estimates								
City or Area	**2010 Census**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Battle Ground	17,571	17,780	17,920	18,130	18,680	19,250	19,640	20,370	20,890	21,520
Camas	19,355	19,620	20,020	20,320	20,880	21,210	21,810	23,080	23,770	24,090
La Center	2,800	2,835	2,985	3,015	3,050	3,100	3,140	3,195	3,320	3,405
Ridgefield	4,763	4,975	5,210	5,545	6,035	6,400	6,870	7,235	7,705	8,895
Vancouver	161,791	162,300	163,200	164,500	167,400	170,400	173,500	176,400	183,500	185,300
Washougal	14,095	14,210	14,340	14,580	14,910	15,170	15,560	15,760	16,020	16,500
Yacolt	1,566	1,585	1,605	1,615	1,620	1,620	1,655	1,715	1,780	1,805
Incorporated Areas (Cities Total)	**221,941**	**223,305**	**225,280**	**227,705**	**232,575**	**237,150**	**242,175**	**247,755**	**256,985**	**261,515**
Incorporated Areas %	52.2%	52.2%	52.2%	52.3%	52.5%	52.5%	52.5%	52.6%	53.6%	53.5%
Unincorp. Areas Total	**203,422**	**204,695**	**205,970**	**207,795**	**210,225**	**214,670**	**218,835**	**223,245**	**222,515**	**226,985**
Unincorp. Areas %	47.8%	47.8%	47.8%	47.7%	47.5%	47.5%	47.5%	47.4%	46.4%	46.5%
Clark County Total	**425,363**	**428,000**	**431,250**	**435,500**	**442,800**	**451,820**	**461,010**	**471,000**	**479,500**	**488,500**
Source: Office of Financial Management										

The growth in the County has been distributed evenly between the cities, rural population centers, and the unincorporated urban growth boundary. When comparing the population distribution between the cities and the unincorporated areas from 2010-2019, the increase was 17.8% and 11.6%, respectively. The population of unincorporated Clark County comprised approximately 48% of the total county population in 2010 but has slightly decreased to 46.5% in 2019.

2.3 Waste Generated and Disposed

The 2012 Comprehensive Solid Waste Management Plan (CSWMP) reported the amount of waste generated rose from 6.55 to 8.46 pounds per capita per day from 2003 to 2012. However, during the same period, the amount of waste disposed in landfills decreased from 3.40 to 2.94 pounds per capita per day. This change can be primarily attributed to two factors:

- County and cities implemented waste reduction and recycling programs and services aimed at reducing waste disposed in landfills.
- Between 2009 and 2013 there was a significant recession that slowed the economy and the waste generated. Many communities experienced a reduction of waste disposed during this period.

Both factors are reflected in the data shown in Table 2.3.

Table 2.3: Waste Generated and Disposed in Landfills from 2003 – 2012

								Diversion		
Year	Tons Landfilled*	Tons Recycled	Tons Recovered**	Recycling Rate	Diversion Rate	Population	Pounds Per Capita Landfilled Per Day	Pounds Per Capita Recycled Per Day	Pounds Per Capita Recovered Per Day	Pounds Per Capita Generated Per Day
2003	235,284	161,295	57,192	35.5%	48.1%	379,577	3.40	2.33	0.83	6.55
2004	251,171	195,451	81,049	41.0%	55.4%	383,300	3.59	2.79	1.16	7.54
2005	265,690	224,099	95,487	38.3%	54.6%	391,500	3.72	3.14	1.34	8.19
2006	277,529	225,930	126,560	35.9%	55.9%	403,500	3.77	3.07	1.72	8.56
2007	273,619	256,105	89,300	41.4%	55.8%	415,000	3.61	3.38	1.18	8.17
2008	254,468	221,821	79,020	43.6%	52.6%	424,200	3.29	2.87	1.02	7.17
2009	231,759	241,814	52,322	46.0%	55.9%	432,999	2.93	3.06	0.66	6.66
2010	227,868	271,789	32,599	49.1%	8.0%	432,999	2.88	3.44	0.41	6.74
2011	228,719	315,918	84,166	50.2%	13.4%	428,000	2.93	4.04	1.08	8.05
2012	231,487	359,169	75,110	53.9%	11.3%	431,250	2.94	4.56	0.95	8.46

** MARR total adjusted outbound (no Metro, no Special Waste)*

Source: 2012 Comprehensive Solid Waste Management Plan

The total waste generated per capita represented in Table 2.3 is the sum of the recycled / recovered tonnage plus waste disposed in landfills. However, there are many variables related to the amount recycled and recovered that cannot be predicted. For purposes of forecasting future waste quantities in Clark County, the waste disposed per capita is used, instead of the total waste generated.

In 2014 many communities began to experience an increase in the amount of waste received at transfer stations and subsequently disposed in landfills. Most of the increase is directly attributed to the economy. Another factor that contributed to increases in the amount of waste disposed was the “China Sword” that impacted markets for recycled materials. Table 2.4 shows the amount of waste received at County transfer stations and transported to landfill for disposal over the past three years.

Table 2.4: Total Disposed Waste Tonnages

	Year			
	2016	**2017**	**2018**	**3-Year Average**
Total Inbound Waste @ Transfer Stations (TPY)	358,310	393,425	387,755	379,830
Estimated Population	461,010	471,000	479,500	470,504
Pounds/Capita/Day	4.26	4.58	4.43	4.42
Pounds/Capita/Year	***1,554***	***1,671***	***1,617***	***1,614***

From 2016 to 2018, the amount of waste disposed averaged 4.4 pounds per capita per day or 1,614 pounds per capita per year. This factor is similar to what is currently being reported in several jurisdictions in the region. For instance, in the Annual Materials Recovery report for the State of Oregon, they reported an average of 1,523 pounds per capita disposed between 2016

and 2018. Also looking back a few years before the recession they reported 1,639 pounds per capita. The State of Oregon is recognized for having consistently accurate data related to the total waste generated, disposed, and recovered annually. The information shows the amount disposed per capita tends to be fairly consistent year to year similar to what Clark County is reporting. It should be noted that in reviewing data prior to 2006 the amount disposed per capita is less in Oregon. However, it is not known how accurate the data is and perhaps the level of reporting was not reliable. The most recent data is most reliable and is supported by other sources and therefore judged to be most reliable and will be used to project how much waste the system will need to manage in the future.

2.4 Forecast of Waste Disposed

OFM is the source for projecting future population growth for jurisdictions throughout the State of Washington. Projections are made by considering several factors and by producing a range of estimates including low, medium, and high scenarios. Considering these ranges and comparing them to historical data, the medium projections appear to be most accurate and, therefore, were used for projecting future waste generation in the County.

The other factor used to project future waste quantities is how much waste will be disposed of by each person in Clark County. Table 2.3 reported in 2012 that each person generated almost 8.5 pounds each day or almost 3,100 pounds per year. The total waste generated is the sum of the waste disposed, materials recycled, and other waste diverted from disposal. Both the materials recycled, and waste diverted rely on data that may or may not be part of the municipal solid waste stream. Therefore, using the actual waste disposed is the most accurate approach for projecting how much waste the Clark County system will need to manage in the future.

Table 2.5 shows the estimated annual quantities of waste disposed based on the OFM population projections from Table 2.4 and the average per capita waste disposed from 2016–2018. These projections assume the current waste reduction and recycling services remain active and will continue to reduce waste disposed in landfills.

Table 2.5: Clark County Population and Waste Disposal Projections

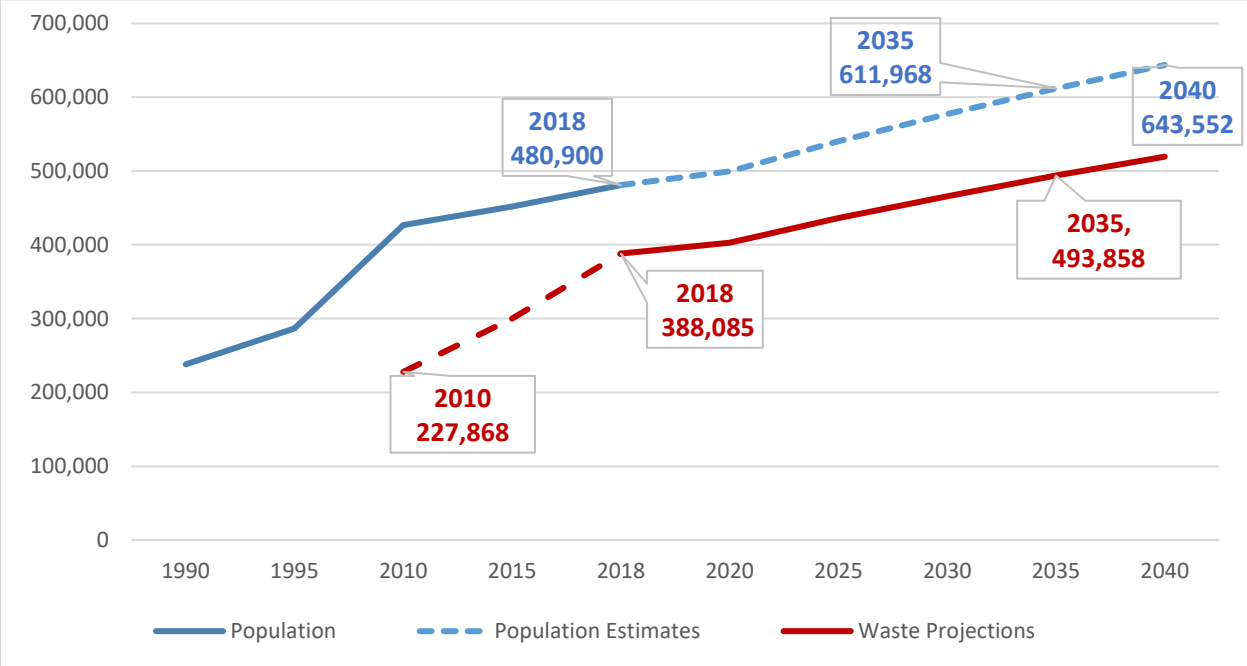
Year	Population Estimates	Waste Projections (Tons / Year based on 1,614 lbs. per capita)
2018	480,899	388,085
2019	490,353	395,715
2020	499,400	403,016
2021	508,136	410,066
2022	516,454	416,778
2023	524,563	423,322
2024	532,508	429,734
2025	540,344	436,058
2026	547,367	441,725
2027	554,786	447,712
2028	562,186	453,684
2029	569,557	459,632
2030	576,879	465,541
2031	584,026	471,309

Year	Population Estimates	Waste Projections (Tons / Year based on 1,614 lbs. per capita)
2032	591,154	477,061
2033	598,230	482,772
2034	605,164	488,367
2035	611,968	493,858
2036	618,455	499,093
2037	624,839	504,245
2038	631,126	509,319
2039	637,349	514,341
2040	643,552	519,346

If new programs and services are implemented, there is potential that the amount of waste received and transferred to landfills for disposal could decrease. For example, many communities are evaluating alternative technologies for converting waste into renewable energy and/or recovering more resources using advanced material recovery processes. Also, future improvements in material recovery facility (MRF) processing equipment at West Van or a new location may improve recovery of marketable materials that could modestly decrease waste disposed. These options could prove to be feasible but will require additional evaluation beyond the scope of this project.

Graph 2.1 illustrates the relationship of the projected population to the estimated waste quantities for the countywide system.

Graph 2.1: Population and Waste Projections



To examine the impacts of future population in the County on the transfer station system, an analysis of where future growth is expected to occur was prepared. Table 2.6 on the next page shows that the OFM projects the population of Clark County to increase by about 132,000 people,

or 27.6% by 2035. The northern cities of Battleground, Ridgefield, and La Center are expected to realize about 30% of the total population growth and Vancouver is expected to account for about 42%. The eastern cities are expected to account for 12.6% of the total population growth and the unincorporated areas just 15.5%. Noteworthy is the fact that the County's northern cities are expected to more than double in population over the next 16 years.

Table 2.6: Population Projections by Cities

	2018	2035	Difference	Overall Growth %	% of Total Growth
Projected Growth	**479,500**	**611,968**	**132,468**	**27.6%**	**N/A**
North Cities					
Battle Ground	*20,890*	*38,443*	*17,553*		
Ridgefield	*7,705*	*25,494*	*17,789*		
La Center	*3,320*	*7,642*	*4,322*		
Total North	***31,915***	***71,579***	***39,664***	**124%**	**30%**
East Cities					
Camas	*23,770*	*34,098*	*10,328*		
Washougal	*16,020*	*22,347*	*6,327*		
Total East	***39,790***	***56,445***	***16,655***	***41.9%***	***12.6%***
City of Vancouver	**183,500**	**238,877**	**55,377**	**30.2%**	**41.8%**
Unincorporated	**222,515**	**243,103**	**20,588**	**9.3%**	**15.5%**

The cities of Camas and Washougal in the eastern portion of the County are expected to see growth of nearly 17,000, or 41.9% of their current population. The largest growth, 55,000 people, is expected in the City of Vancouver. This is a 30% growth for the City. This growth is expected to occur both in the current city limits as well as in the urban growth area that may be annexed.

2.5 Waste Projections for Service Area

The transfer system currently serves three distinct parts of the County. West Van, located in the Port of Vancouver, serves the City of Vancouver and the southwest portion of the County. Due to its western-most location, it is unlikely to attract large amounts of additional waste generated by the increase in population. Located adjacent to the barge loading docks, this transfer station is a primary hub of the regional system. The facility includes the MRF for processing all commingled recyclable materials collected throughout the County. The City of Vancouver provides universal service to residents and businesses through a contract with Waste Connection of Washington (WCW).

The Washougal transfer station serves the cities of Camas and Washougal and the unincorporated areas of east Clark County. Growth in this area has some limitations due the physical constraints of the Columbia River on the south and the foothills of the Cascade Mountains to the northeast. CTR is located in the center of the County and serves the largest area. Figure 2.1 on the next page shows the location and the approximate service area of each transfer station.

Although CTR is shown to serve the largest area of the County, the northeastern portion of Clark County is very rural and has some physical constraints for growth due to the proximity to the Cascade Mountain range.

Figure 2.1: Map of County without Annexation

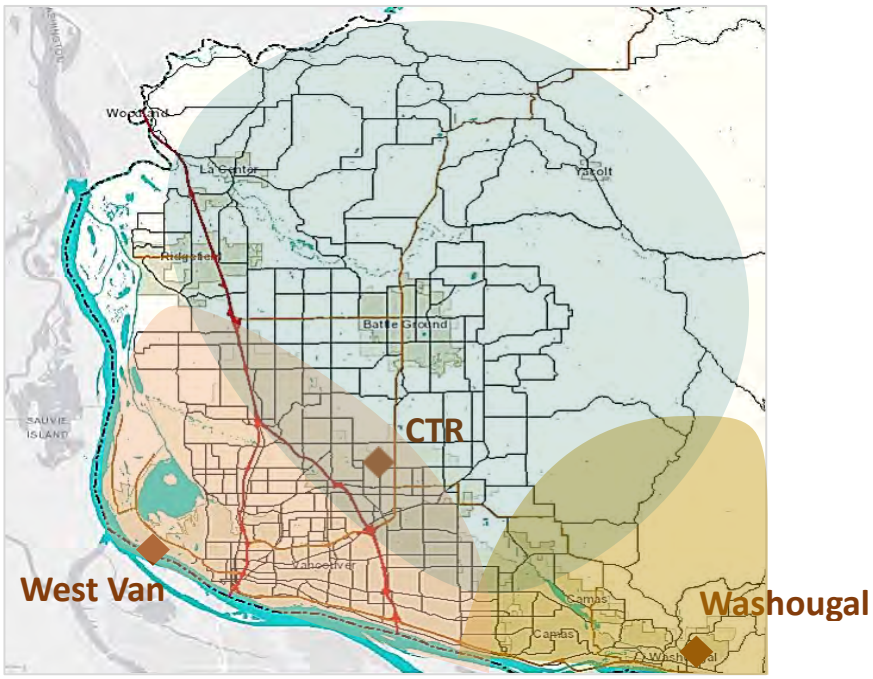
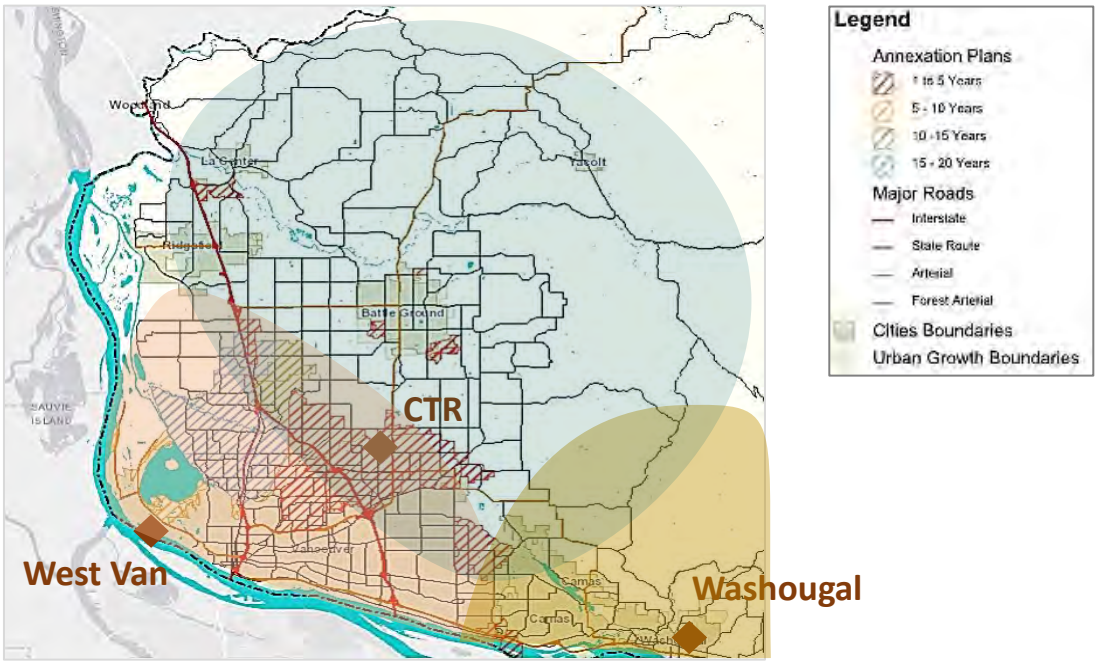


Figure 2.2 was generated from the County's growth management plan and shows the areas expected for future growth. As indicated in the legend, the cross-hatched areas are expected to experience higher density development and to be annexed over the next 15-20 years.

Figure 2.2: Map of County with Annexation



Considering the expected growth in the northern areas of the County, much of which is currently serviced by CTR, the amount of waste delivered to this facility is expected to increase significantly. As shown in Table 2.6, the County's northern cities are expected to more than double in population. The unknown is how much of the projected growth within the City of Vancouver and unincorporated County will occur in the CTR service area. There are no accurate projections of how this growth will be distributed over this area other than what is depicted in Figure 2.2, as a rough concept for proximity of the short haul (i.e., the distance travelled from collection routes to transfer stations).

Two scenarios were developed and are shown in Table 2.7 to estimate the impacts of population growth and the additional waste that may be anticipated for growth in delivery to each transfer station. The first scenario assumes that 50% of the future growth of the unincorporated County and the City of Vancouver will occur in the north-central portion of the County. This scenario includes the projected growth of the northern cities as shown in Table 2.6. Under this scenario, it is estimated that over 77,000 new people will locate in this area. Assuming that each person will generate 1,614 pounds of waste for disposal per year, the additional volume for this service area is over 63,000 tons per year that will need to be transported and disposed by 2035.

The second scenario shown in Table 2.7, assumes that as much as 70% of the projected growth of the unincorporated county and the City of Vancouver will occur in the CTR service area. Under this scenario, about 92,000 new people will move into the service area, including the projected growth of the County's northern cities. This scenario would result in about 75,000 tons of additional waste that will need to be transported and disposed annually by 2035.

Table 2.7: Estimated Population Expansion by Service Area

Transfer Station (TS) Service Areas	**Assuming 50% UGB Growth in Central Area**			**Assuming 70% UGB Growth in Central Area**		
	Population	**% Change**	**Additional Waste (TPY)**	**Population**	**% Change**	**Additional Waste (TPY)**
CTR Service Area						
Growth in City of Vancouver in North/Central County	27,689		22,345	38,764		31,282
Growth in Unincorporated North/Central County	10,294		8,307	14,411		11,630
Growth in North Cities	39,664		32,009	39,664		32,009
Total CTR TS Area	**77,646**	**58.6%**	**63,661**	**92,839**	**70.1%**	**74,921**
Washougal TS Area						
Growth in City of Vancouver (15% of City & County)	8,307		6,703	8,307		6,703
Growth in unincorporated East County	3,088		2,492	3,088		2,492
Growth in East Cities	16,655		13,441	16,655		13,411
Total Washougal TS Area	**28,050**	**21.2%**	**22,636**	**28,050**	**21.2%**	**22,636**
West Vancouver TS Area	**26,777**	**20.21%**	**21,605**	**11,579**	**8.74%**	**9,344**
Total	**132,468**		**106,902**	**132,468**		**106,902**

2.6 Summary of Findings

The current transfer stations were developed in the early 1990s and since that time the only major change was the construction of the Washougal facility in 2005. New services and programs for managing waste and recyclables have been implemented, but facilities have not been expanded. The population of the County in 2018 is estimated to be 478,000 people, an increase of over 100% since 1990.

Per the OFM, Clark County is expected to continue to grow an average of 1.6% annually for the next 20 years. Based on the 2015 growth management plan, the central and northern parts of the County are likely to experience the majority of this growth. How and where the actual growth will occur in the County can be further analyzed. It is expected that the City of Vancouver, as well as the other cities, will increase in density of development and annex adjacent urban growth areas. However, as the growth management plan projects, significant growth is expected to occur north of 78th Street and between Interstate 5 and Highway 503. The mere fact that no major expansions were made to either CTR and West Van to handle the increased waste volumes warrants further analysis of how the system can best accommodate this growth and necessitates an evaluation of the investments needed to continue to provide safe, efficient, and cost-effective services.

Chapter 3

Operational Efficiencies and Impacts from Traffic and Self-Haul

3.1 Introduction

As part of completing the Regional Study, the County wishes to evaluate the current collection services and transfer station system to assess overall efficiencies and impacts that self-haul traffic has at the transfer stations. The number of self-haul and cash customers using the transfer station system has increased to a point where capital investments are necessary to properly manage both the traffic and the additional waste received. This is a key issue particularly at CTR, where self-haul traffic exceeds 800 vehicles per day on weekend days.

This chapter discusses the current collection services and related policies and practices that pertain to the current level of services. The assessment examines policy options or changes to services that may positively influence the effective use of resources and facilities.

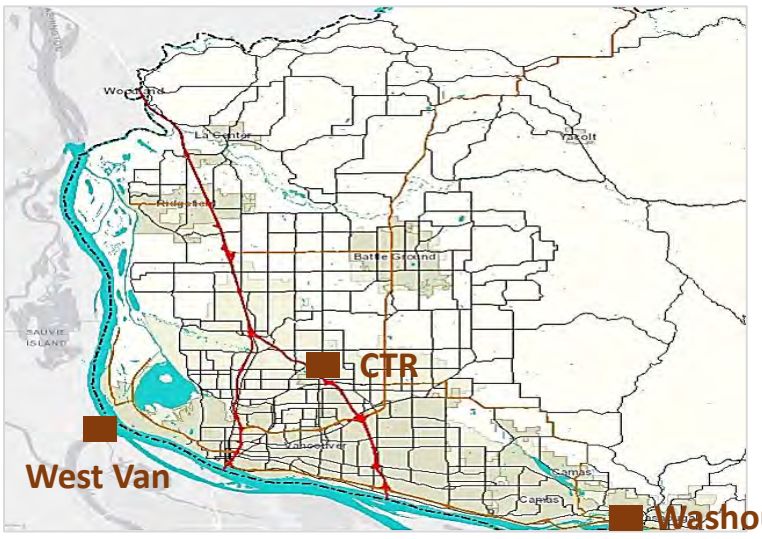
3.2 Current Services and Transfer Station Operations

3.2.1 – Background

Clark County and its incorporated cities currently offer a wide range of garbage and recycling collection services through a contract with WCW, a private waste management company. The City of Camas provides waste collection to its residential and commercial customers. WCW also owns and operates three transfer stations and one MRF in Clark County. These facilities are operated under an agreement between Clark County and CRC, a wholly owned subsidiary of WCW.

A map of the facility locations in the County is shown below in Figure 3.1 .

Figure 3.1: Map of Clark County Recycling and Transfer Stations



All three facilities accept waste from private commercial haulers, route collection trucks, and public (including commercial) self-haulers. Two of the facilities, CTR and West Van, use preload compactors to transfer waste into intermodal containers. The containers are transported by semi-tractor to the Tidewater barge terminal west of the Port of Vancouver. Tidewater transports the containers up the Columbia River to the Finley Buttes Landfill near Boardman, Oregon. Waste from the Washougal Transfer Station is transported via semi-tractor-trailer to the Wasco County Landfill near The Dalles, Oregon. Both Finley Buttes and Wasco County landfills are owned and operated by Waste Connections.

3.2.2 – Existing Collection Services

The transfer stations provide a convenient location for residents and businesses, including those that elect not to subscribe to readily available and affordable garbage or recyclable collection services, to dispose of waste and/or recycled materials. Although Waste Connections provides the collection of yard debris and bulky waste items, many households and businesses choose to haul their waste to the transfer stations. Self-haul and cash customers that do not a have preapproved account deliver waste using a variety of vehicles, including cars, pickups, and vehicles with trailers. Bulky items include used furniture, appliances, tires, and mattresses. Table 3.1 provides a high-level summary of residential service offerings throughout the County.

Table 3.1: Residential Collection Services Matrix

Jurisdiction	Service Provider	Garbage Mandatory		Recycling Services		Yard Debris / Organics Service		Bulky Item Service	
		Yes	No	Bundled	Subscription	Bundled	Subscription	Bundled	On- Call Fee
Vancouver	WCW	X		X [1]			X		X
Camas	City - garbage, WCW - recycling and YW	X			X [1,2]		X		X
Washougal	WCW	X		X [1]			X		X
Ridgefield	WCW	X			X		X		X
La Center	WCW		X	X [1]			X		X
Woodland vicinity (NW Clark County)	Waste Control		X		X		X		X
Urban Growth Boundary (Battleground and Yacolt)	WCW		X		X [2,3]		X		X
Rural	WCW		X		X	Not available			X

[1] A separate fee is charged for recyclable material processing.
[2] Garbage and recycling are included in the base services, but the rates are not bundled.
[3] Recycling collection is mandated within the Clark County urban growth boundary for customers with weekly waste collection service or greater.

Collection services offered by WCW, under contract with the cities, provide access for residents and businesses to manage waste and recyclable materials effectively. In the cities of Vancouver,

Camas, La Center, Washougal, and Ridgefield, collection services are universal, meaning all residences and businesses must subscribe to the service. Recyclables services are bundled or included with solid waste collection services in Vancouver, Washougal, and La Center. Throughout the unincorporated county and in the Cities of Battleground and La Center as well as the Town of Yacolt, waste collection services are voluntary, or subscription based. However, if a resident receives waste collection service weekly or more often, recycling is mandated for customers within the urban growth area.

For the unincorporated portions of the County, the monthly rate for garbage service, regulated by the Washington Utilities and Transportation Commission (UTC), is $13.68 for a 32-gallon can and $19.93 for 64-gallons (two 32-gallon cans) for weekly pickup. Weekly collection of recyclables adds another $7.85 per month to the cost of collection service. A full listing of waste, recycling, and yard debris collection rates are detailed on the local WCW website: https://wcnorthwest.com/residential-rates.

In contrast, yard waste collection services are offered on a subscription basis throughout the County, except in rural areas. Table 3.2 on the next page provides a list of yard waste collection services and rates currently offered by WCW.

Table 3.2: Voluntary Subscription Services — Yard Waste Service

Jurisdiction	Service Provider	Yard Waste / Organic Service	
		Monthly Charge	Optional or On-Call Service
Vancouver	Waste Connections (WCW)	$7.80 96 gal	Every other week optional service. Other service levels available. $6.75 per 64-gallon, $5.70 32-gallon, $4.65 20-gallon.
Camas[1]	City — garbage, WCW — recycling and yard debris	$8.24 96 gal	Every other week optional service March – December. No on-call service. $2.92 per extra pickup.
Washougal[2]	WCW	$7.70 96 gal	Every other week optional service March – December. No on-call service. $2.70 per extra pickup.
Ridgefield	WCW	$8.80 96 gal	Every other week optional service. No on-call service. $3.52 per extra pickup.
La Center	WCW		
Woodland vicinity (NW Clark County)	WCW		
Other Urban	WCW	$6.84	Every other week optional service. Or on-call $1.48 per month cart rental fee and $4.91 for each pickup. $2.86 per extra pickup
Rural	WCW	N/A	

[1] Price For 10 Months: $78.42 if prepaid
[2] Price For 10 Months: $73.35 if prepaid

Similarly, on-call bulky-item collection service is on a voluntary basis throughout the County and residents typically must pre-schedule the service on designated days of the month.

Table 3.3 on the next page summarizes on-call collection services and fees offered for bulky waste (i.e., appliances and bulky items).

Besides the transfer stations and voluntary subscription services for yard waste, residents and businesses can utilize other privately owned facilities throughout the County to discard and divert their materials. Examples of such facilities include but are not limited to:

1. H&H Wood Recyclers
2. McFarlane's Bark
3. Triangle Resources
4. City Bark

These facilities typically charge prices competitive with transfer station pricing.

Table 3.3: On-Call Services — Bulky Item

Jurisdiction	Service Provider	Appliance	Per Unit Charge	Bulky Item	Per Unit Charge
Vancouver[1]	Waste Connections (WCW)	Washer Dryer Stove Fridge/Freezer/AC Unit Water Heater	$18.24 $15.10 $16.67 $30.15 $18.54	Sofa or Loveseat Chair Mattress/Box Spring Car/Pickup Truck Tire Car/Pickup Truck Tire w/ rim Truck Tire Truck Tire with rim Other Bulky Items	$15.10 $12.05 $13.64 $7.18 $11.11 $22.52 $37.15 $15.88
Camas	City — garbage, WCW — recycling and yard waste	N/A		N/A	
Washougal	WCW	Fridge/Freezer/AC Unit Stove or Range Washing Machine Dryer Water Heater	$50.29 $25.16 $25.16 $25.16 $25.16	Sofa or Loveseat Chair Table Mattress or Box Spring Car/Light Pickup Truck Tire Car/Light Pickup Truck Tire w/ rim Truck Tire Truck Tire with rim Tire larger than truck Lawnmower Wheelbarrow Bicycle Other Bulky Items	$25.16 $12.58 $25.16 $18.86 $6.76 $10.16 $20.29 $33.82 $67.67 $13.52 $6.76 $6.76 $25.16
Ridgefield[2]	WCW	Washer Dryer Stove Fridge/Freezer/AC Unit Water Heater Dishwasher	$20.10 $20.10 $20.10 $40.13 $20.10 $20.10	Sofa or Loveseat Chair Mattress or Box Spring Small Tire Small Tire with rim Truck Tire Truck Tire with rim Other Bulky Items	$20.10 $20.10 $20.10 $5.39 $10.78 $12.18 $24.37 $20.10
La Center	WCW				
Woodland vicinity (NW Clark County)	WCW				
Other Urban[2]	WCW	Washer Dryer Stove Fridge/Freezer/AC Unit Water Heater Dishwasher	$5.75 $5.75 $5.75 $20.00 $5.75 $5.75	Sofa or Loveseat Chair Mattress or Box Spring Car/Light Pickup Truck Tire Car/Light Pickup Truck Tire w/ rim Truck Tire Truck Tire with rim Other Bulky Items	$16.12 $16.12 $16.12 $2.35 $4.69 $9.38 $18.77 $16.12
Rural	WCW	N/A			
Electronic Waste: Televisions, computers, monitors, and laptops can be picked up curbside for a price of $15.88 each in Vancouver, $19.52 per unit in Ridgefield, $25.16 per unit in Washougal, $16.12 per in Other Urban, and $16.12 in Rural.					

[1] One free appliance pickup per year. Per-unit charges after that.

[2] In addition to the prices above for, a trip fee of $60.00/hour is charged (half-hour minimum). The clock starts from the beginning of the driver's trip (from 9411 N.E. 94th Ave., Vancouver) and ends once the appliance is picked up from the curb.

3.2.3 – Summary of Countywide Collection Practices

The current collection system provides a high level of services to cities, towns, and the unincorporated areas of the County. Universal services for garbage and recyclables are provided to the cities of Vancouver, Camas, Washougal, and Ridgefield. In urban areas, yard waste collection is provided on a voluntary subscription basis either weekly or every other week and pickup of bulky waste items is offered on an on-call basis.

For the unincorporated areas of the County and the jurisdictions of Battleground, La Center, and Yacolt, collection services are solely offered by WCW on a voluntary subscription basis. The base rates offered for this service are comparable to the base rates offered to customers where universal services are provided. However, some jurisdictions do charge a "Utility Tax" that is added to the base rates to help pay for general governmental services.

Growth in the County has had a significant impact on the density of the urbanized portion of the County. As projected in the regional growth management plan, this trend will continue and many areas contiguous to the incorporated cities are expected to be annexed. These areas may be subject to the universal service levels required by these cities. Population growth will impact the number of customers using the transfer station system. Consideration of providing universal services and/or changes to the service levels and rates may provide a more efficient and comprehensive collection system for waste generated either by residences or businesses.

3.2.4 – Description of Transfer Stations and Customer Traffic

The County transfer station system was developed to first provide cost-effective collection services to residences and businesses. Collection trucks can unload quickly and return to collection routes. CRC can then reload waste into larger trailers capable of transporting almost four times the payload of a collection truck, thereby reducing overall transportation costs and impacts on local roads. Transfer stations also supplement collection services by providing a convenient location for residents and businesses that do not have collection services to take waste or items not collected by regular services to a facility. Even though contracted collection companies offer services to all areas of the County, many residents in less dense areas that do not require universal services often elect to transport their waste to a transfer station.

Transfer stations also provide a facility for residences and businesses to take waste materials that are not regularly picked up at the curb. This can include items from households that periodically clean out attics or garages and may also include used appliances, large bulky items such as used furniture, tires, and mattresses; construction debris; and yard waste. The County system also offers facilities for customers to drop off materials for recycling and to dispose of household hazardous waste (HHW).

As discussed in Chapter 2, due to population growth in the County, the number of customers using transfer stations continues to increase. Changes in the system and improvements at facilities need to be evaluated.

3.3 Future Traffic Impacts from Growth

The transfer stations were designed to handle a certain amount of self-haul customers given that that portions of the County do not require all households to subscribe to regular collection services and that certain items are not collected regularly. However, with the growth the County has experienced over the past 10 years, the number of self-haul and cash customers has increased. CRC provides the resources and space required to manage traffic and additional waste received from these customers at each of its transfer stations. But with the County expecting to grow by an additional 132,000 more people by 2035, capital investments at each of the transfer stations will be necessary to handle the number of customers using the existing three transfer stations.

An evaluation of the transfer stations and the capacity to handle future waste volumes and customers is discussed in Chapter Four of this Study. In this chapter, the Study discusses options that might be considered to modify or expand collection services, to make it more convenient for households to dispose of unwanted items, enhance efficiency, reduce unintended litter along roads, and reduce system cost. Since self-haul traffic at CTR is most impactful, with vehicles queueing onto State Route 503 at times, this facility is the focus of the analysis. However, the options being discussed in this section are intended to be applicable on a County-wide basis.

3.3.1 – Background Information; Population and Self-Haul Customer Trends

As mentioned, population in Clark County is expected to increase by about 28% over the next 15 years. Much of this growth is expected to occur within the areas served by CTR. Estimated population growth within the northern incorporated cities and the unincorporated areas of the County has increased by 20.8% from 2010 to 2019, as detailed in Table 3.4[1].

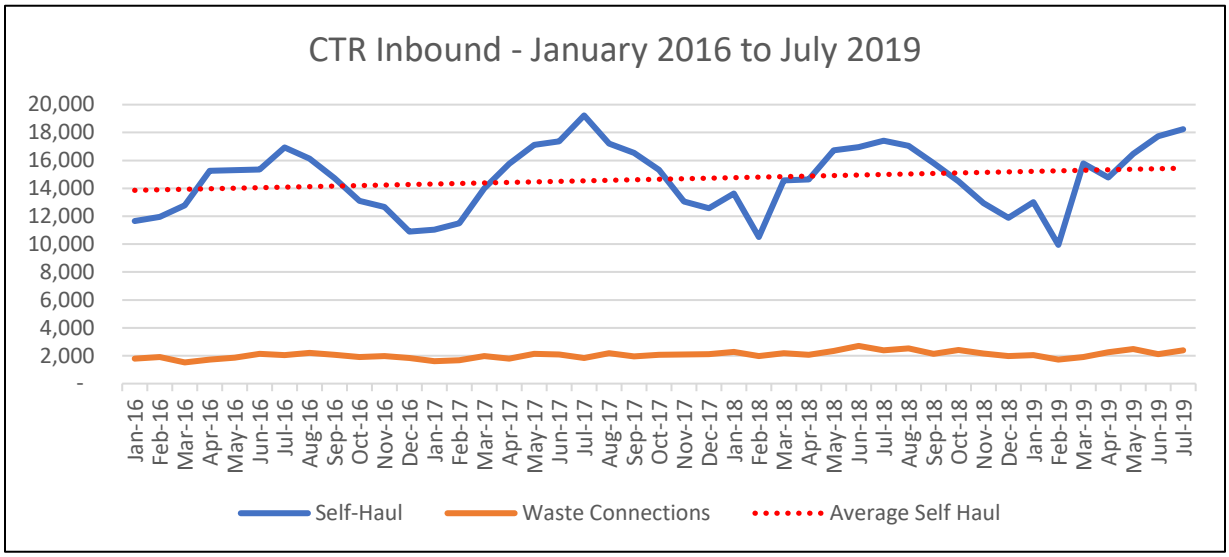
Table 3.4: Population Growth from 2010–2035 for North County

	Year					
Jurisdiction/Area	**2010**	**2015**	**2019**	**2025**	**2030**	**2035**
Battle Ground	17,571	19,250	21,520	28,219	33,860	38,443
La Center	2,800	3,100	3,405	5,082	6,494	7,642
Ridgefield	4,763	6,400	8,895	15,465	20,998	25,494
Yacolt	1,566	1,620	1,805	1,868	1,921	1,964
Clark UGA	61,855	69,610	71,333	72,903	67,088	61,403
Total	**88,555**	**99,980**	**106,958**	**123,537**	**130,362**	**134,946**
% ▲ from 2010		12.9%	20.8%	39.5%	47.2%	52.4%
Total Increase from 2010		**11,425**	**18,403**	**34,982**	**41,807**	**46,391**

With the growth the County has experienced in the past decade, an increasing number of customers are using the CTR transfer station for waste and bulky items. Graph 3.1 on the next page details the monthly transactions, or trips, by all customers (i.e., self-haul, commercial, and collection trucks) at CTR. The red dashed line shows the trend of incoming self-haul/commercial customers from January 2016–July 2019, which reveals an upward trajectory that correlates closely to the increased population growth.

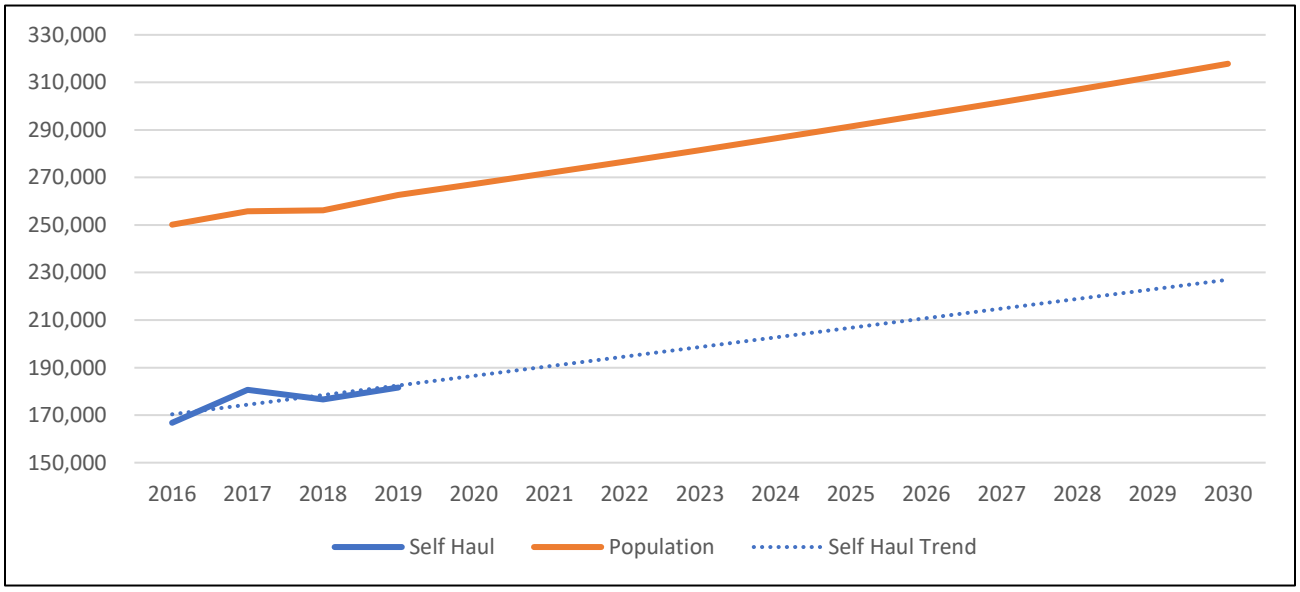
[1] Source: Washington State Office of Financial Management, Forecasting and Research Division (https://www.ofm.wa.gov/washington-data-research/population-demographics/population-estimates/april-1-official-population-estimates)

Graph 3.1: Monthly Inbound Trips at CTR from January 2016–July 2019



Graph 3.2 compares the expected increase in north county population of 1.75% annually from Table 3.4 on the previous page to the annual inbound self-haul trips from Graph 3.1 above.

Graph 3.2: Comparison of Annual Self-Haul Trips to Population Growth



The blue dashed line is the expected increase in self-haul customers based on the four years of incoming customers and the correlation of the increase in the population of the north county area.

While some jurisdictions such as Vancouver, Camas, Ridgefield, and Washougal require residential waste collection, services in the north part of the County are voluntary subscription. Because of this, CTR experiences a higher percentage of inbound tons from self-haul when compared with the West Van and Washougal transfer stations, as summarized in Table 3.5.

Table 3.5: Self-Haul Metrics by Facility

Facility	2016	2017	2018	2019
CTR				
Self-Haul % of Tons	21.0%	22.6%	20.6%	22.3%
Average Pounds Per Customer	635	794	704	725
West Van				
Self-Haul % of Tons	14.5%	17.5%	18.1%	16.4%
Average Pounds Per Customer	804	922	817	783
Washougal				
Self-Haul % of Tons	10.6%	12.8%	14.0%	16.4%
Average Pounds Per Customer	446	486	451	476

The original R&R Transfer Station (now the CTR recycling building) was opened in the mid-1980s, but when the Leichner Landfill closed in 1992, the facility was expanded to what is now CTR. However, the facility was not designed to serve the increase in customer traffic or the amount of waste that it now receives.

3.4 Strategies to Reduce Traffic Impacts at Facilities

This section of the Study examines how changes in policies and/or collection services could potentially reduce traffic at the transfer stations, primarily at CTR. However, the program options described are expected to apply to all transfer stations.

3.4.1 – Background

The location and design of the existing transfer station system has not been fully assessed for over 15 years. Since 2010, Clark County has experienced an increase in the population of 14%[2]. The last major investment in the system was the construction of the Washougal Transfer Station in 2008–2009. At CTR, where the number of customers has increased significantly, there have been no expansions or improvements made to meet the demand. As a result, traffic on weekends typically backs onto State Route 503. This condition presents safety issues. Thus, there is an immediate need to remedy this situation. CRC is working with the County and the Washington Department of Transportation (WSDOT) to modify the entrance and make other improvements, as necessary, to address this which are discussed in Chapter 4 of this Study.

While each transfer station has experienced increases in traffic and waste flow, the issue is most critical at CTR. The West Van and Washougal Transfer Stations are adequately sized to handle self-haul customer traffic for the immediate future. A review of the capacity of these facilities to handle future growth will also be conducted as part of this regional study and improvements to address future traffic and waste volumes may be required is presented in Chapter 4.

To address current and future traffic issues at CTR as well as the other stations in the future, the Study evaluates operational and policy strategies and options that may reduce unnecessary traffic

[2] Source: Washington State Office of Financial Management, Forecasting and Research Division (https://www.ofm.wa.gov/washington-data-research/population-demographics/population-estimates/april-1-official-population-estimates)

and queuing problems. These strategies are focused on changes to rates, policies, and collection service standards. A crucial policy issue is how much money will need to be invested to upgrade and/or expand CTR.

One approach is to evaluate current operational parameters to determine what policy or administrative procedures might be implemented to improve safety, traffic, and overall customer services. This includes examining how other jurisdictions or facility operators have dealt with similar issues in consideration of the following strategies:

1. **Modify level of collection services —** Modifications to collection services standards including mandatory or universal service and/or bundling more services (e.g., curbside yard waste and bulky item collection as part of a universal service package).
2. **Modify facility fee structures —** Minimum load requirements and fees to encourage customers to use collection services of make fewer trips to the transfer stations.
3. **Modify the hours or days transfer stations are open to self-haulers –** Extending hours and/or days the facilities are open to self-haul may result in reducing traffic at peak times.

The analysis examined the impacts of the current minimum load requirements in conjunction with minimum fees for services. From the research completed, options the County can consider for customers to consolidate waste into larger loads or to utilize weekly waste collection services to reduce traffic and costs were evaluated.

Given the current breadth of curbside collection services offered to customers countywide (see Table 3.1 on page 20), there remains a relatively large number of self-haul customers using CTR as their primary waste disposal option (see Graph 3.2 on page 26 and Table 3.5 on page 27); such high usage is causing backups and related traffic issues at CTR.

3.4.2 – Strategy 1: Modify Level of Collection Services

One approach that may result in reducing the number of self-haul and cash customers is to modify the current services by requiring all households to subscribe to weekly collection and/ or provide options to pick up bulky items at the curb, i.e. universal services. This would not only impact traffic at the transfer stations but would also reduce traffic and litter on roadways, improve services to individual households, and improve overall efficiency in the waste management system.

A 2018 survey of CTR self-haulers found that the two ZIP codes with highest self-haul customer counts were predominantly in the unincorporated areas of the County where weekly collection is provided, but not mandated, under the regulation of the UTC. Table 3.6 on the next page shows the distribution of self-haul or cash customers using CTR by the amount of trash received by weight (from CTR scale house data) for 2019.

Table 3.6: Summary of CTR Cash Customers by Weight (2018)

Weight Range (lbs.)	Self-Haul / Cash Customers Total #	Self-Haul / Cash Customers Total %
10–110	12,927	10.9%
110–210	22,933	19.3%
210–310	20,775	17.5%
310–410	16,540	13.9%
Subtotal under 410 lbs.	***73,175***	***61.7%***
Over 410 lbs.	**45,477**	**38.3%**
Total	**118,652**	**100%**

According to the self-haul tonnage data from Table 3.6 above, approximately 30% of the incoming loads from self-haul and cash customers were 210 lbs. or less. The average residential weekly garbage set-out weight is about 30 lbs. and for recycling 55 lbs. per month; Therefore, a month of garbage set out for collection will weigh approximately 185 lbs. (30 lbs. x 4.3 pickups per month) + 55 lbs. of recycling. It is assumed most of these visits are customers that do not subscribe to weekly garbage, recycling, and yard waste (if offered) or bulky waste collection service. Areas that had the lowest number of self-haulers were from Washougal, Camas, Ridgefield, and Vancouver, where service is universal.

Under the current rate structure, the cost to dispose of 200 pounds at CTR is $9.58 for disposal plus $10 for the transaction fee (see Table 3.8 on page 34) for a total cost of $19.58. In contrast, the cost for curbside waste collection in the County is $19.93 for two garbage cans (64 gallons of service capacity) collected weekly and only $13.68 for a 32-gallon can. The system's cost to provide services at the transfer station for self-haulers should be evaluated to determine if these customers are being charged properly for the services. Depending on the actual cost per trip, the minimum charge could be revised.

3.4.2.1 – Service Option to Expand Universal Subscription Collection Services

Under this option, the County would expand universal services to the urban areas of the County. In order to implement this alternative, the County is required under Revised Code of Washington (RCW) 36.58A.010 to establish a Solid Waste Collection District. Administrative rules enacted by the District could specify that areas meeting minimum household densities be required to subscribe to collection services. The level of services must be uniform to all service areas and must comply with requirements established by the UTC.

All cities in the County, except the jurisdictions of Battleground, La Center, and Yacolt, have universal collection services for garbage. These jurisdictions have the authority to adopt universal services if they wish. As areas of the County become denser and more urban, requiring universal service to the urbanized County as well as these cities benefit the system and potentially reduce traffic at transfer stations.

Analysis of Expanding Universal Service

Jurisdictions that provide universal services to all households can have an impact on the number of customers that self-haul waste. Requiring households to subscribe to collection services is a standard practice for many jurisdictions throughout the country. For most urban areas, it is required as a general practice, for health and safety reasons, to prevent households from

inappropriately storing putrescible waste that may cause sanitation problems, attract vectors, and/or impact the aesthetics of the neighborhood.

Another advantage of universal services is to reduce unnecessary traffic on public roads, and thus reduce air-quality impacts. Collection trucks are already traveling in neighborhoods to pick up from households that do subscribe to services. Picking up additional households along the route will reduce trips to the transfer station and provide routing efficiencies for the waste hauler. When garbage or yard waste are collected, it is placed in fully enclosed containers and emptied into a fully enclosed compaction chamber in the truck, thus eliminating fugitive litter. The above factors all result in benefits to the local community.

A comparison of the self-haul traffic at CTR and West Van appears to lend some support to the impacts of instituting universal collection services. The self-haul traffic at CTR averages about 450-500 vehicles per day and in peak periods can range as high as 700-800 vehicles. At the West Van transfer station, self-haul traffic averages from 200-250 vehicles per day and in peak periods ranges from 350-400 vehicles per day. This is about half as many as CTR. West Van primarily serves the City of Vancouver, the largest city in the County, which provides universal collection services. CTR not only serves a larger area but is also the largest concentration of customers that use a voluntary subscription service. There is no data that substantiates the difference in self-haul customers at West Van that can be fully attributed to the impact of universal service, but it is likely that it does contribute to fewer customers using that facility.

Data also shows that over 80% of households in urbanized areas of the unincorporated County subscribe to recycling services. If this is an indication of the total households that also subscribe to collection of waste, which is logical, then perhaps the adoption of universal services would have limited impacts on the number of vehicles using CTR.

Related to the cost of weekly solid waste collection services in Clark County, a single household in the non-universal service areas (i.e., UTC regulated area) can subscribe to weekly collection of garbage for as low as $10.68 per month (20-gallon service) to as high as $29.54 per month (96-gallon service). A typical customer is likely to subscribe to 32-gallon service, which is $13.68 per month.

In comparison, a single trip to the transfer station is likely to cost a minimum of $19.58 (assumes 200-lb. load) and as much as $34 for a 500-lb. load. This cost does not include roundtrip travel time to the station or time at the station to unload. It appears it would cost households much less to use the curbside collection service based on the current transfer station rates.

Although there are obvious cost benefits for households to subscribe to collection service, it is not clear how much impact universal service, if offered, would have on the self-haul traffic at transfer stations. More study is needed to determine the benefits of adopting this policy. Also, the reasons to institute universal services go beyond the need to reduce self-haul traffic as it provides greater benefits to the individual community or local jurisdiction that may adopt this policy and it improves the overall efficiency of the solid waste system.

3.4.2.2 – Service Option to Bundle Regular Collection of Bulky Items with Garbage Collection Services

Unlike curbside garbage and yard waste collection services, on-call services for appliances is more expensive than the rates charged at the transfer stations. As shown in Table 3.3 on page 23, curbside pickup of bulky waste varies depending on item being discarded. In the urbanized County, a sofa or chair picked at the curb is $16.12 plus a trip fee of $60 per hour. This fee is charged from the time the truck leaves the yard on 94th Avenue to the pickup address. If it takes 20 minutes to arrive at the location, the total cost would be $36.12 for one item. For a self-haul trip to a transfer station, that same item may cost less than $20 if it weighs less than 100 pounds.

Also, each of the Clark County facilities charges special handling fees as shown in Table 3.7 for appliances, electronic waste, and tires.

Table 3.7: Clark County Transfer Station Special Charges

Item/ Material	Per Unit Charge
Refrigerator, Freezer or Air Conditioner	$20.25
TVs, Monitors	$0.00[1]
Car Tire	$2.55[2]
Car Tire w/rim	$4.85[2]
Truck Tire	$9.45[2]
Truck Tire w/rim	$18.65[2]

[1] TVs and monitors not shown on rate sheet at West Van.
[2] A transaction fee will not be charged on the first four tires brought in separately. A $5.25 minimum applies. As required by Washington State, a 3.6% GRT tax will be charged on every disposal transaction at each facility.

At the transfer station, tires and appliances are charged a fee, but bulky items such as used furniture, mattresses, and other items are charged on per ton basis. Also, self-hauling bulky materials to the transfer station might be more convenient since households can dispose of the item on their schedule.

There are other possible service options for collecting appliances, bulky items, and electronic waste items including:

- **Special Collection Events –** One approach is to offer periodic community-wide collection events in the spring or fall. Such events would likely increase the total amount of items collected compared with subscription services. The City of Camas holds an annual spring clean-up where residents bring large materials and household hazardous waste to the public works yard for disposal. In the City of Vancouver neighborhoods are provided on one Saturday per year to have WCW trucks and staff in their area to collect bulky items or other materials for disposal/diversion.
  In Oregon, the cities of Troutdale and Milwaukie have annual spring clean-up events where residents can set out up to one yard of waste on their curb for pick-up by the

franchised haulers. The cost of these services is less than $1 per customer per month and is included in the monthly collection rate.

Resourceful Portland sponsors a series of local springtime clean-up events with a variety of community groups that provide convenient drop-off services for a reasonable donation or fee. Each group can offer a combination of bulky waste collection, an onsite reuse section, and litter pickup.

Clark County's Green Neighbor Program has offered "Recycle Days" in the past where a variety of recyclable or HHW materials or services (paper shredding) and sometimes disposal of bulky items (with local funding support) were incorporated into centralized community events. As a policy shift over the past two to four years, these events have been discontinued as it is challenging to plan, staff, and fund these one-day events (there had been up to seven or eight per year). There is much greater interest in making these opportunities available throughout the year in fixed locations.

Bulky Waste Collection as Part of Franchise/contracted Service (a.k.a. Bundled Services)

Some jurisdictions provide on-call curbside collection services for bulky waste one to three times per year. These services are included in the standard garbage rates charged to residential customers. Such service is commonplace throughout California and has proven popular with customers and more cost-effective than periodic collection events. In the South Bayside Waste Management Authority (San Mateo County, California), 34% of all residential accounts scheduled bulky item pickup services as part of their twice-per-year on-call bulky item service. The service is bundled with weekly garbage collection rates. Items can include furniture (sofas, chairs, desks, bookshelves, etc.), mattresses, electronics scrap, appliances, and tires. Often the amount of items set out by household is limited to a certain number or size. However, each jurisdiction may choose what items are acceptable to be placed on the curb for collection.

Another example in California is San Benito County, where such bulky item service was on an on-call basis with separate charges and less than 1% of the residential accounts scheduled bulky item pickups.

There are many variations of the options to provide collection of bulky waste items, and jurisdictions can design the services to best fit their community. Based on some of the examples, these services can be added, for a rather small incremental cost, to standard curbside services. If implemented in Clark County there is no current data available to determine if such a program would impact the number of self-haul customers using the transfer station system. More data is needed, and it would also be desirable to have feedback from residences of their interest in such services.

Yard Waste/Debris Collection

Similar to curbside garbage collection, it would be less expensive for residents with smaller loads (i.e., less than 500 lbs.) of yard waste/debris to use the curbside services as opposed to driving to one of the County's transfer stations. Subscription services for curbside collection of yard waste range from $6.84/month (Other Urban) to $8.80/month. If a customer takes 500 lbs. to CTR or Washougal Transfer Station, it will cost $16.58 ((500/2,000) x $66.32). Yard waste collection service is only offered on a subscription basis throughout the urban areas of the County. Including

yard waste collection service as part of a universal collection service package will appear to save residents money if they generate measurable volumes of organic waste while having the added benefit of reduced self-haul traffic and increasing diversion rates for local communities.

Currently, in cities and the County curbside collection of yard waste is offered by subscription. Also, there are several private companies throughout the County that accept and process yard waste meaning there are alternatives to taking this material to transfer stations. For this reason and because most residences do not generate much yard waste during winter months, the benefits of adding this to the universal services appears unnecessary at this time.

Analysis of Service Options for Collection of Bulky Items

The purpose of expanding collection services to offer standard universal collection services for bulky waste items and/or yard waste would be to provide a higher level of collection services potentially and reduce self-haul customer traffic at transfer stations. There would be an incremental increase on the monthly rate to all residences to provide this service. However, without more information it is not known how many households would take advantage of this service or may not even require it.

In order to implement any of the collection service option the County would need to comply with certain requirements established by UTC. The first requirement is to ensure that the services are offered universally, that is available equally to all customers throughout the regulated areas. For items covered under the bulky waste services the rates would need to be equally applied for all sizes and weight. If the rates are different then there is a level of unpredictability in setting rates which is not acceptable to UTC. Assuming the program can be designed to address UTC concerns, the County would need to amend the Solid Waste Management Plan and adopt this program.

This would establish the program to permit the collection company to include in their cost of services and apply to the UTC for a fixed rate. Because it is difficult for collection companies to predict the cost and revenues in conjunction with requirements for such services from the UTC, there are few if any jurisdictions in the State that offer this service. Jurisdictions, like the City of Vancouver, that regulate collection rates have the authority to implement these programs, if they desire. These same conditions apply to bundling yard waste collection services. Currently, it is offered as a subscription service but is not a universal service in any part of Clark County.

Based on the limited data available to properly evaluate these service options including the impacts on self-haul traffic at transfer stations, it is not a high priority to pursue these options. However, in light of the expected population growth and the increase in density of development in the County, consideration for further evaluation of collection programs for bulky waste items might have some benefits when updating the Solid Waste Management Plan in 2021.

3.4.3 – Strategy 2 - Modify Facility Tipping Fee Structures

3.4.3.1 – Background

Currently, self-haul customers using transfer stations are charged a fee based on the weight of the discarded items plus a flat transaction fee of $10. The current tip fee is $95.77 per ton. All vehicles are required to weigh in and out to determine their fee. If a self-haul cash customer brings

in 100 lbs., their fee would be $14.79 — $4.79 for the prorated tip fee plus $10 for the transaction fee. For a load of 200 lbs., the fee would be $19.58 — $9.58 for the prorated tip fee plus the $10 transaction fee. As shown on Table 3.6 on page 29, about 30% of customers entering CTR dispose of 200 lbs. or less. Another 30% of CTR cash customers discard of between 200 lbs. and 400 lbs. of waste.

The County is interested in determining the actual system or facility cost to provide the level of services currently provided at the transfer stations and whether alternatives to the fee structure could result in reducing traffic or incentivizing customers to consider other service options.

Comparable Fees at Transfer Stations

All of the transfer station facilities shown in Table 3.8 below, except Clark County, have a set minimum rate for garbage by dollar amount instead of adding a transaction fee. This is because there is a fixed cost to provide the services at transfer station that must be recovered. In contrast, Clark County solid waste facilities have a transaction fee of $10 that contributes to recover the fixed cost. Nearly all facilities shown also have a minimum rate/charge for yard waste and some have a minimum for wood waste.

The policies for establishing the minimum fees may differ for each facility. However, in our research many have set this fee to require customers to pay for the actual cost of the services provided.

Table 3.8: Local and Regional Transfer Station Rates

Jurisdiction	Garbage			Yard/ Wood Waste			
	Minimum Rate	Garbage Minimum Weight	Garbage Rate / Ton	Yard Waste Minimum Charge	Yard Waste Rate / Ton	Wood Waste Rate Minimum Charge	Wood Waste Rate / Ton
Clark County – CTR, WTS	**$10 Transaction Fee + Weight x $95.77 Example: Weight @ 200 lbs. = $10 + $9.58 = $19.58**	**None**	**$95.77**		**$66.74[1]**		**$66.74[1]**
Clark County – West Van	**See above**	**None**	**$95.77**		**$66.32[1]**		**$66.32[1]**
Portland Metro _ Central and South	$28 plus Transaction Fee of $2 Using scales or $10 w/o Scales	360 lbs.	$122.45	$24	$81	$26	$90.23
King County – all Transfer Stations	$25.25	320 lbs.	$151.06	$12	$75	$12	$75
City Seattle – North and South Transfer Stations	$30	420 lbs.	$145	$20	$110	$20	$110
Lewis County	$10	200 lbs.	$90	$5	$60	$5	$60
City of Tacoma Recovery and Transfer Station	$20	400 lbs.		$20			

Table 3.8: Local and Regional Transfer Station Rates

Jurisdiction	Garbage			Yard/ Wood Waste			
	Minimum Rate	Garbage Minimum Weight	Garbage Rate / Ton	Yard Waste Minimum Charge	Yard Waste Rate / Ton	Wood Waste Rate Minimum Charge	Wood Waste Rate / Ton
Deschutes County – Knot Landfill Recycling and TS	$22 + $3 for each 100 lbs.	400 lbs.					
Marion County – North Marion Recycling TS + SKRTS	$25 + $.053725/lb. after 460 lbs.	460 lbs.	$107.45	$15.00 ($.0297/lb. after 500 lbs.	$59.49		
Thurston County - WARC	$18	300 lbs.	$119	$9	$45		
[1] *Transaction fee does not apply.*							

3.4.3.2 – Option to Modify Fee Structure to Impact Traffic

The actual cost to operate the facility is comprised of two elements. First, is the fixed cost to provide the infrastructure as well as the primary personnel to operate equipment along with laborers/spotters and the gatehouse staff. This baseline cost is incurred by each vehicle that arrives to unload waste no matter how much waste is discarded. Second, are the primary variable expenses, which includes the cost of transporting and disposing of waste.

Based on the cost of service analysis the fixed cost or cost for handling each vehicle or transaction is estimated to be $21.60[3] at CTR for the 12-month period beginning in April 2018 to March 2019. It does not include the cost to provide recycling and household hazardous waste (HHW) drop-off services at the transfer stations. The facility cost or fixed cost for each transaction, no matter how much waste is received, was calculated by dividing the operating expenses of CTR by the total incoming vehicles as summarized in Table 3.9.

Table 3.9: CTR Cost Per Transaction (April 2018–March 2019)

Description	Detail	%	Totals
Annual Facility Cost			$4,386,389
Incoming Self-Haul / Commercial Vehicles	176,614	87%	
Incoming Regulated Route Vehicles	26,460	13%	
Total Incoming Vehicles (Transactions)			203,074
Cost per Transaction			**$21.60**

Facility expenses between the regulated route trucks and cash/commercial haulers were allocated based on a combination of onsite labor, equipment use, waste tons, and scale house transactions to calculate the cost of each customer class. Transport, disposal, HHW, and County administration fees are assessed on a prorated weight per ton basis and are the same for all

[3] Study period was from April 2018 through March 2019

customers. Table 3.10 summarizes the incoming waste tons by source and the cost per ton for CTR.

Table 3.10: CTR Cost Per Ton by Source (April 2018–March 2019)

Description - Tonnage	Total	Regulated Route Trucks	Self-Haul / Commercial
Incoming Tonnage	230,595	156,631	73,965
Incoming Vehicles	203,074	26,460	176,614
Average Tons per Vehicle Type	1.14	5.92	0.42
Description – Cost/Ton			
Facility Cost	$22.16	$12.85	$41.87
Transport & Disposal	$45.45	$45.45	$45.45
HHW / County Admin Fee	$9.12	$9.12	$9.12
Total Cost per Ton	$76.72	$67.41	$96.43

The fixed cost for the services provided at CTR is $21.60 for any vehicle; however, the current transaction fee assessed to all vehicles is $10. The total cost for not only operating the station but also transporting and disposing of the waste is $95.77 per ton. What is not clear under the current rate structure is what expenses the transaction fee is covering and what expense is the tonnage fee covering. Both of these costs are combined when assessing the tip fee for disposal.

Costs from Tables 3.9 and 3.10 are combined to compare the current rate method to a transaction-based fee of 100 pounds in Table 3.11.

Table 3.11: Comparison of Current Fee to Transaction Fee Structure

Rate Structure Items	Current Rate Structure	Transaction Fee Structure
Transaction Fee	$10.00	
Disposal Fee per Ton ((100 pounds /2,000) x $95.77))	$4.79	
Total Fee	**$14.79**	
Transaction Fee (Based on Fixed Cost) from Table 3.9		$21.60
Disposal / HHW / County Fee per Ton from Table 3.10 (100 pounds / 2,000) x ($45.45 + $9.12)		$2.73
Total Fee		**$24.33**

The current $10 transaction fee offsets some of the facility costs for light weight customers but is approximately 40% below the cost of providing the service. Not only does this rate fall short of paying for the service it is less than the current monthly for subscription curbside pickup service. Under the current rate structure, a 300-pound load is very close to the transaction fee structure in Table 3.11.

Disposal Fee ((300 pounds / 2,000) x $95.77))	**$14.37**
Transaction Fee @ $10	**$10.00**
Total Fee:	**$24.37**

Although this total fee is about equivalent to what the actual cost of the service is CTR it does not recover the variable cost to transport and dispose of the waste received.

The current transaction plus the cost of the waste delivered if less than 300 pounds is less than the monthly charge to subscribe for weekly curbside service. It would therefore appear to create some incentive for households to transport their own waste.

Minimum Tip Fee Option – Minimum Weight/Tip Fee Structure (Transaction Fee + Weight)

The cost of service study for the transfer station concluded the combined cost per ton for all three transfer stations (facility cost) was $23.48, but the per-ton cost between regulated waste collection and self-haul/commercial customers was $14.06 and $36.62 per ton, respectively. The difference between the two customer classes is the effort necessary to provide the services. The time, floor space, and manpower necessary to drive across the scale, dump on the tipping floor, and leave for a route truck is lower compared with self-haulers.

A financial incentive for customers to reduce the frequency of vehicles with small weight loads is to set a minimum rate. Portland Metro has a minimum fee of $28 for loads under 360 pounds. Any load greater than 360 pounds is assessed a per-ton fee of $97.45 plus a $10 transaction fee.

If a minimum gate rate were set at 410 lbs., the amount that would be charged at the current tipping fee is $29.63 ($95.77 tipping fee x (410 / 2,000) + $ 10 transaction fee). The fee would be applied to approximately 62% of cash/commercial customers.

Minimum Tip Fee for County Transfer Stations

Establishing minimum fees to reduce the number of customers that deliver small volumes of waste could reduce traffic to CTR. In calendar year 2018, CTR reported 176,253 self-haul and commercial customer transactions. Most of these customers (85.5%) were weighed. As detailed on Table 3.12 below, over half of the incoming vehicles weigh under 300 pounds; the table summarizes the range of weights and the type of vehicle used to deliver the waste.

Table 3.12: CTR Incoming Waste Volume by Vehicle

	Car	Truck	Van	Total	% of Transactions
0 to 100	754	11,067	870	12,691	13%
101 to 200	505	19,990	1,368	21,863	22%
201 to 300	199	17,342	1,186	18,727	19%
301 to 400	90	13,056	926	14,072	14%
401 to 500	60	8,545	715	9,320	9%
500 +	66	19,794	2,324	22,184	22%
Totals	1,674	89,794	7,389	98,857	
0 to 300	**1,458**	**48,399**	**3,424**	**53,281**	**54%**

Another consideration is that the cost of service varies between collection route trucks and self-haulers/commercial companies. The primary reasons for the cost difference are the additional staff, floor area, and the increased time to dump. The current disposal fee per ton is $95.77. In

addition to the cost per ton, a $10 transaction fee is assessed on all incoming loads. Therefore, the effective cost per ton varies with the amount of waste disposed. Table 3.13 compares the total disposal fee and the effective disposal fee for various waste payloads.

Table 3.13: Effective Disposal Fee for Variable Incoming Tonnage Volumes

	Weight				
	100 pounds	**200 pounds**	**300 pounds**	**1 Ton**	**8 Tons**
Disposal Fee[1]	$4.79	$9.58	$14.37	$95.77	$766.16
Transaction Fee	$10.00	$10.00	$10.00	$10.00	$10.00
Total Disposal Fee	**$14.79**	**$19.58**	**$24.37**	**$105.77**	**$776.16**
Effective Cost per Ton[2]	$295.77	$195.77	$162.44	$105.77	$97.02

[1] Calculation (weight / 2,000) x $95.77 disposal fee per ton

[2] Calculation (Total Disposal Fee / (Weight / 2,000)

It could be argued the transaction fee provides a financial incentive to consolidate waste and reduce trips to the transfer station; however, the amount of incoming loads under 300 pounds proves otherwise. One suggestion would be to set a minimum fee of $25 for a minimum load of 300 lbs.

Analysis of Options to Modify Facility Fee Structure

Adopting a minimum charge of $25 per ton with the current $10 transaction fee is the equivalent to disposing of 313 pounds of waste. Metro currently has a minimum fee of $28 for 360 pounds of waste. Metro also has a $10 transaction fee that is assessed on loads greater than 360 pounds.

If a minimum charge of $25 for cars and pickups were adopted, scale operators could accept $25, or a ticket would be printed based on total weight. The vehicle would proceed to unload at the station. Upon exiting across the scale, the customer would insert the ticket and obtain a weight total. The customer would either pay the attendant or use a credit card terminal to complete the transaction if the weight were more than the minimum of 300 pounds. The vehicle would exit upon payment. A similar system is operating at the Seattle North transfer station that has resulted in reducing the transaction times at the scale house and thus has prevented traffic congestion.

The current rate for residential waste and recycling service outside the Urban Growth Area is $22.12 per month for a 32-gallon can collected weekly. Setting the minimum fee for self-haul service at a few dollars above the current rate provides residents an additional incentive to subscribe to regular collection service. The County and WCW could initiate a promotion program to inform customers about the increased disposal fee at the transfer stations and the advantages to subscribing to regular waste and recycling collection service.

The financial impact of a $25 minimum rate is expected to generate between $300,000 to $350,000 annually of additional revenue at CTR and reduce the subsidy by one customer category for the self-haul/cash customers with small loads.

3.4.4 –Strategies to Modifying Hours & Days of Operation

3.4.4.1 – Background

One strategy to reduce peak traffic events at transfer stations is to expand the time the facility is open to customer traffic. Each transfer station is open to receive customers based on the needs of the service area. For both CTR and West Van, the stations are open every day whereas Washougal is only open a few days per week. Below is a summary of the current operating hours:

West Van Material Recovery Facility and Transfer Station

6601 N.W. Old Lower River Road, Port of Vancouver
Monday–Friday 6 a.m.–6 p.m.
Saturday 8 a.m.–4 p.m.

- Recyclables are accepted for free during business hours.
- Household hazardous waste is accepted for free from county residents on Fri. and Sat. 8 a.m.–4 p.m. There is a 25-gallon or 200-lb. limit.
- Closed: Sundays, Thanksgiving, Christmas, and New Year's Day. May close early on Christmas Eve and New Year's Eve

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Central Transfer and Recycling Center

11034 N.E. 117th Avenue, Vancouver
Monday–Friday 6 a.m.–6 p.m.
Saturday–Sunday 8 a.m.–4 p.m.

- Recyclables are accepted for free during business hours.
- Household hazardous waste is accepted for free from county residents on Fri.–Sun. 8 a.m.–4 p.m. There is a 25-gallon or 200-lb. limit.
- Closed: Memorial Day, Fourth of July, Labor Day, Thanksgiving, Christmas, and New Year's Day. May close early on Christmas Eve and New Year's Eve.

Washougal Transfer Station

4020 S. Grant Street, Washougal
Household garbage is accepted ONLY on Wednesdays from 7 a.m.–5 p.m., Fridays from 7 a.m.–5 p.m., and Saturdays from 8 a.m.–4 p.m.

- Recyclables are accepted for free every day during business hours (Monday–Friday from 7 a.m.–5 p.m., Saturday from 8 a.m.–4 p.m.) except Sunday.
- Household hazardous waste is accepted for free from county residents on the third Saturday of the month from 8 a.m.–4 p.m. There is a 25-gallon or 200-lb. limit.
- Closed Sundays. Transfer Station may close on holidays and may close early on Christmas Eve and New Year's Eve.

Similar to most jurisdictions that operate transfer stations, the County system provides a fairly high level of service for self-haul and cash customers. To keep up with the increased traffic, capital investments will be needed to expand the infrastructure to continue to provide safe and efficient services. Options to restrict or increase the hours and/or days that are open to the public may result in reducing the overall number of self-haul customers. If this approach is effective, it may offset some need for these investments in the near term.

As previously discussed, approximately 16% of customers using CTR unload less than 150 pounds. A typical household might generate on average 150 pounds and will pay about $21 per month for waste collection. Every household or business in the County can subscribe to waste and recycling collection services. Since customers have alternatives for waste disposal, reducing hours or days the transfer stations are open may reduce traffic assuming more households subscribe to regular services.

3.4.4.2 – Options for Modifying Hours and Days of Operation

Transfer station operating hours are primarily set to receive waste from collection route trucks. These collection trucks, typically from residential routes, make two trips per day to the transfer station to unload. Upon examination of the delivery schedule at all stations, most of the collected waste is received before 3:30 p.m. each day. However, the stations remain in operation until all waste received is loaded into trailers and transported to the barge facility at the Port of Vancouver or transferred to the landfill, as is the case at the Washougal Transfer Station.

Both West Van and CTR are open 12 hours per day, from 6 a.m.–6 p.m. Monday–Friday. Therefore, the transfer stations are open to accept self-haul/cash customers until 4:00 p.m. each day. One approach to reducing overall traffic might be to decrease the time the facility accepts self-haul traffic from 12 hours to eight hours per day from 8 a.m.–4 p.m. In reviewing the data of a peak week in 2017 at CTR, the number of customers arriving outside those hours was about 16%, or 96 out of an average of 600 customers per weekday. Reducing hours may incentivize some customers to either subscribe to collection service or they may elect to arrive during the eight hours the facility is open. In either case, the peak traffic hours will either increase or stay the same. The challenge at the station is managing the peak traffic arriving between 9 a.m. and 3 p.m. Adding traffic during peak hours only exacerbates the problem.

The exception to this is Washougal that receives self-haul customers only three days per week (Wednesday, Friday, and Saturday). The reduced operating days is because of the limited number of stalls to unload and marginal space available to handle the amount of waste from collection trucks during the week. Reducing the hours of operations does not appear necessary at this facility

Modify Times by Changing the Number of Days of Operation

The CTR transfer station is open seven days per week; West Van is open every day except Sunday; and Washougal is open only Wednesday, Friday, and Saturday for residential self-haulers. The option of opening both Washougal and West Van to self-haulers customers on Sundays is another approach that may reduce weekend traffic at CTR. CTR receives almost 800 vehicles on a given Sunday during the peak months of May through September. If 25% of the traffic at CTR were to travel to one or the other stations, that could result in a reduction of a reduction of 200 per day on weekends. This could reduce the traffic and potential for off-site queueing at CTR.

In addition, and perhaps even more important, is by opening on Sundays offers an increase in services by the County at those locations. The Washougal station does experience some off-site queue issues at certain times. The station has limited spots to unload and by opening the facility to self-haul traffic on Sundays may relieve some of the peak traffic experienced on Saturdays. At West Van, there are no known queue issues, but opening on Sundays will not only provide a higher level of service to the City of Vancouver residences and businesses, but it may have an impact on traffic at CTR.

Analysis of Increasing Days of Operation

Opening both West Van and Washougal on Sunday will increase the cost of the services. The operational cost per hour at the West Vancouver and Washougal Transfer Station is $794 and $321, respectively. These cost however, represent the average cost per day assuming all commercial and self-haul traffic and waste flows. If the facility were to open to just receive waste from self-haul customers, the cost per hour to operate the facility would require less labor and operators. This is because 80% of the waste delivered at West Van during weekdays is from collection trucks that do not collect on weekends. With less staff needed and less waste to load into trailers, the cost to operate on weekends is less than on a typical weekday.

For this analysis, the staffing would include gatehouse personnel, laborers or spotters, and a few operators. Since the waste delivered is expected to be less than100, tons the amount of waste to be loaded for transfer would be 3 to 4 trailers or containers over the eight-hour period. These costs do not include the HHW facility or waste transport and disposal. Therefore, for this analysis it is assumed the cost to operate would be about 75% of the cost to operate a typical day. This is shown in Table 3.14 below.

The table displays two scenarios. The first is to open both the West Van and Washougal every Sunday of the year. The second option suggests opening the transfer stations only during the peak season (about six months of the year). Extending the hours of operation to Sundays at West Van and Washougal for eight hours (8 a.m. to 4 p.m.) would cost $595 and $241 per hour of operations, respectively. The added cost to operate West Van on Sundays could range from $124,000 to $248,000 per year depending on the number of weeks it is open. The Washougal transfer station would range from $50,000 to $100,000 per year.

Table 3.14: Cost of Sunday Operation Hours

Costs Items	West Van	Washougal
Average Facility Cost/Hr. /Full Operations	**$794**	**$321**
Cost /Hr. to Operate Sundays (75%) of full operations	***$595***	***$241***
Sunday Cost (8-hour day)	$4,760	$1,928
Cost per Year (Rounded $000)	**$248,000**	**$100,000**
Ave. Saturday Customer Traffic	289	208
Cost per Customer	$16.50 + Disposal	$9.25+ Disposal
Total Cost for Peak Season (6 months)	**$124,000**	**$50,000**

Assuming these costs are paid by the customers, the fixed cost to operate would be $16.50 per vehicle at West Van and $9.25 per vehicle at Washougal. This assumes that the number of vehicles would be similar to what these facilities receive on a typical Saturday. Most likely the number of vehicles would be less especially in the near term but most likely would increase over time.

Expanding the days of operations at the West Van and Washougal Transfer Stations may result in decreasing the traffic at CTR. But more importantly, it provides a higher level of service to the communities they serve. There will be an increase in the total cost to operate the facilities. This can be offset by the current fee structure or by adopting a fee structure that included a minimum charge for a minimum weight approach. The approach was discussed to charge $25 per vehicle with a minimum load of 300 pounds of trash. Loads with more than 300 pounds would be charged on a weight basis.

Analysis for Modifying Operating Hours or Days of Services at Transfer Stations

In completing a preliminary review of the options to reduce or expand the hours of operations and/or reduce the number of days available for self-haul or cash customers, it appears there would be little impact on overall operations. Certainly, regular users of these services would be inclined to arrive when the facilities are open. In most cases, this will cause increased customer traffic during fewer hours, exacerbating traffic during peak hours. A potential unintended consequence of reducing hours and days for disposal is an increase in illegal dumping.

If the hours are reduced, it should be in conjunction with changes to collection services, such as bulky waste pickup, to provide residents with a reasonable alternative to self-hauling.

The option of expanding the days of operations at both West Van and Washougal appears to be more practical and provides increased services to those communities. It will increase the cost of these operations but, with further analysis of the actual added cost to be provided by CRC, it is expected the tip fees and revenues generated by these new customers may be sufficient to offset costs.

3.5 Summary and Recommendations of Service Options

This section of the regional study considers the current services offered in cities and the County for collecting solid waste and for transferring waste to a processing and final disposal facility. The primary focus is to determine if modifications to these services would have an impact on the number of self-haul customers that use the transfer stations and possibly improve operations and impact the need to make large capital investments in the stations. The report includes a discussion of the options for the County, its partner jurisdictions and CRC to consider. A summary matrix was prepared that discusses the advantages and disadvantages of these options. (Appendix A)

Suggested Recommendations

Modify Level of Collection Services

There were two options presented and evaluated that considered changes to the current collection services and the impact they may have on traffic and operations at transfer stations.

Option 1 – Expand Universal Services to the Urbanized County and the Cities of Battleground, La Center, and Yacolt.

The reasons to expand universal services for all in the County goes beyond the purpose of this study. Universal services can improve overall efficiency in the system, reduce traffic and litter on roads, and reduce air quality impacts on local communities. Based on the Study, the direct benefits to reducing traffic at the transfer stations could not be established. More data and feedback from the public is needed. In addition, such changes should be based on policies adopted by each local jurisdiction and would also require coordination with the UTC.

Option 2 – Establish Bulky Waste Collection Programs

Similar to universal collection services, there was not sufficient data to determine how much an impact these collection programs may have on the traffic at transfer stations. On-call services are provided, and the transfer stations provide a convenient place for households and businesses to take unwanted bulky items. Having this service reduces the potential for illegal dumping.

Recommendation 1 – The County should further evaluate the options of expanding these services in conjunction with updating the Solid Waste Management Plan. This would allow the County to execute a process to obtain feedback from the general public and local officials to consider the broader policy implications of adopting changes to the collection services.

Modify facility fee structures – Minimum load requirements and fees to encourage customers to use collection services. The Study determined that the current rate structure does not offer a deterrent for individuals to haul their own waste. More significant is that those who self-haul with small loads are not paying for the actual cost of the services. These customers are being subsidized.

Recommendation 2 – The County should adopt a policy that customers pay for the actual cost of the services provided and minimize the potential for unintended subsidies of other user classifications. Setting a suggested minimum rate of $25 per customer with a minimum load of 300 pounds appears to be fair based on the information analysis presented in this Study. It is also expected to encourage households to either subscribe to collection services and/or reduce the number of trips by incentivizing them to make fewer trips with larger loads.

Modify the hours or days transfer stations are open to self-haulers – Each transfer station is open to the public on various days and times. CTR is the only facility open on Sundays and as a result often experiences high traffic on weekends particularly during the peak season. This does contribute to times where vehicles will queue onto public right of way. The Study could not establish a definite correlation if the weekend traffic would be impacted if both West Van and Washougal were open on Sundays. Nor is it logical that modifying the hours at CTR would impact

the peak traffic and reduce traffic issues. But by opening all stations on Sundays may result in more efficient and uniform services.

Recommendation 3 – The County should work with CRC to expand operating hours at the Washougal and West Van on Sundays. One approach would be to initially open these facilities on Sundays during the peak season (six months). This would minimize the increase in the added expense of operating an extra day plus it would provide data and feedback as to the benefits and impacts of adding this service.

Summary Matrix - Service Options for Collection and Transfer Stations					
	Description	**System Impacts**	**Cost Impacts**	**Pros**	**Cons**
Strategies to Modify Collection Service					
1. Expand Universal Services	Expands universal services to urbanized areas of county based on density or other standard	Increase participation in collection services. • Increase recycling • May reduce traffic at transfer stations • May reduce fugitive litter and less traffic on roads • Improve overall efficiency of collection services	May decrease cost of services if more households subscribe	Most efficient for residences to use collection system Less traffic on roads May impact neighbor clutter	Some residents may resist requirements to subscribe particularly in rural areas.
2. Bundle Bulky Waste w/ Standard Collection	Add to regular collection services provision to pick up bulky items. Program can be designed to pick up seasonally or alternative schedule	Residences have convenient alternative for disposal of unwanted items i.e. Bulky items furniture. May reduce traffic at transfer stations.	Expected to increase monthly rate to residences and/or businesses	Provides convenient collection of used bulky items. May help clean up of neighborhoods May reduce illegal dumping May reduce traffic at TS	May impact drop off at reuse stores i.e. Goodwill etc. May cause clutter in neighborhoods if system is abused
3. Conduct Bulky Waste Collection Events	At least annually or seasonally provide special events for collector of bulky waste. Program can be designed for different areas throughout year.	Provides an alternative for residences to dispose of bulky items vs transport to transfer stations	Will increase rates to residences unless program includes a drop off fee	Provides alternative for residences to dispose of bulky waste items. May reduce clutter in neighbor hoods May reduce traffic at transfer stations	May impact drop off at reuse stores i.e. Goodwill, etc. May cause clutter in neighborhoods if system is abused Events not as convenient as going to transfer station

Strategies to Modify Rates					
1. Maintain Current Rate Policy at TS	TS will continue to charge $10 Fee + Weight of waste disposed at TS	No expected changes No impact of transfer station operations	As traffic increases the cost of services at transfer stations will increase Added capital to increase space to handle self-haul traffic	No change in rate system that has been in place for several years	Self-haul / cash customers will not pay cost of service Collection services subsidize self-haul at TS
2. Establish Rates Based on Cost of Services	Establish fees based on policy to have self-haul/ cash customer pay actual cost of services to use transfer stations.	May reduce traffic or those customers as potentially more residences subscribe to collection services. Could cause increase in illegal dumping	Impacts cost and revenue at transfer stations.	Expected to reduce some traffic at transfer stations Customers will each pay for level of services provided May incentivize residences to subscribe to collection vs self haul	May increase illegal dumping due to increase in self haul rates
3. Set Minimum Rate	Establish a minimum rate to offset actual cost of services and to provide some incentive to self-haul customers to subscribe to collection.	May result in less traffic @ transfer stations • Some customers might subscribe to collection • Self-haul customers will increase loads and reduce number of trips May Increase in Illegal Dumping	Projected to increase revenue and possibly cover cost of services May reduce cost to operate with less traffic	Expected to reduce some traffic at transfer stations marginally Customers will each pay for level of services May incentivize residences to subscribe to collection vs self haul Less traffic on roads and less litter on roads	May increase illegal dumping

Revise Hours and Day of Operations					
1. ***Maintain Current Hours of Operation***	No change in the hours of operations at TS	No Impacts			
2. ***Modify Hours @CTR And Other Transfer stations as necessary***	Reduce hours for SH and Cash customers to use TS	May reduce some traffic at TS May increase traffic at peak times causing more congestion	May reduce cost of TS operations by shorter hours If customer traffic is reduced this option may reduce need for TS improvements in immediate future	Could reduce cost of operations and reduce overall traffic May increase subscriptions by households using collection system	May cause increase in illegal dumping
3. ***Modify days of Operations at Transfer Stations***	Propose opening both West Van and Washougal to self-haul customers on Sundays	Provides higher level of service to customers.in service areas May impact /reduce peak traffic at CTR	Increase cost of operations at transfer stations Revenues generated may offset most of the cost	Additional days of operations provides more options for customers. May reduce peak traffic during weekdays and on Saturdays	May deter some households from subscribing to collection services Adds costs to operate

Chapter 4

Regional Operations & Condition System Assessment

The Clark County Transfer Stations provide convenient locations to deliver household waste and yard debris, and to discard bulky waste items. The West Van and CTR were constructed in the early 1990s. Neither facility has been expanded to handle the increased volume of waste from the population growth within the County. This section discusses the current CTR facilities and their capacity as it relates to providing services and for handling waste over the next 15 years.

4.1 Introduction

The comprehensive review of Regional Solid Waste System is primarily focused on assessing the current infrastructure or facilities. The assessment entails examining the physical condition of the facilities and identifying repairs and replacement needs. It also examines the operating conditions for managing both current waste volumes and customers as well as assessing improvements needed to manage growth.

The chapter presents the reviews of both the physical and operating conditions for managing solid waste services for the next 20 years. The findings will be used to identify the investments needed to continue providing cost effective and efficient services. The Assessment was completed by working with CRC staff to conduct site visits, review data, and discuss findings.

4.2 CTR Operating and Conditions Assessment

CTR is located on Washington State Route 503 in central Clark County near Brush Prairie. It serves the largest area of the County, the area projected to have the most growth over the next 20 years. The facility was designed to handle 1,200 tons of municipal solid waste (MSW) daily from WCW and self-haulers. In addition to managing the area's waste, CRC operates a recycling and moderate risk (household hazardous) waste drop-off facility. Figure 4.1 below provides an aerial photo of the site operations.

Figure 4.1: Current CTR Site Plan

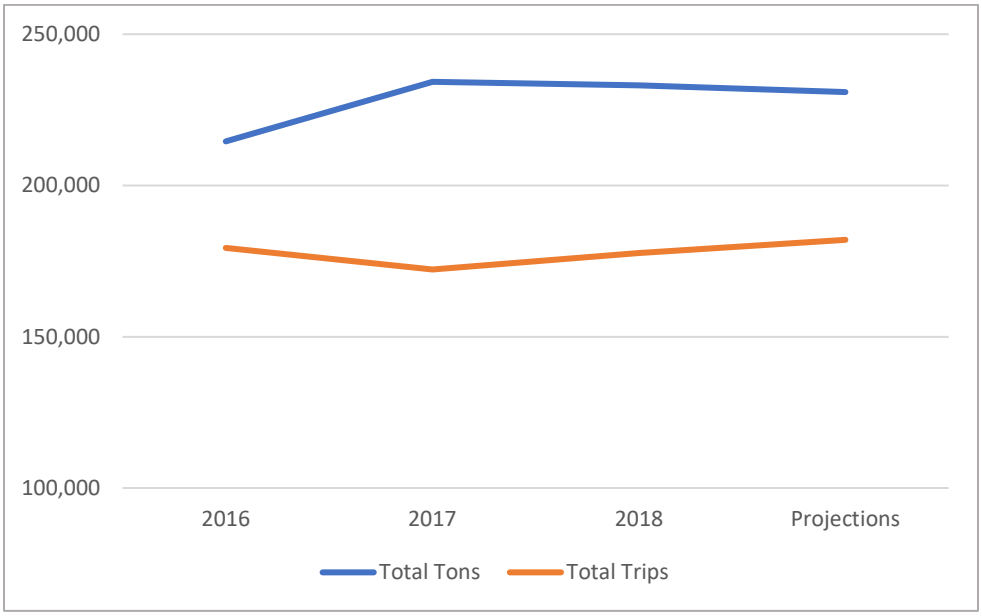
4.2.1 – CTR Waste Quantities

Over the past three years, CTR has experienced a significant increase in annual waste volume received, from 215,000 tons in 2016 to 233,000 tons in 2018. However, as shown in Table 4.1 and in Graph 4.1, projections for 2019 indicate no increase from the previous two years.

Table 4.1: CTR Tons and Trips

Tons	2016	2017	2018	2019
Cash	45,141	52,866	48,117	49,859
Commercial	22,775	27,344	23,775	23,883
Route Trucks	107,382	112,176	116,143	113,338
WCW Drop Box	39,272	41,868	45,009	41,956
Total Tons	**214,570**	**234,254**	**233,045**	**229,036**
Cash	142,288	133,144	136,773	135,293
Commercial	14,462	15,929	14,172	13,879
Route Trucks	11,957	12,025	14,063	13,635
WCW Drop Box	10,681	11,131	12,695	12,175
Total Trips	**179,388**	**172,229**	**177,703**	**174,982**

Graph 4.1: CTR Historic Waste Quantities and Traffic



Although the amount of waste received has remained constant over the last three years, based on the population, and resulting waste projections, the area served by CTR is expected to grow faster than the rest of the County. This growth is projected primarily in the cities of Ridgefield and Battleground and in the area north of Northeast 119th Street and west of State Route 503.

CTR is open seven days per week. The majority of the waste at CTR is received during weekdays (Monday through Friday), when large hauling trucks operate. Waste quantities delivered to CTR vary depending on the season. During the summer months (May through August), weekly waste averages 4,771 tons. This increase in waste volume, when compared with the rest of the year, is primarily due to increased traffic from self-haulers and construction activity. CTR is permitted to operate for only 12 hours per day, so all waste must be loaded into trailers and transported off-site within that period. The peak waste quantities received per week at CTR in 2017 and 2018 are detailed in Table 4.2.

Table 4.2: CTR Peak Waste Quantities per Week (tons)

2017	Week of July 16th							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
	192	928	822	929	855	973	198	4,897
2018	Week of June 17th							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
	124	1,192	1,003	951	995	1,006	179	5,449

During the weekday peak weeks shown in Table 4.2, the average waste received is approximately 900 tons per day. Waste Connections collection vehicles deliver approximately 667 tons per day, or 74%, while self-haul vehicles deliver about 230 tons per day, or 26%. Additionally, CTR experiences 250 vehicle per day or about 30 per hour that use the recycle and hazardous household waste (HHW) drop-off facilities.

On weekends, the amount of waste received averages approximately 180 tons per day. On Saturdays, CTR does receive waste from a limited number of WCW collection vehicles; however, the average is seven vehicles for a total of 50 tons per weekend. During certain holidays, such as Thanksgiving, Saturdays can experience as much as 600 tons or more because Waste Connections makes up for the skipped collection day.

CTR receives almost 900 tons of waste each weekday. It requires 25 minutes to load a transfer container with the current compactor system. Over the 12-hour (720 minutes) approved workday, CTR can load 29 containers for transportation to the Tidewater loading dock. The containers average 30 tons each; therefore, the MSW capacity of the station, as constrained by permitted operating hours, is about 870 tons per 12-hour day.

4.2.2 – CTR Traffic Conditions

Of the three transfer stations operated by CRC, CTR serves the largest area and therefore has more traffic. During the average week in 2019, the total number of customers was 3,532. However, 35% of all traffic occurs on the weekends. During the weekday, the primary customers are Waste Connections collection trucks. As shown in Table 4.3 on the next page, the average weekday traffic ranges from 419 to 598 vehicles. During peak summer weeks, the average weekday traffic ranges from 497 to 713 vehicles, an average of 172 more, as detailed in Table 4.4 on the next page.

Table 4.3: 2019 Average Weekday Number of Hourly Trips

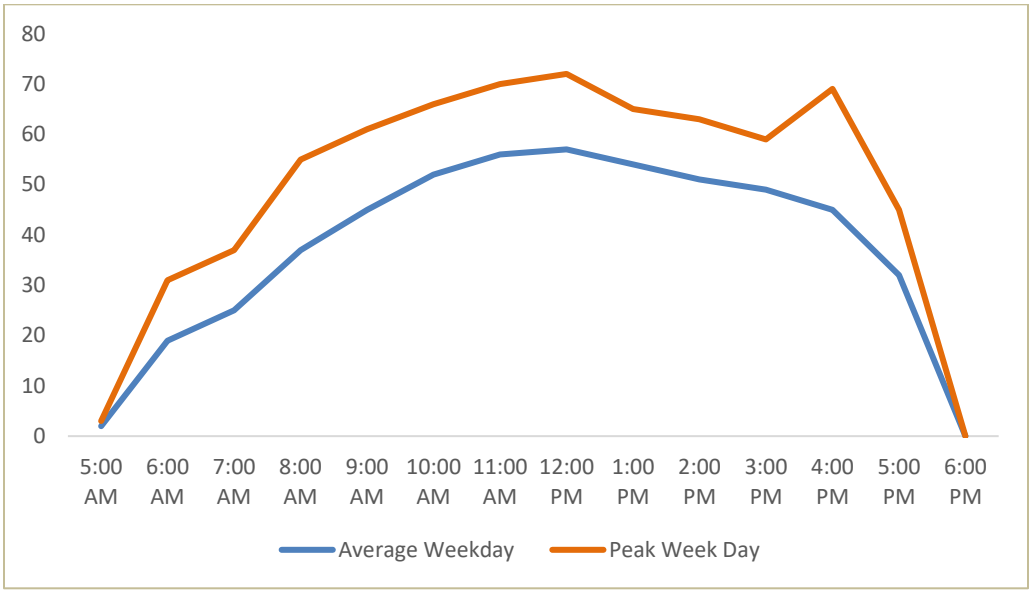
Workdays:	29	30	30	31	30	30	30	
Time of Day	**Sun.**	**Mon.**	**Tues.**	**Wed.**	**Thurs.**	**Fri.**	**Sat.**	**Weekly Totals**
5:00 AM	0	2	1	1	1	1	0	6
6:00 AM	0	19	15	14	13	17	0	78
7:00 AM	7	25	26	21	20	25	10	134
8:00 AM	61	37	34	30	29	38	55	284
9:00 AM	61	45	41	39	36	46	57	325
10:00 AM	71	52	49	47	45	51	66	381
11:00 AM	77	56	52	47	44	54	74	404
12:00 PM	80	57	49	49	43	53	75	406
1:00 PM	80	54	51	46	45	54	78	408
2:00 PM	80	51	47	45	44	47	79	393
3:00 PM	78	49	42	43	40	44	79	375
4:00 PM	3	45	38	37	36	41	5	205
5:00 PM	0	32	26	26	23	26	0	133
6:00 PM	0	0	0	0	0	0	0	0
Total:	**598**	**524**	**471**	**445**	**419**	**497**	**578**	**3,532**
Bright yellow shading indicates CTR's peak weekday.								
Orange shading indicates CTR's peak hours.								

Table 4.4: 2019 Peak Weekday Number of Hourly Trips

	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul	
Time of Day	**Sun.**	**Mon.**	**Tues.**	**Wed.**	**Thurs.**	**Fri.**	**Sat.**	**Weekly Totals**
5:00 AM		3		1	2	1		7
6:00 AM		31	24	25	14	21		115
7:00 AM	6	37	37	31	31	37	20	199
8:00 AM	81	55	36	39	37	44	65	357
9:00 AM	78	61	65	31	42	55	78	410
10:00 AM	83	66	61	46	51	56	71	434
11:00 AM	88	70	69	59	45	60	80	471
12:00 PM	90	72	56	49	45	65	83	460
1:00 PM	97	65	76	48	49	67	76	478
2:00 PM	105	63	56	46	64	61	76	471
3:00 PM	85	59	58	47	59	51	81	440
4:00 PM		69	56	40	38	49	2	254
5:00 PM		45	39	35	28	29		176
6:00 PM			1		1	1		3
Total:	**713**	**696**	**634**	**497**	**506**	**597**	**632**	**4,275**
Yellow shading indicates CTR's peak weekday.								
Orange shading indicates CTR's peak hours.								

Graph 4.2 shows the hourly customer traffic on Monday, the busiest weekday at CTR. It compares the hourly traffic to the average weekday traffic during the peak season. During the busiest five-hour period, the hourly traffic is about 20 vehicles per hour more during the peak summer season. (Note: The blue line on the graph in Graph 4.2 corresponds with the Monday column in Table 4.3, and the orange line corresponds with the Monday column in Table 4.4.)

Graph 4.2: 2019 Weekday (Mondays) Customers to CTR — Hourly Arrivals



What is most critical to the operations is the consistent stream of customers arriving from 8:00 am to 3:00 pm. During these eight hours, the facility needs to handle more than 60 vehicles per hour.

Although CTR has experienced a steady number of customers during weekdays over the past three years, the busiest periods for the station occurs on Saturdays and Sundays. Tables 4.5 and 4.6 on the next page detail the number of weekly customers at CTR. From 8:00 am to 3:00 pm, traffic averages 72 customers per hour, peaking at 80 vehicles per hour.

During the summer season, CTR receives almost 800 vehicles per day on the weekend, peaking at or near 100 vehicles per hour. Graph 4.3 on page 44 compares peak weekend traffic with average weekend traffic. (Note: The blue line on the graph in Graph 4.3 corresponds with the Saturday column in Table 4.5, and the red line corresponds with the Saturday column in Table 4.6.)

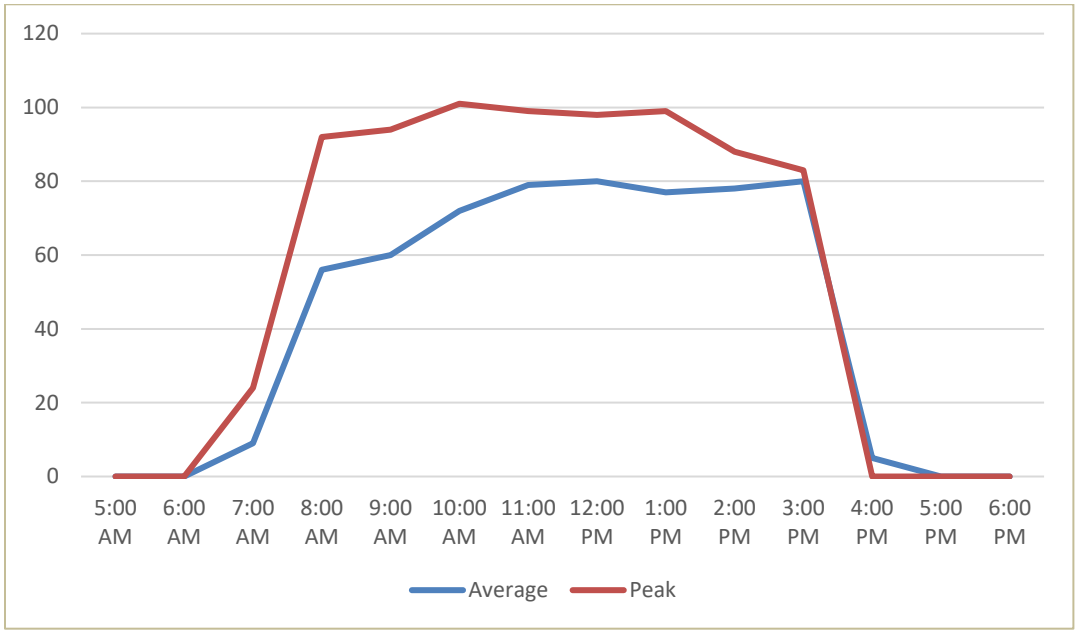
Table 4.5: 2017 Average Week

	Workdays							
Time of Day	**Sun.**	**Mon.**	**Tue.**	**Wed.**	**Thur.**	**Fri.**	**Sat.**	**Weekly Totals**
5:00 AM	0	1	1	1	0	1	0	4
6:00 AM	0	15	14	14	15	15	0	73
7:00 AM	6	23	25	23	22	24	9	132
8:00 AM	54	38	32	32	34	37	56	283
9:00 AM	57	46	41	39	41	43	60	327
10:00 AM	67	50	48	46	45	51	72	379
11:00 AM	74	52	49	48	46	54	79	402
12:00 PM	76	52	49	43	46	53	80	399
1:00 PM	77	51	47	45	47	52	77	396
2:00 PM	73	50	44	44	44	49	78	382
3:00 PM	71	48	42	40	39	46	80	366
4:00 PM	3	43	37	37	35	38	5	198
5:00 PM	0	28	24	24	22	23	0	121
6:00 PM	0	0	0	0	0	0	0	0
Total:	**558**	**497**	**453**	**436**	**436**	**486**	**596**	**3,462**
Bright yellow shading indicates CTR's peak day.								
Orange shading indicates CTR's peak hours.								

Table 4.6: 2017 Peak Week

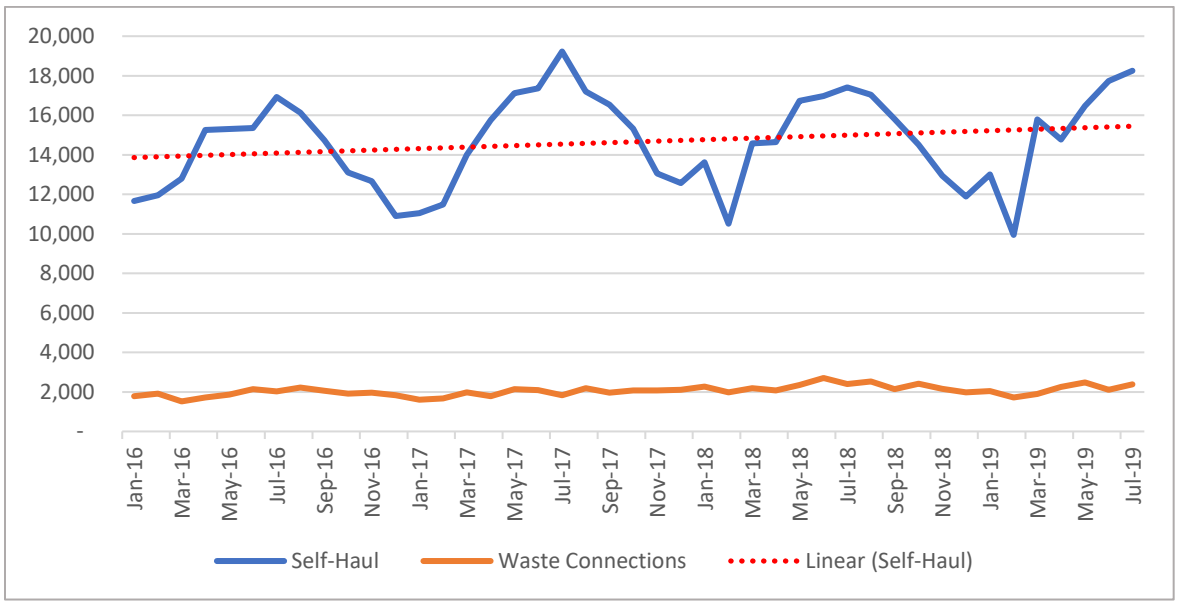
	21-May	**22-May**	**23-May**	**24-May**	**25-May**	**26-May**	**27-May**	
Time of Day	**Sun.**	**Mon.**	**Tues.**	**Wed.**	**Thurs.**	**Fri.**	**Sat.**	**Weekly Totals**
5:00 AM			1	4		1		6
6:00 AM		27	13	19	24	30		113
7:00 AM	17	40	34	35	28	43	24	221
8:00 AM	73	57	47	32	45	63	92	409
9:00 AM	101	55	64	56	57	54	94	481
10:00 AM	90	73	44	53	59	66	101	486
11:00 AM	93	54	68	59	50	68	99	491
12:00 PM	103	63	49	47	56	66	98	482
1:00 PM	102	60	45	56	58	72	99	492
2:00 PM	84	58	42	45	62	62	88	441
3:00 PM	81	49	45	68	45	56	83	427
4:00 PM	1	36	39	45	46	52		219
5:00 PM		34	41	42	36	26		179
6:00 PM								0
Total:	**745**	**606**	**532**	**561**	**566**	**659**	**778**	**4,447**
Yellow shading indicates CTR's peak weekday.								
Orange shading indicates CTR's peak hours.								

Graph 4.3: 2017 Peak (Saturday) Customers Compared With Average



The increase in customers over the past three years has greatly contributed to the increased traffic that regularly backs onto State Route 503. CTR was not designed to handle the amount of traffic or waste it is experiencing under the current conditions. Another consideration in assessing customer traffic at CTR is seasonal impacts. Graph 4.4 below depicts the inbound traffic to CTR over a 43-month period. Self-haul traffic fluctuates in a seasonal pattern, whereas traffic from Waste Connections collection vehicles remains steady.

Graph 4.4: CTR Inbound – January 2016 to July 2019



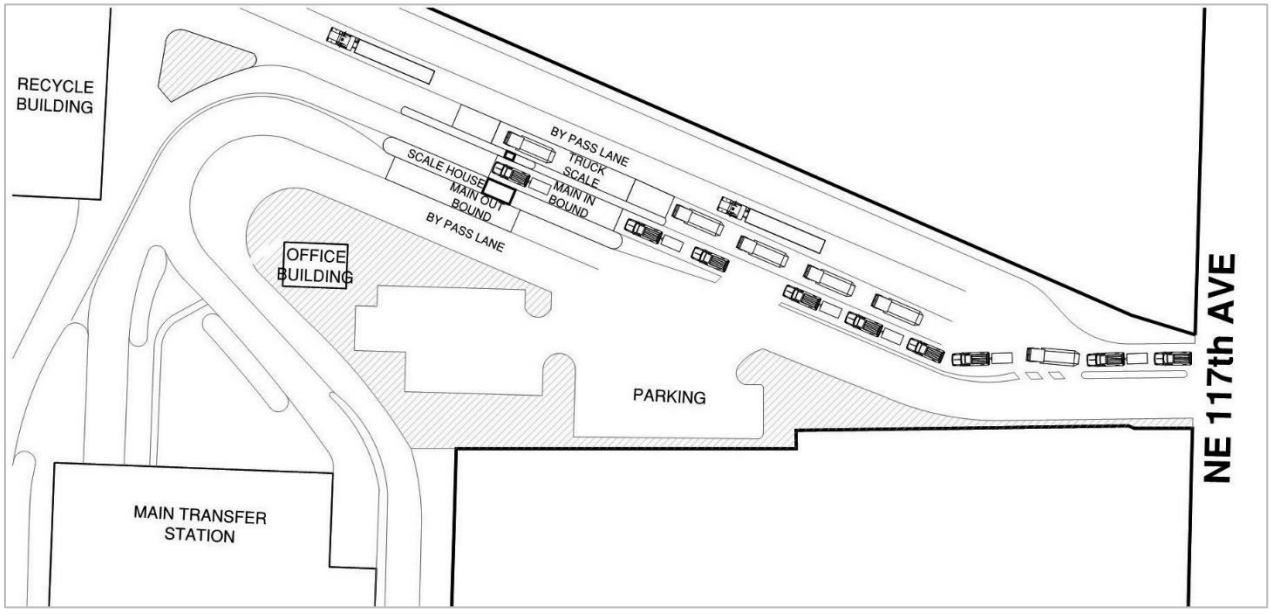
The trend in waste tons, which is depicted on the graph by the red dashed line, reveals the increase in waste tons delivered to CTR over this period. Data provided by the Washington State Office of Finance and Management and confirmed by Clark County's Growth Management Plan, estimate an increase in population between 77,000 and 92,000 over the next 20 years for the north-central part of the County. The largest increase in population will occur in the CTR service area. Growth in population is directly related to growth in waste generation. At the expected levels of growth, an additional 62,000 to 73,000 annual tons (170 to 200 tons per day) of waste will be handled by the County's solid waste system, with a majority delivered to CTR.

4.2.3 – Scale House Operations

CTR customers are charged by weight, based on the amount of waste they bring to the station. Customers arriving at the station must weigh in across the scale system, which includes two scales. One scale is dedicated to weighing inbound Waste Connections collection trucks. These vehicles have registered tare weights and therefore do not need to be weighed out, and so they exit using the bypass lane.

All self-haul vehicles (including cars and pickups with or without trailers) are weighed on the main inbound scale, where an attendant provides a ticket upon entering the site. If a vehicle is using only the recycle or HHW drop-off center, they do not need to weigh in and can use a separate bypass lane, for lane entry and also for exit. Figure 4.2 below shows the two in-bound scale lanes, the outbound lane, and the by-pass lanes.

Figure 4.2: Existing Scale House Complex



After being weighed in, vehicles enter the transfer station to unload. Upon completion, self-haul customers line up to weigh out on a separate outbound scale. The scale house attendant will enter the ticket, determine their fee, and process payment.

A key factor in managing customer traffic is how much time it takes to process and receive payment from inbound and outbound customers. Under the current system, the average time to weigh customers in is approximately 45 seconds. At this pace, the main inbound scale system can process 80 vehicles per hour. During weekends there are almost 100 vehicles per hour; therefore, queueing issues are understandable.

Similarly, there is only one outbound scale. The average time to complete a transaction is about 45 seconds, the same as the inbound scale. The result of processing outbound customers at the same rate as the inbound causes onsite queueing. Slow processing of outbound customers could be acceptable if the queuing line did not back into the transfer station where customers are unloading.

There are several options that can be considered to remedy this problem. The first option being considered by CRC and the County is to add a second inbound scale and increase the length of the queue lane. Using this approach, a second inbound scale would be located on a separate parcel just west of the current property but on the same site. Channel lanes are proposed to improve the ingress / egress off State Route 503 that will allow two dedicated lanes to enter the station. Inbound customers arriving from the south and turning left into the site would have a dedicated lane and would not compete with traffic turning right from the north. These improvements would be expected to eliminate the potential for offsite queueing.

From the data reviewed, another option CRC should consider is increasing outbound scale capacity or changing procedures to expedite fee collections. Some examples of potential changes in procedures are charging minimum fees for small loads (not requiring weight) or using faster payment processing software.

4.2.4 – Site Circulation and Unloading Stall Capacity

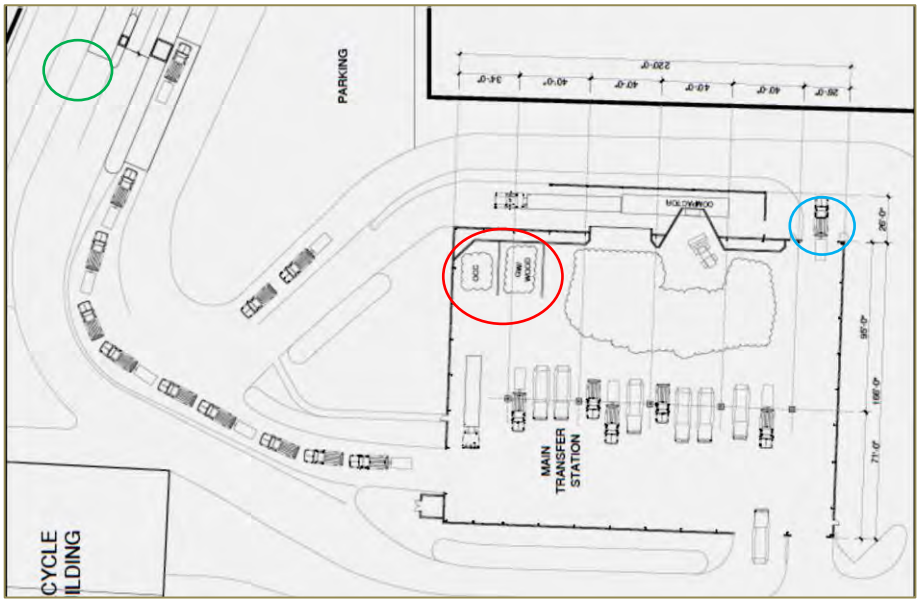
When CTR was constructed in 1992, it was not designed to accommodate the current levels of traffic or the different activities and services currently provided.

Daily traffic at CTR averages 50 to 60 vehicles per hour. An unloading stall is expected to handle six vehicles per hour ─ 10 minutes per vehicle to maneuver into the stall, unload, and exit. Some vehicles, such as cars and pickups with less waste, will unload faster. However, vehicles with trailers and those with hydraulic tippers typically take longer. Therefore, in non-peak times, 10 to 12 stalls are sufficient for unloading.

During peak times, customer traffic can increase from 80 to as many as 100 vehicles per hour. At this volume, the facility would need to dedicate 13 stalls to unloading during peak weekday times and 17 to 20 stalls during peak weekend times. Figure 4.3 on the next page shows the tipping floor and vehicle unloading capacity (north is the left side of the figure). With the two northernmost stalls dedicated to source-separated cardboard, green waste, and clean wood (red circled area), there are only 13 stalls for unloading waste. On weekends, CTR can use the south drive aisle to route vehicles to unload. After unloading, these vehicles will exit the southeast door (blue circle) and drive to the outbound scale (green circle).

Also depicted in Figure 4.3 is how transfer trucks, when loaded, exit the facility. The truck and trailer must intersect with other outbound traffic and will need to access the scale.

Figure 4.3: Tipping Floor Capacity



CRC does a good job managing traffic and ensuring vehicles can safely unload in the transfer station. Spotters are located at the entrance and on the tipping floor to guide customers to the appropriate stalls. Although the current facility does not have enough stalls to unload quickly during peak times, there is space for customers to queue onsite before entering the transfer station. However, when exiting the transfer station from the southeast door (blue circle), there is approximately 550 feet before the outbound scale, queue space for 20–22 vehicles. Routing vehicles in this direction can reduce the traffic queue exiting the transfer station.

The amount of customer traffic on weekends and during peak seasons also impacts the overall site circulation. The primary place of congestion is the outbound lanes before the scales. As shown on the site circulation map in Figure 4.4, all traffic must converge on two lanes including transfer trucks loaded with containers bound for the Tidewater loading dock.

Figure 4.4: CTR Site Circulation

Outbound traffic conditions may be improved by decreasing the time to process customers; however, the physical space for vehicles to line up to be weighed out as well as those to use the bypass lane is very limited. If the station is to make improvements to eliminate the off-site queue, it would also be desirable to consider modifications to remedy both the outbound scale capacity issues and the site circulation restrictions.

4.2.5 – Impacts of Growth Management in CTR Service Area

As discussed in Chapter 2 of this report, Clark County has grown about 2% per year since 2010 (approximately 60,000 people from 2010 to 2019), and it is expected to continue at this rate for the next 20 years. The central and northern portions of the County, served by CTR, are expected to experience the majority of this growth, as predicted in the Growth Management Plan. The projected growth for this area could result in more than 60,000 tons of additional waste being generated per year in the next 20 years.

Growth has resulted in increased development around CTR. The apartment complex on the north side of CTR expanded, and now sits within a few feet of the north retaining wall. Property on the west side of 112th Street is being platted and developed for new single-family houses. On the south side of the transfer station, a storage unit facility and private school are being constructed. CRC owns the eight acres located on the west side of CTR, providing a buffer between the new residential development and the transfer station. A new scale complex designed to eliminate off-site queueing problems is proposed by CRC for this property. These recent changes in the development of adjacent properties will impact decisions for future changes to operations and future facility improvements.

Considering the increase in volume and number of self-haul customers, CTR is currently at operating capacity. This operating capacity is based on current waste quantities and hours of operation at about 900 tons per day. If the waste exceeds the capacity, CRC will process the waste to ensure it is removed from the tip floor and not stored overnight. There were several observed deficiencies during the consultant team's site visits and review of data. It is important to understand that these deficiencies are a result of the physical conditions and limitations of the original design. CRC executes day-to-day operations to manage the current waste streams and traffic in a safe and efficient manner, given these physical constraints.

Based on the assessment of current operations, the following site constraints and deficiencies were noted (as shown in Figure 4.5 on the next page).

1. **Scale capacity:** CRC is currently planning to add a second in-bound scale to increase the queuing for in-bound traffic. This is a high priority and work is underway to secure approval by the Washington Department of Transportation.

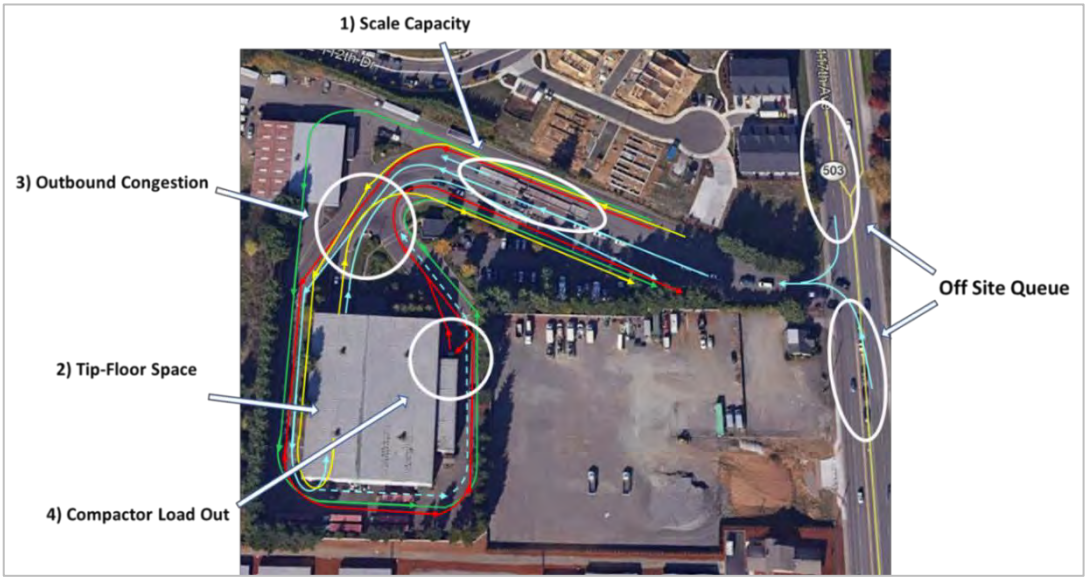
2. **Tipping Floor Space:** The current facility does not have sufficient space for vehicles to unload. This occurs on busy days during the week and regularly on weekends during most of the year. Also, collection trucks must unload next to self-haul vehicles. CRC does a good job of monitoring and managing traffic to avoid accidents, but as customer traffic has increased in the past few years, this condition is less desirable.

3. **Congestion at Exit Lanes:** All traffic exiting the site must make a left turn onto two out-bound lanes. Transfer trucks are subjected to a hairpin-like turn and therefore use both lanes to access one out-bound scale. The competition for the out-bound scale and exiting

is not a desirable condition and is exacerbated by the increase in waste quantities and increase in self-haul traffic.

4. **Compactor Load-Out Capacity:** With the current operating hours (12 per day), the compactor can only loud out about 900 tons per day. CTR averages between 800 and 900 tons per day. There are some days during peak periods CTR receives between 900 and 1,100 tons. CRC reported that on occasions when waste in excess of this capacity is received, they will load this material to ensure it is not stored overnight.

Figure 4.5: CTR Operations Assessment



4.2.6 – Review of CTR Conditions Assessment

Our limited structural and site improvement condition assessment reveals that most of the assets at the site are in fair to good condition, except for the recycling building, paved areas east of the boundary retaining wall, and the infiltration portion of the stormwater system. The complete report is included as Appendix B, *Conditions Assessment Report.* A summary of the key points are as follows:

- The Transfer Station and HHW buildings (see Figure 4.1 on page 38, the north boundary retaining wall and the south boundary retaining wall are in **good** overall condition.

- The Recycling Building next to the HHW building is in relatively **poor** condition. It is our recommendation that a detailed structural investigation be implemented as part of the planning process when considering public ownership of the site.

- The drive aisles that course through the site are paved with asphalt concrete pavement. Some areas of the paving are in very **poor** condition that require rehabilitation. We recommend worn surface areas be repaired or replaced.

- The east boundary buffer is in **poor** condition due to the trees and tree roots impacting the pavement section and curb. The pavement section and the damaged curb should be repaired or replaced.

- The existing pump station for the sanitary sewer system is a duplex pump system with two pumps that alternate pumping discharge of the sanitary sewer effluent. According to facility staff, one of the pumps failed in September 2019 and was replaced in the fall of 2019. CRC provides routine maintenance of equipment. The pump station is in **good** condition.

- The scale house and the scale booth were not assessed since they were to be replaced in the near future (it was replaced in December 2019). The domestic water system was not assessed since it is owned and maintained by Clark County Public Utilities.

Our structural and civil condition assessments were limited to those areas that are readily accessible and visible to the field staff. Concealed conditions that become exposed in the future may change our current recommendations. Our repair timeline will be provided as part of our facility alternatives analysis.

4.2.7 – CTR Service Area Alternatives

Every year, CTR receives more waste and increased customer traffic as the population in Clark County continues to grow. The most critical need is to make improvements that will eliminate customers from queueing onto State Route 503. CRC is working with the County and the Washington Department of Transportation to develop near-term plans to remedy this condition.

Based on the condition's assessment, the transfer station facility has been well-maintained and is in good condition. It is a critical component of the Clark County solid waste system. However, a range of improvements should be considered for the facility, depending on the determination by local officials of how CTR will fit into a long-term plan for managing solid waste in Clark County. Based on the assessment of the operations and the physical conditions, the following three options should be considered:

1. **Make major improvements to CTR to improve operations and mitigate potential impacts to neighbors and build a new transfer station.**

   CRC can make several investments to CTR to enhance onsite conditions, reduce impacts to neighbors, and improve operating efficiencies. This would entail expanding the facility on the west side property. This would include a new scale complex, staging and parking for trailers /containers and expanding the transfer station building. These improvements would increase the facility's capacity to efficiently process the current volumes of waste received and mange future growth. CTR is located minutes from Waste Connections' truck yard and located convenient access to the highway system and to the population it serves.

2. **Make minimal improvements at CTR and build a new transfer station.**

   Under this option minimal improvements would be made at CTR targeted at remediating offsite queue issues and to enhance the facilities capacity to manage current waste flows. A fourth transfer station would be constructed within five years to serve the northern portion of the County. This site would receive waste and serve customers from Battle

Ground, Ridgefield, and LaCenter, areas of anticipated high growth. The new transfer station would be constructed to accept waste from self-haul customers and route trucks. It would be equipped with automated scales for route trucks and would be open a few days per week for self-haul customers. The facility would be designed to expand with future waste demands.

3. **Make minimal improvements at CTR and build a new transfer station to serve the central and northern portions of the County within five years.**

   Immediate improvements would be made to CTR to remedy the current offsite queue issues. Concurrently, a new facility would be sited, designed, and built to handle the County's expected tonnage volume growth, synchronized with the transportation network and compatible with its adjacent neighbors / properties. Once the new transfer station was complete the existing CTR would be closed.

4.2.8 – Summary of CTR Operations and Conditions Assessment

The CTR station was built in 1992 and was not designed to handle the current waste volume and traffic conditions. The demand for services has greatly increased, particularly in the past five years. CTR is centrally located, has been well-maintained, and is in relatively good condition. There are improvements that can be made to not only deal with the current off-site queue, but also to improve overall site circulation and enhance the material handling needs. Changes include expanding the transfer station building to provide space for unloading and floor storage. The additional areas would provide space for unloading construction and demolition (C&D) waste for processing that could divert this material from the landfill. Added space to handle green waste and wood could also contribute to higher material recovery. The key question to address is what level of investment should be made at CTR in conjunction with other regional service needs.

The options presented will be evaluated along with the feasibility of other improvements to upgrade the system in Chapter 5.

4.3 West Vancouver Materials Recovery Facility and Transfer Station Operations and Condition Assessment

4.3.1 – Introduction

West Van was the second of the three facilities put into service to receive MSW from commercial collection trucks and self-haul customers in 1993. The facility is owned and operated by CRC and serves the majority of the City of Vancouver and its' central business district. It is the oldest of the three transfer stations operating in the County.

This section provides a description of the facility and an assessment of both the operating and physical conditions. The results will be used to identify the necessary capital improvements that are needed to enhance immediate services as well as determine long term investments to satisfy longer term services for this area.

4.3.2 – West Vancouver Material Recovery Facility and Transfer Station (West Van)

West Van is located on a 21+ acre site off Old Lower River Road at the Port of Vancouver. The property includes a large 91,100 sq. ft Pre-Engineered Metal Building (PEMB) that receives waste

from both self-haul customers and WCW collection trucks servicing residential and commercial accounts. This is the original transfer station structure that was constructed in 1992. Garbage or MSW is loaded into containers and transferred to barges for transportation to the Finley Buttes Landfill in Oregon. There have been no major renovations or expansions to the facility.

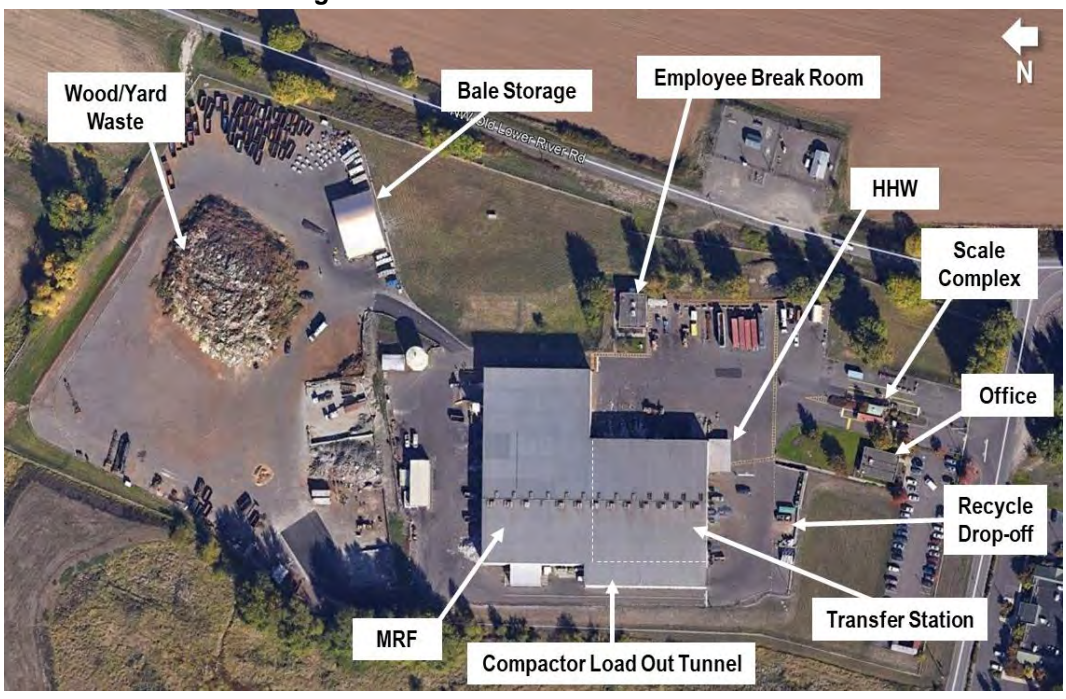
West Van also houses the equipment used to process commingled recyclable materials from residential customers and source separated materials from commercial accounts. This is the only material recovery facility operating in Clark County and was significantly updated in 2009 when the County switched to a cart-based collection system.

In addition to these primary functions West Van includes several other facilities necessary to provide the full range of services. This includes the following:

1. Scale house complex with in-bound / out bound scales
2. Recycle drop off for self-haul customers
3. Household hazardous waste drop-off
4. Wood waste / yard debris area
5. Special waste handling such tires/ appliances /asbestos
6. Waste oil / glass drop for collection trucks
7. Administration office
8. Employee break building

The West Van site map and the features are shown below in Figure 4.6.

Figure 4.6: Current West Van Site Plan



Over the 28 years of operation the West Van site has added various operations to handle yard debris and wood waste, HHW and special waste, however the primary structure and site circulation are primarily the same as originally designed.

4.3.3 – West Van Transfer Station Operating Conditions Assessment

4.3.3.1 – Waste Quantities

The West Van MRF and Transfer Station provides for a number of services to the County- wide system. In addition to receiving waste delivered by WCW residential and commercial collection trucks, self-haul, and private contractors the facility also is the primary recycling facility for the County. It accepts and processes commingled recyclable materials collected from residential routes and commercial accounts and it accepts wood waste and yard debris. This section of the report focuses on the operations for managing the MSW accepted at the facility. A discussion of the wood waste/yard debris and MRF operations will be discussed later in the report.

As shown in Table 4.7 below, for the four-year period between January 2016 and December 2019 the total amount of waste received at West Van has ranged from 97,791 tons per year to a high 110,866 tons per year a difference of 13%.

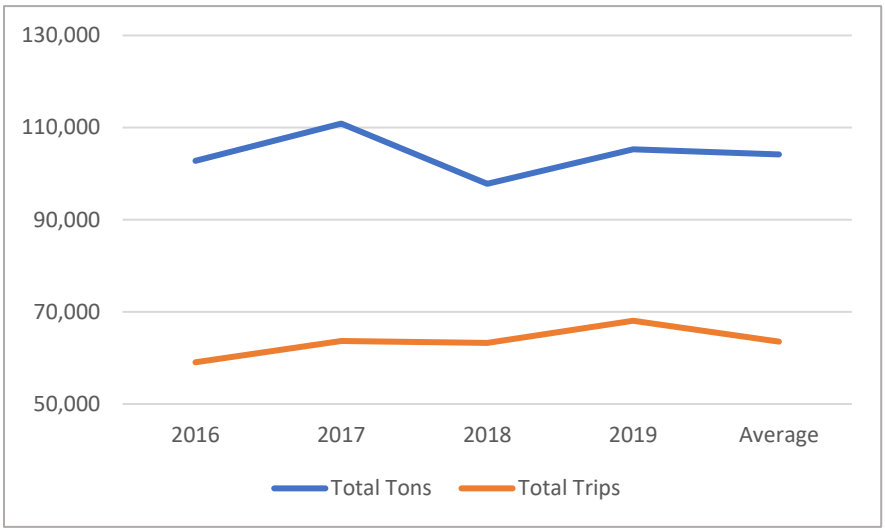
Table 4.7: West Van Tons and Trips

	Tons by Year					
	2016	**2017**	**2018**	***2019***	**4 - Year Ave.**	**% Average**
Cash / Self Haul	15,683	19,732	17,694	17,841	17,738	17%
Commercial	43,564	44,380	38,335	30,361	39,160	37.5%
Route Trucks	21,172	22,955	21,838	31,495	24,365	23.4%
Drop Box	22,379	23,798	19,925	25,602	22,926	22%
Total Tons	**102,797**	**110,866**	**97,791**	**105,299**	**104,188**	**100%**
	Trips by Year					
Cash / Self Haul	39,003	42,805	43,299	45,674	42,695	67.2%
Commercial	10,951	11,425	11,197	10,802	11,094	17.4%
Route Trucks	2,766	2,877	2,926	4,134	3,176	5%
Drop Box	6,340	6,569	5,809	7,465	6,546	10.3%
Total Trips	**59,060**	**63,676**	**63,231**	**68,075**	**63,511**	**100%**

However, over this this same period the -average waste received at the station is 104,188 tons and remains fairly constant as seen in Graph 4.5 on the next page.

During this same period, the average transaction or trips to the station has average 63,511 annually and has remained relatively constant.

Graph 4.5: West Van Historic Waste Quantities and Traffic



It has been reported by WCW that during the last part of 2019 the compactor at West Van was not operating at full capacity and was due to be replaced. Therefore, WCW re-directed some collection trucks to CTR to be unloaded until the new compactor was installed and operational in early 2020. In comparing the last five months of 2018 to that of 2019, it appears that about 1,000 tons per month or 50 tons per day were being re- routed. This would mean the commercial truck traffic may be 7 or 8 more vehicles per day. WCW is considering the current status to determine the diverted, most efficient collection and system operation.

Currently the transfer station receives on average 2,000 tons per week with improved compactor capacity in 2020 or about 380 tons per weekday and about 100 tons on a Saturday. In Chapter 2, projections were made as to how much waste might be generated in the Cities and the County. The City of Vancouver is projected to grow by about 21,000 people by 2035. This would translate to about 17,000 tons of additional waste annually. However, according to the County's Growth Management Plan (GMP) it appears much of this growth is projected to occur in the urban growth areas located in the north central part of the County. Depending on how much growth occurs in the West Van service area it is estimated the projected total amount of waste to be received at the transfer station could range from 9,000 tons to perhaps 22,000 tons annually when rounded. This would mean an expected increase of somewhere between 150 tons to 423 tons per week or worse case 85 tons per day. When added to the current waste quantities, West Van might expect to receive as much as 450 tons per weekday. Thus, the facility would need to be able to receive and load out perhaps 500 tons per day on peak days.

The West Van station is now equipped with a new compactor. Load times for the compactor are between 20 and 25 minutes. With each load being on average 30 tons. Therefore, the station can produce 16 loads over an 8-hour period or 480 tons. If the station were to operate 12 hours, it could process 720 tons. Based on these conditions, West Van can process the current and projected future waste quantities.

4.3.3.2 – West Van Traffic Conditions

The West Van facility was initially designed to accept the County's MSW and transfer the waste to containers that could be barged to the regional landfill (Finley Buttes). Unlike the other stations, West Van serves as the primary receiving facility for more waste streams including handling all of the recycled materials collected in the County. This results in more traffic from different sources that must cross the scales and travel within the site to unload. And, despite the fact that the City of Vancouver provides universal collection services to all residential and commercial customers there is a fair amount of self-haul and contractor traffic.

The total traffic at West Van includes a wide range of customers. Self-haul and cash customers include cars, vans, pickups, vehicles with trailers and independent contractors, are directed to unload on the south side of the transfer station. Some customers also use the HHW drop off site also on the south side. Only vehicles with wood and yard waste travel on the north side to access the organics receiving area on the far north side of the facility.

WCW's intercompany traffic includes MSW collection trucks from residential and commercial routes, residential collection trucks with commingled materials and yard waste, and drop box or roll off trucks from various sources. These vehicles primarily stay on the eastside of the station to unload in either the MSW bays or those bays dedicated for recycle trucks. Collection trucks with organics / food waste unloaded in Bay No. 1 next to the compactor under the roof. (See Figure 4.8 on page 60)

In reviewing the data for the past three years, during a peak week August 2018, West Van received 2,169 vehicles as shown in Table 4.8. Almost 68% or 1,465 weekly trips of this traffic was self-haul, cash, or government customers. The WCW intercompany traffic was 633 for this peak week. During these periods there can be almost 400 vehicle transactions processed in a single day.

Table 4.8: West Van Peak Weak Inbound Customers –August 27 – August 31, 2018

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Self-Haul MSW	177	139	115	137	185	202	955
Wood/Yard Waste	38	33	37	40	54	62	264
Other	31	49	39	36	37	54	246
Total Self-Haul/ Cash	**246**	**221**	**191**	**213**	**277**	**312**	**1,465**
WCW MSW & C/D	59	69	41	52	47	1	269
Wood/ Yard Waste	7	14	10	11	11	1	54
MRF / Recycle	63	61	67	64	50	5	310
Total Commercial	**129**	**144**	**118**	**127**	**108**	**7**	**633**
Total West Van	**388**	**384**	**323**	**352**	**397**	**325**	**2,169**

The following provides an assessment of the West Van facility and the types of traffic that CRC manages each day. The purpose is to review the functional operation and determine if current infrastructure is sufficient to support efficient operations. The focus is not on how CRC is operating the facility or whether facilities might need to be retrofitted and/or expanded. CRC has an excellent record of operating the facility safely to meet the needs of the regional system.

4.3.3.3 – Self Haul /Cash Customers

On an average weekday the station receives between 180 to perhaps 230 self-haul vehicles per day. A typical week is displayed in Table 4.9. On the typical Saturday, the self-haul customer traffic is about 270 to 280 vehicles.

Table 4.9: West Van Average Weekly Inbound Customers

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
Self-Haul	229	189	181	180	204	281	1,264

During the peak week in August 2018 the weekday traffic averaged 230 vehicles but was as high as 297 vehicles on a Friday. The peak hour on a Saturday was 312 vehicles as shown on Table 4.10. Over 80% of self-haul traffic represent cars, vans, pickups, and vehicles with trailers. It also includes some other cash customers or perhaps small contractors, or government loads.

Table 4.10: West Van Peak Week – August 27 to August 31, 2018

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
Self-Haul	246	226	191	213	277	312	1,465

These vehicles are weighed and upon leaving the scale are directed by signs to turn left to unload on the south side of the transfer station building. Bays 1 through 5 on the south side of the building are allocated for self-haul and cash customers to unload. Assuming two (2) vehicles can occupy one bay, the facility on weekdays, can unload 10 vehicles at any one time. Assuming an average time to unload is 10 minutes each stall can unload 6 vehicles per hour. Therefore, the total capacity for unloading self-haul or cash customers is 60 vehicles per hour during the week.

As shown on the following table 4.11 on an average weekday the station receives anywhere between 30 to as much 40 vehicles in any one hour (highlighted in yellow in Table 4.11). Given the number of unloading stalls available on the south side the station can effectively manage the self-haul and waste stream.

Table 4.11: West Van Average Inbound Traffic by Hour (highest hour(s) are highlighted)

Time of Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
5:00 AM	3	3	3	3	3		13
6:00 AM	15	13	13	14	12		68
7:00 AM	17	16	15	15	15	2	82
8:00 AM	24	22	21	22	22	22	133
9:00 AM	30	27	29	28	31	26	171
10:00 AM	36	34	34	33	36	35	208
11:00 AM	39	39	38	38	40	42	237
12:00 AM	40	36	37	37	39	42	233
1:00 PM	40	40	37	36	40	43	237
2:00 PM	41	37	35	36	37	43	230
3:00 PM	34	35	32	34	34	40	210
4:00 PM	25	24	25	22	25	1	123
5:00 PM	12	11	11	10	11		54
6:00 PM							1
Total:	**356**	**337**	**330**	**328**	**345**	**296**	**2,000**

The station also has 6 bays, each 22-foot-wide for unloading commercial vehicles on the east side of the building. On weekends when there are limited commercial trucks to unload, self-haul traffic can be directed to use one or more of these bays to unload. If the station receives 320 vehicles on a Saturday and they arrive over a 5-hour period, the peak hourly events would be 64 vehicles per hour. Using the 5 bays on the south side and dedicating just 2 bays on the east side would increase the capacity of the station to handle as many as 84 vehicles per hour. (60 on the south plus 24 on the east side)

The remaining self-haul /cash customers, about 20% or 40 vehicles per weekday do travel along the east side of the transfer station building to the far north side to unload wood and yard waste. CRC directs these customers to unload in designated areas but there is adequate space to accommodate this traffic.

Inside the transfer station there is more than sufficient space to handle all of the waste unloaded and have surge capacity for 200 tons or more. Typically, West Van receives about 150 tons per day from self-haul and cash customers.

4.3.3.4 – Commercial / WCW Traffic

The commercial or what is referred to as WCW intercompany traffic averages between 120 to 130 vehicles per day (See Table 4.11). This traffic is divided into three primary collection services. Commercial trucks collecting waste from residences and businesses represents 42% or about 53 vehicles per day. Trucks collecting commingled recyclable materials from residences and from commercial accounts is almost 50% or 62 vehicles per day. Yard waste collected from residences and businesses every other week represents about 11 vehicles per day. However, the yard waste

truck traffic will drop off slightly during winter months when there is less yard waste generated by residences in the City of Vancouver.

All the commercial trucks with waste will travel to the east side of the transfer station and will unload in bays 6-9 each with 22-foot-wide doors. There could be as many as 10 to 12 trucks per hour in peak times that need to unload. Assuming a typical commercial truck unloads in 7 minutes one stall can handle about 8 vehicles in one hour. There are 4 bays that could if needed handle 2 trucks, but it is preferable to allow more space for commercial trucks to unload. However, the 4 bays can easily handle about 48 vehicles in a peak hour.

The recycle trucks are directed to unload in either bay 10 or 11. Whereas there are more recycle trucks arriving each day they tend to be more spread out over the 8-hour collection period. Assuming worse case perhaps 15 trucks could arrive to unload in a single hour. Each bay can manage 7 to 8 trucks per hour. Thus, at times there may be a short wait to unload but this would appear be infrequent. And, because some of these trucks are collecting source separated recyclable materials such mixed paper or OCC, these trucks are directed to unload on the north side of the MRF building. Glass is collected separately and is unloaded in a bay located in the west side.

In the MRF section of this report there is more discussion of the MRF space and operations. However, from the standpoint of having stalls to unload the current West Van station provided sufficient space.

As with the rest of Clark County, Vancouver has had a subscription curbside yard debris program service provided since 1995. Segregated yard debris has generally been delivered to a local processor such as H & H or McFarlane's. However, in April 2019 the City of Vancouver initiated a new 10-year agreement with WCW to incorporate food scraps into the subscription yard debris program available to city residents (effective September 30, 2019). The program rebranded as *Organics Collection*, was modified to provide customers with options for container sizes, the availability of on-call service and access to commercial generators.

One key change to the program requires that the organic material (yard debris with food scraps) be received inside the West Van Transfer Station (in Bay 1) where it is reloaded and transferred daily for processing at the Dirt Hugger facility located in Dallesport, WA. WCW has a contract with Dirt Hugger to manage the Vancouver organics through 2030. This material must be handled in an enclosed facility versus being received either at one of the local processors or unloaded on the north side of the West Van facility. The West Van operating permit allows for the current volume of combined Vancouver yard debris and food waste and for some source separated food waste delivered from schools or certain commercial restaurant/grocery locations.

There is potential in the next 2 to 5 years for other city or County curbside yard debris programs to add food scraps as an option and for increased participation by businesses/schools in separating their food wastes. Bay 1 can handle the current volume of materials but with expansion of the program in the City and perhaps to other parts of the County will require some expansion or reconfiguration of the capability/capacity at West Van to manage this material.

4.3.3.5 – Scale House Operations

West Van is open to receive waste six days per week and is closed on Sunday. During the week, the hours of operations are from 6:00 AM to 6:00 PM. On Saturdays, the station is open from 8:00

AM to 4:00 PM. All vehicles enter the facility by taking a left turn from NW Old Lower River Road onto a private access drive. The driveway into the West Van station is located less than 200 feet from NW Old Lower River Road which has limited public traffic and only serves a few residences and farms. Upon entering the transfer station, the scale house complex includes one inbound and one out bound scale (See Figure 4.7). There is also a bypass lane on each side of the scale house. The scale house complex is located just 100 feet from the private access road. Therefore, the total onsite queue is less than 100 feet. The inbound bypass lane does have a small booth that can be occupied to handle traffic that may not need to be weighed if such customers using the recycle drop off or HHW facility.

Figure 4.7: Entrance and Scale house Complex

It is assumed that transaction time to process customers is similar to the CTR or 45 seconds per cash customer. Therefore, the scale can process 1.33 customers per minute or 80 vehicles per hour. West Van only has one inbound scale therefore, both commercial collection trucks and self-haul cash customers must both use the scale. The difference is that commercial trucks have registered tare weights and with the RFID code can be processed in less than 15 seconds.

The data shows that inbound cash customers can be processed at 80 vehicles per hour. Yet on an average weekday the traffic can be 40 vehicle per hour using about 30 minutes of weigh in time. Over the remaining 30 minutes the scale can process over 100 commercial trucks in that same hour if there are perhaps 30 commercial trucks in a peak hour, then the scale would manage the traffic without major delays or long queues.

With less than 100 feet of onsite queue space the facility can support maybe 4 to 6 self-haul vehicles in queue but only 3 commercial trucks. Traffic may spill onto the private access road with minimal disruption to other traffic. This space would more or less double the queue space before spilling onto NW Old Lower River Road.

It was reported by the WCW Engineer on March 24, that when the scales are being calibrated or malfunction there could be short delays that can cause some vehicles to queue onto the private

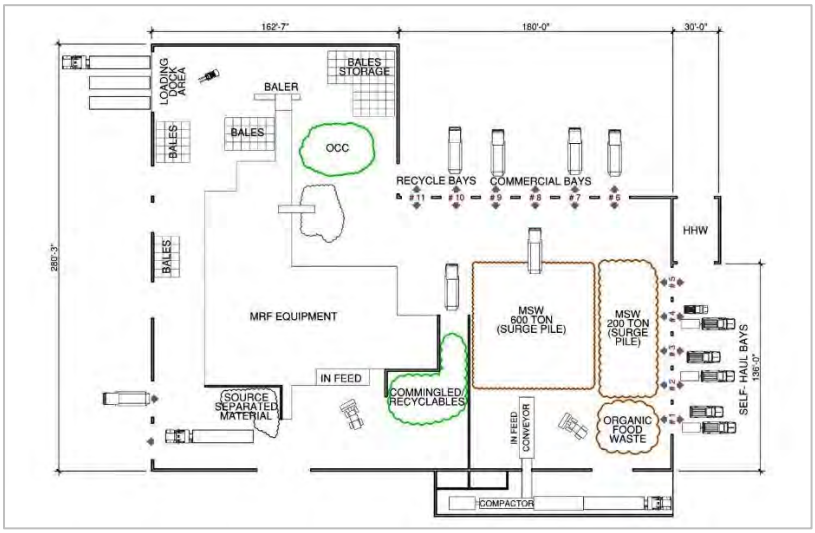
road. Also, there are times when traffic is heavy due to delays at the scales from large trucks maneuvering to unload. These events are very infrequent.

For the near-term conditions, the scale house complex has the capacity to manage the inbound and out bound traffic without causing a queue onto the public right of way. In the future, increased traffic may cause off site queueing, requiring installation of a second inbound scale.

4.3.3.6 – Site Circulation and Tip Floor Operations

As discussed under the onsite traffic conditions the transfer station has 11, 22-foot bays that provide sufficient unloading stalls for both the self-haul and the commercial collection trucks. Figure 4.8 shows tip floor space plan for the transfer station and MRF which is described in the following the paragraphs. Also important is how traffic is managed on site once loads have been weighed and ticketed.

Figure 4.8: West Van- Tip Floor Plan



For all self-haul/cash customers, as well as the drop off recycle and HHW drop off traffic, upon leaving the scale will enter the yard and approach a sign that directs them to turn left. From there customers travel in a dedicated lane where vehicles with recyclable materials can splinter off to use the drop off area on the far south side of the complex. Self-haul customers with waste can proceed and are directed to unload in Bays numbered 2 through 5 on the south side of the building. There is adequate space to allow each vehicle to align with a stall in any bay and back in and unload. Once they are empty self-haul can drive back to the entrance to scale out. On weekdays they must merge with the outbound commercial traffic at this point. However, most of the commercial traffic does not have to scale out as they have registered tare weights.

Bay 1 was previously used for self-haul customers to unload but is now used to received food waste form select commercial loads. In September, the City of Vancouver allowed residences to place food scraps in with their yard waste. These loads must also be unloaded inside the transfer station in Bay 1.

Vehicles that use the recycle drop off can and do not have waste can make a u-turn and exit the facility and do not need to weigh out. When the HHW is open customers will follow this route and are able to exit without being weighed out.

Once commercial trucks are weighed, they will proceed to use Bays 6-11 on the east side. This includes collection trucks with recycled materials that will use Bays 10 or 11. Some commercial trucks collect source separated recyclables and they will unload on the in a separate area on north side of the building.

Trucks with yard debris and wood waste will travel to the far north side of the facility on a dedicated road to unload in the back side or far north yard. These materials are stored in a pile(s) and is routinely processed and hauled offsite to be used as hog fuel.

The total onsite traffic can range from 350 to 400 vehicle trips each day. About half of the traffic is self-haul or independent contractor while the half is WCW vehicles. Once leaving the scale complex the facility provides for other separate traffic patterns for these different operations which allows for safe and efficient vehicle circulation. The only intersection where traffic must mingle is upon leaving the site. However, the site lines are very good and with signage or with spotters when needed this traffic is easily managed.

The only travel lane shared by self-haul and commercial trucks is the route to unload at the wood/yard waste yard on the north side of the site. However, this traffic is well managed by spotters and signs.

Regarding tip floor space and ability of the building to handle the daily waste flow the transfer station has sufficient capacity. On the self-haul side there are adequate unloading stalls with space to handle 200 tons or more of surge capacity. On average self-haul and cash customers will unload about 150 tons per day. On Saturdays, the tonnage is less and averages about 120 tons.

On the commercial side WCW trucks will unload between 300 and 400 tons per day. This will vary depending on the amount of drop box traffic. Based on the available space the surge capacity on the tip floor is at least 600 tons. This includes allowing space for trucks to unload, and for front loaders to operate and load the compactor. Because the tip floor provides for self-haul and commercial trucks to unload in separate areas there is little or no conflicts for operators to move materials.

All MSW is pushed by front loaders onto an in-ground conveyor that discharges into a single compactor to load containers. The containers are then transported to the barge dock less than a half mile from the station. This is a new compactor and has operational life expectancy of 10 to 15 years assuming regular maintenance is performed.

4.3.3.7 – Yard Waste and Organics

A primary element of the regional system is having the infrastructure to manage wood and yard debris. The West Van station provides a dedicated area in the far north side of the facility. This area represents about 3.5 acres of open space that is paved. About 1.5 acres is used for customers and commercial trucks to unload wood and yard waste. On a regular basis CRC's contractor will arrive on site to grind wood and some clean ward waste to be used as hog fuel. Yard waste is ground up and sent off site to be composted. This operation is a key component of the County recycling services. The remaining paved area in the north side is used to store drop box containers and other equipment. A temporary tent structure is also used as supplemental storage of recycled bales produced at the MRF. These operations are for the most part isolated from daily traffic.

There are collection routes that pick-up food waste' some customers that discard food waste with yard waste. These trucks must unload in Bay 1 where commercial food waste loads are received. Currently, there are 10 to 20 tons per day of commercial food waste unloads each day. The space required to handle this amount of food waste is limited and CRC can store these materials until the time they can be loaded in a trailer for transport to Dirt Huggers for composting. There are no compost sites in Clark County that can accept food waste. However, the City has now started a program whereby residents can place food waste in with yard waste. This service is on a subscription basis and therefore does not generate much material to date. For example, the City generates about 1,200 tons of yard waste per month or about 60 tons per day. If 50% of residences participate in the food scraps plus yard waste program, the number of organics to be received in Bay 1 would increase from 20 tons per day to perhaps as much as 80 to 100 tons. This material must be received and reloaded for processing offsite and more space will be needed. Additionally, this program yard waste plus food scraps programs is expected to extend to other jurisdictions and may eventually be offered County wide. Therefore, the transfer station system must provide adequate space to receive and manage this material in a covered area.

4.3.4 – Review of West Van Conditions Assessment

Our limited structural and site improvement conditions assessment reveals that most of the assets at the site are in good condition. Areas of pavement are in fair condition.

- The transfer station and MRF process building are both in **fair** condition. Many columns in the public unloading and commercial unloading areas were damaged. The column damages are considered structural in nature and should be repaired. A schedule should be prepared to have these repaired within the next 12 months. Siding near the public and commercial unloading bays is damaged. The damage is not structural in nature and is not critical. However, the damaged siding should be repaired to prevent any potential corrosion problems due to moisture penetration.
- The scale house and scales, recycling shelter, pump house, and used oil storage facility are in **good** overall condition. No short-term action is needed.
- The administrative building, employee facility, and maintenance building are in **fair** overall condition. No short-term action is needed.
- The upper yard and lower yard areas are paved with asphalt concrete pavement. In general, the paving is in **fair** condition except for in heavy traffic areas, which are in **poor** condition. We recommend the worn surface areas be repaired or replaced to prevent extensive damage to subgrade.
- The stormwater facilities are in overall **good** condition. No short-term action is needed.
- There is no sanitary sewer serving this facility. Offices and conditions spaces are serviced by a septic system. Drainage and washdown water in the transfer station and MRF is collected in sumps and pumped to a storage tank. When tanks are full, wastewater is transported to the Wastewater Treatment Plant.

Our structural and civil conditions assessments were limited to those areas that are readily accessible and visible to field staff. Concealed conditions that become exposed in the future may change our current recommendations.

4.3.5 – Summary of West Van Transfer Station Operations

The West Van Transfer Station was the second facility built to begin receiving waste and reloading it into containers for transportation to the Finley Buttes Regional Landfill. Considering the 28 years operational wear and tear it is good condition. The layout of the buildings and support structures are situated in a manner to accommodate the ever-changing needs of the solid waste system. CRC has been able to adapt the facility to address these needs while preserving the safety and operational efficiencies inherent in the original design.

Given the site is located on 21+ acres, West Van provides a valuable asset for managing various waste streams, recycled materials, and organics. There are no immediate improvements required to enhance current transfer operations. In the future with added traffic there may be a need to increase capacity at the scale house by adding a second inbound scale or a dedicated scale for commercial collection trucks. This is something that can be monitored and there is adequate space to increase the capacity.

Physical improvements that have been identified in the “Conditions Assessment” report will need to be planned for in the six-year capital improvement plans.

One consideration would be to consider developing a long-term master site plan. This plan would be prepared in conjunction with the evaluation of the infrastructural needs identified from updating the long-term Solid Waste Management Plan. A few examples of this are as follows:

1. One system option may be to construct a new MRF to be located in a central location to both collection routes and provide transportation access to regional markets.

2. If the MRF is relocated it will free up a large building that could be repurposed for other service needs. One concept could be to provide a construction / demolition recycling facility.

3. Bay 1 has limited space and therefore additional space inside the transfer station will be needed to receive mixed organics (i.e., food waste and yard waste with food scraps) as these programs are expanded. There may be space available assuming the MRF processing equipment is relocated. Another option would be to construct a separate receiving building that can receive and process materials to be transported offsite. The operation could also be co-located with the yard waste grinding operation.

A master plan can be prepared to consider how these facilities can be implemented with the caveat they may not be built.

4.3.6 – West Van Recycling (Materials Recovery Facility /MRF) Conditions Assessment

Providing recycling services to residences and business is a primary responsibility of cities and the County. All the contracted recycled materials collected in the County are processed at the West Van MRF. A detailed review of the MRF equipment system was conducted by the consultant team. This report is included in Appendix E. This section provides a brief summary of this report and presents the findings.

The initial recycling processing equipment was installed in 1992. This equipment line was a basic straight-line system with presorting stations, screens, and a series of manual sorting stations to remove recyclables. The process line was significantly upgraded in 2009 with more advanced screening systems, additional sort stations, and other unit processes to improve throughput and product quality.

The current MRF system processes about 60,000 tons annually. As shown in Table 4.12 almost 70% of the material processed is commingled single stream materials collected from residential customers. Commercial customers that largely generate source separated materials represents about 26% with the remaining materials being generated by self-haul customers at recycle drop off sites.

Table 4.12: West Van Total Inbound Recycle Tons by Source

Recycle Stream	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
Commercial Recycling	3,052	3,134	3,166	3,359	3,108	251	16,069
Residential Commingled Single Stream w/o glass	8,246	7,917	8,305	7,941	7,791	711	40,911
Cardboard (WCI and Self Haul)	378	384	576	765	346	36	2,484
Total Inbound Recycling Tons	11,675	11,435	12,046	12,064	11,245	998	59,464

Table 4.13 below, shows the typical amount of materials received at the MRF each day. The amount of recycled materials is fairly constant during the weekdays and averages about 230 tons per day.

Table 4.13: West Van Average Weekly Inbound Tons

Recycle Stream	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
Commercial Recycling	59	60	61	65	60	5	309
Residential Commingle	159	152	160	153	150	14	787
Cardboard (WCW and Self Haul)	7	7	11	15	7	1	48
Total Inbound Recycling Tons	225	219	232	233	217	20	1,144

Based on current collection information more than 85% of households in the Cities and Urban Growth Boundary areas do subscribe to recycling collection services. Having this much

participation in the system signals that any increase in the quantities will largely be generated by increase in households or potentially with new programs to collect more recyclables from either multi-family and/or commercial customers.

The average daily traffic for vehicles unloading at the MRF is shown in Table 4.14.

Table 4.14: West Van Average Weekly Inbound Traffic

Recycle Stream	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
Commercial Recycling	13	13	13	14	13	1	67
Residential Single Stream Commingle	42	44	47	44	41	3	221
Cardboard (WCW and Self Haul)	6	4	6	6	4	1	27
Total Inbound Recycle Trucks	**61**	**61**	**66**	**64**	**58**	**5**	**315**

As discussed in the previous section, most of the residential curbside collection trucks will unload in Bays 10 and 11 on the east side of the transfer station. Commercial trucks that collect source separated materials such as cardboard from businesses will unload on the north side as these materials do not need to be processed over the full processing system. This stream of material is graded upon arrival and separated into two groups. Group 1 requires partial system processing on a second shift. Group 2 requires only floor sort quality control. This group of materials, after limited QC efforts, are conveyed directly to the balers to be processed.

4.3.7 – Summary of MRF Operations and Space Requirements

Over the past 20 years, CRC has adapted the equipment needed to process the recycled materials with the existing physical structures and available space to manage these materials as needed. In reviewing the daily operations there is adequate space to receive the materials and to store them for processing. The tip floor space allocated is not ideal for unloading but CRC has created dedicated areas to avoid contamination with MSW stored in Bays 6-9. Also, they have created areas where source separated materials can be unloaded in locations to provide access to the conveyors to feed balers directly.

The current processing system that was installed in 2009 was configured to fit with the structures without major expansions. As such the conveyor system includes a number of 90 degree turns that are less than ideal when processing recyclable materials. Because of this configuration, there are obvious material flow issues that challenge yield opportunities for downstream sorters and creates more opportunities for spillage that can increase maintenance and some losses of material at conveyor transitions. These conditions are a result of the equipment being designed

to fit the space provided and as acknowledged in the Condition Assessment, CRC does a good job in keeping this system operating with an up-time performance level of over 90%.

The MRF residential single stream (excluding glass) processing system is currently operating at a throughput rate of between 18 to 20 tons per run hour. The original design through-put of the system was higher perhaps as much 30 tons per run hour. The reduction in original equipment manufacturer (OEM) run rates is due to the dramatic change in quality standards related to all paper products. This has forced the operating team to reduce the system run rate by 30% similar to many MRF's in the country that operate with equipment installed during this same period. Thus, to process the current inbound recycling streams the plant is operating between 13-16 hours per day or two shifts. Shift 1 processes residential single stream (3,410 per month) at 20 tph in 8 hours over an average of 22 days per month. During shift 1, any commercial direct bale materials received are processed in real time. Shift 2 processes the Commercial stream that requires partial system processing and completes baling of "direct bale" materials (like cardboard). Each shift is 8 hours with one hour for breaks. The process time does allow for process interruptions typical in recycling process systems.

Since this system was installed there have been significant advances in equipment for processing recycled materials. Also, over the past three years there have been significant disruptions to the markets due to the China Sword and general export market contractions. These market conditions have forced many MRF operators to consider retrofits to modernize their systems. These demands are occurring at the same time they are experiencing disruptions in the marketplace. And, because China has stopped purchasing many materials, there is an oversupply in the US market driving prices down. As an example, the average blended value for recycled commodities was peaking at about $160 to as much as $180 per ton in 2015. Now the average blended value can range from $20 to $50 per ton depending on proximity to markets.

The conditions assessment provided a report to CRC that details several suggested improvements mostly related to adding certain equipment to enhance the process line flow and yield/recovery capabilities. However, longer term it will be necessary to purchase a new system that will result in decreased labor per ton, increase throughput per hour, and improve quality and quantity of materials recovered. In the short-term, modest equipment and sorter process investments can be made that will derive immediate improvements to operational results. This equipment and sorter processes can later be incorporated into the new processing system design.

4.3.8 – Recommendations from the Operations MRF and Conditions Assessment Report

1. Expand floor grading practices. Reduce processing materials over entire system.
2. Improve color coding / sorting signs to increase sorter awareness of priority sorts.
3. Potential Equipment Improvements:

   a. *Add optical sorters on plastics line to increase yield and decrease residue.*

   b. Install robotics to select locations to improve quality and reduce labor.

   c. Replace vibratory screens with ballistics screens to improve material flow and related recovery.

d. Enhance eddy current separator

e. Install large drum feeder to reduce surging and improve material flow and related recovery.

f. Add paper optical sorter to increase paper quality and decrease labor cost per ton.

As stated in the report there are several immediate benefits that could be realized with these improvements These include:

1. Increase throughput / production by 5 to 10 tons per hour. This increase in throughput will help reduce overall cost but also increase plant capacity. A normal plant requires 6-8,000 tons to be cost effective and tipping fee friendly.

2. Reduce the sorting labor cost associated with the current system. By introducing optical sorting along with robotics at certain locations fewer sorters are needed thus reducing cost. Both optical and robotic sorting typically increases sorting rates on average by 30 to 50% per position.

3. Enhance quality of the commodities i.e. producing bales with less contamination and generating higher valuations. CRC is producing clean bales and are successful in marketing all materials. But there is lost opportunity to compete in high grade markets that require better than current state quality. Thus, the ability to produce premium high-quality bales should help this MRF stay in the forefront of market opportunities.

The full MRF Conditions Assessment is provided in Appendix E.

4.4 Washougal Transfer Station Operations and Conditions Assessment

4.4.1 – Background

The Washougal Transfer Station serves the eastern portion of Clark County, including the cities of Camas and Washougal. This section provides a description of the facility and an assessment of both the operating and site conditions. The results will be used to identify any necessary capital improvements that are needed to enhance immediate services as well as determine long-term investments to satisfy longer term services for this area.

4.4.2 – Washougal Transfer Station Description

The Washougal Transfer Station began operations in 2009. The facility is located on a 4.6-acre site in the Port of Washougal. Customers enter from Grant Street to a scale house complex that includes one inbound scale and one outbound scale. Each customer must be weighed, and fees are assessed based on total waste disposed. It includes a 75-by-60-foot transfer station building (4,500 sq. ft) with a depressed tunnel for loading transfer trucks and trailers. The station operates as a lift-and-load, meaning the bottom of the tunnel is only 8 feet below the tipping floor. Therefore, a front loader is used to lift waste about 9 feet to load trailers.

The transfer station has three 22-foot-wide access doors where self-haul vehicles can back in and unload. This design allows for up to six (6) vehicles to unload at one time. The layout of the facility is shown in Figure 4.9.

Figure 4.9: Current Washougal Site Plan

On the south side of the station, a 22-foot roll-up door allows access for commercial collection trucks to back in and unload onto the tipping floor.

The facility is open six days per week (Monday – Saturdays) for commercial collection trucks from 7 a.m. to 5 p.m. The transfer station is open to the public and self-haul traffic on Wednesdays and Fridays from 7 a.m. to 5 p.m., and Saturdays from 8 a.m. to 4 p.m.

The facility also provides a recycling drop-off center where customers can bring commingled and source-separated materials to be recycled. The drop-off center is open to the public Monday through Friday 7 a.m. to 5 p.m. and Saturdays from 8 a.m. to 4 p.m. Customers can drop off household hazardous waste (HHW) every third Saturday of the month from 8 a.m. to 4 p.m.

4.4.3 – Washougal Operating Conditions Assessment

The assessment of the transfer station operations was made on Wednesday, February 12, 2020. The site visit included a meeting with the site manager and review of current conditions. This operations review focused on how the site manages traffic and waste handling and loading under the present conditions. The assessment will consider how the current facilities can manage future waste volumes and traffic to service the eastern portion of the County.

During this same visit, a physical condition assessment was made by structural and civil engineers. A full report of the physical site conditions is presented in Appendix D.

4.4.3.1 – Washougal Waste Quantities

Over the past three years, the amount of waste received at the transfer station increased about 10% from 25,468 tons in 2017 to 27,784 tons in 2018. In 2019 the facility received 32,031 tons or

a 16% increase from 2018. This increase can be attributed to growth but also an increase in self haul customers. The majority of waste is received on weekdays from commercial waste haulers. This includes the City of Camas, who is responsible for collecting waste in the City and from WCW, who collects waste from the City of Washougal and the unincorporated portions of eastern Clark County.

The facility is open to receive waste from self-haul customers three days per week (Wednesday, Friday, and Saturday). The station is not open on Sunday.

Tables 4.15 and 4.16 (on the next page) show the amount of waste delivered by different service providers and self-haul customers in 2018 and 2019, respectively.

Table 4.15: Washougal Transfer Station Annual Inbound Tons 2018

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
Self-Haul /Cash Customers	0.15	3.90	1,940.10	10.81	650.04	2,184.32	4,789.32
City of Camas	1,098.68	1,565.37	1,976.82	1,366.80	1,414.54	0.93	7,423.14
WCW	4,654.02	3,223.36	4,179.98	3,156.34	4,339.81	91.35	19,644.86
Recycling	3.17	5.80	17.72	8.84	2.56	6.50	44.59
Other	0.07		21.61		5.22		26.90
Total Tons	**5,756.09**	**4,798.43**	**8,136.23**	**4,542.79**	**6,412.17**	**2,283.10**	**31,928.81**

Table 4.16: Washougal Transfer Station Annual Inbound Tons 2019 (January–July–31 weeks)

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
Self-Haul /Cash Customer	0.88	11.81	1,276.67	17.59	664.13	1,325.14	3,296.22
City of Camas	763.00	856.52	1,054.26	837.86	874.29	0.56	4,386.49
WCW	2,517.25	1,618.36	2,202.29	1,738.96	2,488.90	15.98	10,581.74
Recycle				5.78	3.22	1.59	10.59
Other			103.30		33.86	0.07	137.23
Total (31 weeks)	3,281.13	2,486.69	4,636.52	2,600.19	4,064.40	1,343.34	18,412.27
Estimated 2019 Total	**5,503.8**	**4,171.2**	**7,534.3**	**4,361.6**	**6,817.7**	**2,253.3**	**30,885.1**

From 2018 to the seven months of 2019, there is an increase in waste delivered by self-haul, from 15% to 18%. The City of Camas increased slightly, by 1%, from 23% to 24%. The waste collected by WCW in the City of Washougal and the incorporated County decreased from 62% to 58%. However, total waste has not increased.

Considering the same time frame the data (shown in Table 4.17 below and Table 4.18 show the average daily waste volume delivered can vary from as low as 80 tons per day (TPD) to as much as 155 TPD. The peak waste volume is delivered on Wednesdays, one of three days per week that the transfer station is open to self-haul customers.

Table 4.17: Average Daily Inbound Tons 2018

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Self-Haul/Cash	0	0	37	0	13	42
City of Camas	21	30	38	26	27	0
WCW	88	62	80	61	83	2
Recycle	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total Tons	**109**	**92**	**155**	**87**	**123**	**44**

Table 4.18: Average Daily Inbound Tons 2019

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Self-Haul	0	0	40	1	21	43
City of Camas	25	28	33	27	28	0
WCW	81	52	69	56	80	1
Recycle	0	0	0	0	0	0
Other	0	0	3	0	1	0
Total tons	**106**	**80**	**145**	**84**	**130**	**44**

The lowest volume of waste received is 44 tons on Saturdays, when only a few commercial collection trucks are operating. This represents about 7% of the 600 tons total waste received during a typical week.

4.4.3.2 – Waste Projections

The population of the cities of Camas and Washougal is projected to increase from 39,790 to 56,445, an increase of almost 17,000 people, by 2035. The amount of growth in the unincorporated areas in the eastern part of the County is more difficult to project. Based on assumptions made in the waste projections it is estimated that 11,000 more people could live in the unincorporated portions of eastern Clark County. In total, 28,000 additional people are projected to be served by the Washougal Transfer Station.

With this growth, the increase in waste will be about 23,000 tons per year (TPY). When added to the current waste volume of 32,000 TPY, the projected total waste is estimated to be about 55,000 TPY. This estimate suggests the amount of waste received at the Washougal Transfer Station will increase to about 1,060 tons per week. With only 7% delivered on Saturdays, the weekday volume could be between 970 tons to perhaps 1,000 tons. Although weekday volumes could average 200 TPD, if Wednesdays remain open to self-haul, the amount of waste received on that day could be as much as 250 tons.

4.4.4 – Circulation and Traffic Conditions

The overall circulation of customer traffic is in a counterclockwise direction, which is the most desirable. All customers enter through a single access point and are weighed on a single scale. Commercial collection trucks from the City of Camas and WCW can back in the large door on the south side of the station to unload. On Mondays, Tuesdays, and Thursdays, when there are no self-haul customers, these collection trucks can also use the doors on the west side of the station. After unloading, collection trucks that have an established tare weight can exit without crossing the outbound scale.

On days when self-haul customers use the station, they enter through the same gate and weigh in. They can then proceed to one of three open doors, each of which has two stalls to unload waste. After unloading, vehicles return to the outbound scale to determine the fee.

This circulation provides some separation of self-haul customers and commercial to unload, but they must intersect upon entering and leaving the site.

Some self-haul customers will bring in special waste, such as appliances, bulky items, or tires. These are unloaded and stored under a canopy on the north side of the transfer station building. These customers must then maneuver past the traffic waiting to unload at the transfer station to return to the outbound lane at the scale complex.

4.4.4.1 – Traffic Volumes

Waste is received at the transfer station six days per week, but self-haul customers only deliver waste on Wednesdays, Fridays, and Saturdays. In 2018, 26,507 trips were made to the station, with 77% of those trips made by self-haul customers. As shown in Table 4.19 on the next page, most trips are made on Saturdays and Wednesdays; far fewer are made on Fridays.

Table 4.19: Washougal Transfer Station Annual Traffic, 2018

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Self-Haul/ Cash Customers	2	3	7,468	9	2,197	10,819	20,494
City of Camas	171	230	264	196	202	7	1,070
WCW	1,016	885	919	911	1,147	11	4,889
Recycle	1	2	6	3	1	18	31
Other	1		13		5		19
Total Traffic	**1,191**	**1,120**	**8,670**	**1,119**	**3,552**	**10,855**	**26,507**

Peak traffic weeks from August 2018 and July 2019 are shown in Tables 4.20 and 4.21. They show that peak traffic customers decreased from 208 to 244 on Saturdays. Traffic on both Wednesdays and Fridays also decreased.

Table 4.20: Washougal Peak Traffic Week, August 2018

Customer Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Self-Haul/Cash Customers	0	1	197	0	108	244
City of Camas	5	4	4	4	4	0
WCW	21	17	18	15	22	0
Total Traffic	**26**	**22**	**219**	**19**	**134**	**244**

Table 4.21: Washougal Peak Traffic Week, July 2019

Customer type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Self-Haul / Cash Customers	0	0	144	0	42	208
City of Camas	3	4	5	4	4	0
WCW	19	17	18	18	22	0
Total Traffic	**22**	**21**	**167**	**22**	**68**	**208**

Table 4.22 on the next page, shows average hourly self-haul traffic over the three-year period from 2017 to 2019. As shown, the transfer station was open for self-haul customers for only two days, Wednesdays, and Saturdays, in 2017. The station opened for self-haul on Fridays beginning in 2018. Although the total number of self-haul trips has increased slightly over this period by adding an extra day, the peak hourly traffic of about 30 vehicles has remained relatively constant.

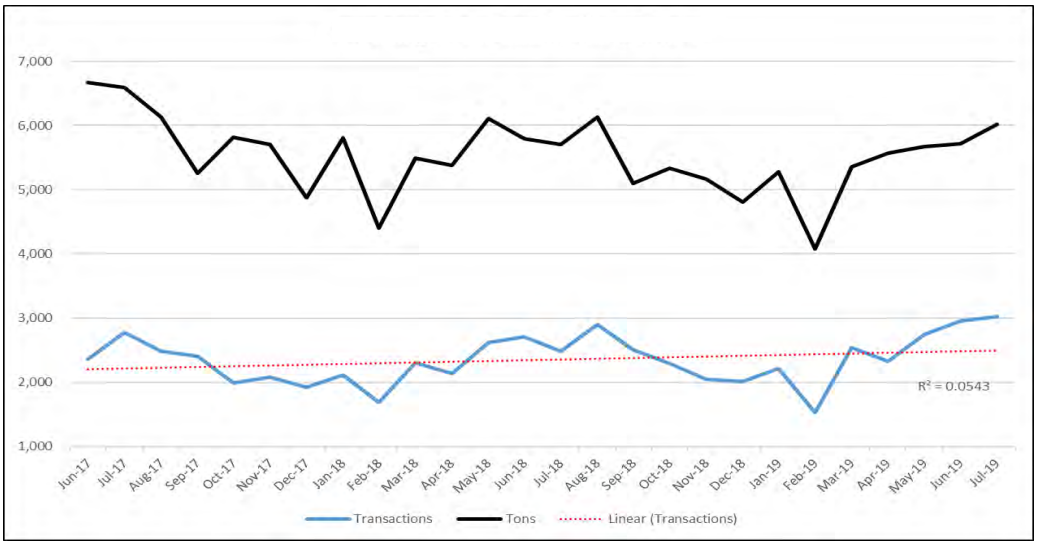
Table 4.22: Washougal Average Incoming Self-Haul Traffic by Year

Year	2017		2018			2019		
Time	Wednesday	Saturday	Wednesday	Friday	Saturday	Wednesday	Friday	Saturday
6:00	1	0	0	0	0	1	0	0
7:00	6	0	5	2	0	6	3	0
8:00	11	20	10	3	20	11	6	16
9:00	17	25	16	4	25	17	8	21
10:00	20	29	18	6	29	19	9	27
11:00	21	32	17	6	32	19	10	31
12:00	19	29	17	5	29	16	9	29
13:00	17	29	17	5	29	16	9	31
14:00	18	26	16	4	26	17	8	28
15:00	16	26	16	5	26	14	8	30
16:00	14	1	12	3	1	13	6	1
17:00	0	0	0	0	0	0	0	0
Total	**160**	**217**	**144**	**43**	**217**	**149**	**76**	**214**

The transfer station has three large doors that allow up to six vehicles to unload at once. Assuming the average time to unload a self-haul, vehicle is 10 minutes each, an unloading stall can handle six customers per hour. Therefore, the station has a capacity to unload 36 vehicles per hour.

While total waste volumes have remained fairly constant over the past three years, the total number of transactions at the Washougal Transfer Station has increased. Graph 4.6 on the next page shows the relationship of waste volumes, shown in black, to total transactions, shown in blue, over the past two years. The red dashed line displays the linear trend in the number of customers over this period. Although the trend line shows a gradual increase in traffic, with the expected growth in population for this area may be 28,000 more people by 2035.

Graph 4.6: Washougal Transfer Station Inbound Traffic and Tons



As discussed previously the amount of waste received at the transfer station may increase by over 50% in the next 15 years.

4.4.4.2 – Operations

During the site visit, the site manager for CRC reported the facility has no significant operating deficiencies. At times, traffic can back up to the street, but it is not a routine condition. However, this is based on the number of customers and waste volumes having remained similar in the past few years. With moderate growth in customer traffic on Wednesdays and Saturdays, additional unloading stalls would be needed.

The station is receiving an average of 30 customers per hour over a six-hour period on Wednesdays and Saturdays. With only 12 stalls for unloading, the facility is near capacity to handle the self-haul traffic. One option to increase capacity might be to open another day each week, perhaps on Sundays. As shown in Table 4.22, customer traffic on Wednesdays declined when the station opened on Fridays in 2018. Between 2018 and 2019 the traffic on Saturday remained constant, with traffic increasing on Fridays.

The other option would be to plan to expand the transfer station building to provide more stalls. Eventually, as traffic increases, the station may need to widen the entrance road and expand the scale house complex to provide an additional inbound scale. This is not an immediate need, but longer-term improvement that should be planned. The current site appears to provide the space needed to make this improvement without any additional property.

4.4.4.3 – Surge Capacity

It was reported that commercial trucks will unload using the south door. Waste can then be pushed and lifted to dump into trailers on the east side of the building. Because the building is only 60 feet wide with only 45 feet available for storage of waste at certain times, some waste can spill out of the building temporarily. This is not a routine event but is an indication of the limited

surge/storage capacity of the station. On days when self-haul customers are unloading there could be interruptions from unloading until the waste is clear from the tipping floor to allow self-haul access to certain stalls.

One approach to increase the surge capacity is to construct a push wall along the wall of the transfer station where trailers are loaded. This wall would be approximately 10 feet high to allow waste to be stacked and provide more space for waste to be unloaded. The push wall would also provide a load chute and would protect the side walls of the trailer from potential damage as waste is lifted to load the trailer.

These conditions also suggest the transfer station should be expanded to increase both the surge capacity for waste and to add stalls for self-haul customers.

By adding a new 4,500-square-foot building adjacent to the existing transfer station, the number of unloading stalls can be doubled to 12, allowing for as many as 70 vehicles per hour. This addition would also provide more surge capacity for waste volumes.

4.4.4.4 – Recycling / HHW Operations

The recycling and HHW drop-off areas are accessible from Grant Street, even when the station is closed to self-haul customers. The overall space is sufficient for managing the recycling needs of the community. Likewise, the HHW facilities are sufficient for managing materials dropped off. The only drawback is that when the HHW is open, traffic can back up and temporarily impede access to the recycling drop-off area. Fortunately, the HHW facility was designed to allow for two drive-through lanes for customers. To provide access to both lanes and eliminate interference with access to the recycling center, the entrance lane to the HHW can be widened. According to the operator, this would resolve the recycling center access problem.

4.4.5 – Conditions Assessment

Our limited structural and site improvement conditions assessment reveals most of the assets at the site are in good condition except areas of pavement, which are in fair condition.

- The transfer station is in **good** condition. Siding damage behind the trailer lift-and-load area was observed. The damage is not structural in nature. However, the damaged siding should be repaired to prevent potential corrosion problems due to moisture penetration.

- The HHW canopy, the scale house and administration office are in **good** overall condition. No short-term action is needed.

- The gravel storage area is in **good** condition. No short-term action is needed.

- The public recycling area is in **good** condition. Small areas of cracked pavement were observed. No short-term action is needed. The cracked pavement should be repaired in the future.

- The drive aisles that course through the site are paved with asphalt concrete pavement. In general, the paving is in **good** condition except for in the truck maneuvering areas. We recommend the worn surface areas be repaired or replaced.

- The storm facilities, the sanitary system, and the water system are in overall **good** condition. No short-term action is needed.

Our structural and civil conditions assessments were limited to those areas that are readily accessible and visible to field staff. Concealed conditions that become exposed in the future may change our current recommendations made here. The Conditions Assessment Report is included in Appendix D.

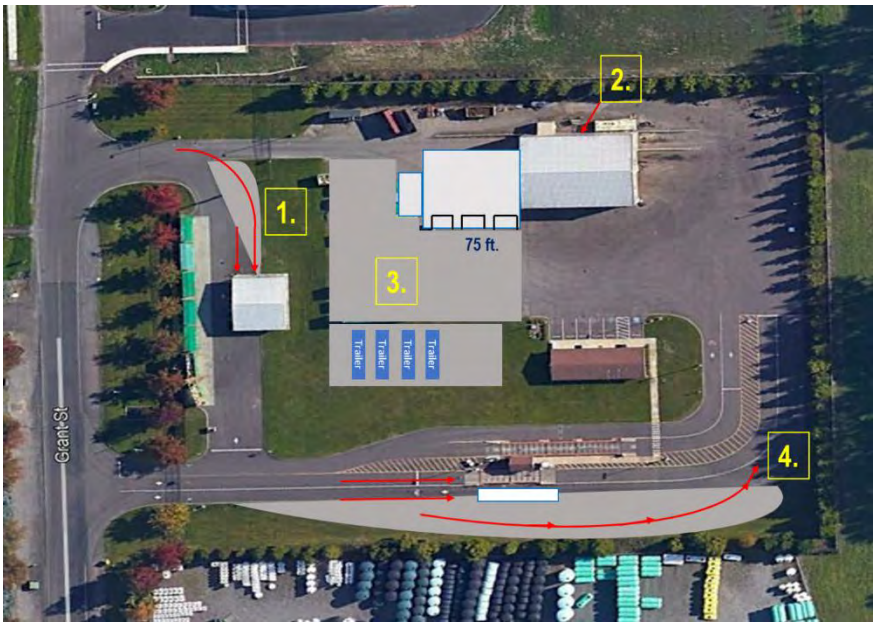
4.4.6 – Summary of Washougal Operations and Conditions Assessment

The Washougal Transfer Station is currently operating close to its capacity but with no critical operating deficiencies. The County may consider opening the station for self-haul customers for additional days of the week. Assuming this would result mainly in distributing the current customers over a longer period, not increasing overall transactions, this may resolve any near-term needs to add more stalls. This is similar to what occurred when the CRC opened the station to self-haul customers on Fridays in 2018.

The only other minor improvement to consider would be add a push wall to stack waste along the trailer tunnel. This could provide additional stacking for waste prior to loading and reduce spillage when loading trailers.

To address the overall needs of the facility to meet the needs of the service area, there are several improvements that should be planned to provide more unloading stalls and to add tipping floor space. This site map in Figure 4.10 below shows four improvements to be included in the Capital Improvements Plan for the Washougal Transfer Station.

Figure 4.10: Site Map Showing Improvements



1. A short-term improvement mentioned by the operator was to expand the access lane to the HHW facility. This is a minor investment to improve traffic flow and safety and could be completed in the near future.

2. Add a steel backsplash and chute along the east side of the building in the load-out tunnel. This backsplash will protect the siding from damage caused from loading trailers. It should also reduce possible spillage of waste from the top-load operation. Also, consider adding a short push wall on the tip floor side to increase surge capacity

3. Expand the transfer station building and pave the yard to increase capacity. The new building can include a lean-to on the north side to provide storage of special waste.

4. Expand the entrance road to increase the capacity of the scale complex and reduce potential of traffic backing onto Grant Street.

With expected growth in the service area to increase waste volumes at the facility by as much as 50% in the next 15 years, these improvements can be scheduled over the next three to six years.

Chapter 5

North Area Service Options

5.1 Introduction

This Chapter describes the options for providing the transfer and recycling facilities needed to serve the north and central portion of Clark County. This area is currently served by CTR. As described in Chapter 2, the north-central portions of the County are projected to experience the largest percentage of the growth over the next 15 years. This growth has resulted in increased waste volumes and traffic at CTR and the need to make investments in facilities to manage the current conditions. However, to manage future growth in this service area additional investments in the system will be necessary. This chapter of the report details the options for meeting the future infrastructure needs of the northcentral service area as identified in the CTR assessment report discussed in Chapter 4.

The three distinct options identified are summarized as follows:

1. Make major Improvements at CTR to address current and future service needs
2. Make minimal improvements at CTR and site and build a new satellite transfer station to serve the northern most portion of the County and relieve some of the customer traffic using CTR.
3. Replace CTR with a new transfer station designed to handle future growth. This alternative recognizes the need to minimize impacts to the residential properties adjacent to CTR; it is important that CTR be a good neighbor.

For each option, the consultant team has developed conceptual facility plans to be used to provide planning level construction cost estimates. The cost estimates are used to complete an evaluation of the financial impacts to the regional system in order to compare the options. They are also used to prepare a 20-year capital improvement plan (CIP) for the regional system.

5.2 North Service Area Facility Information

The facility needs for serving the north-central portion of the County were discussed earlier in Chapter 2 and 4 of the Study. The following represents a summary of the key criteria for making these future investments.

5.2.1 – Waste Quantities

Currently, CTR handles about 230,000 tons per year (tpy) of municipal solid waste and averages between 800 to 900 tons per day (tpd) on a typical weekday. During peak months, CTR receives 1,000 tons or more per day. Approximately 90% of weekday waste is received from WCW collection trucks with 10% being received from self-haul vehicles. Based on the CTR assessment report, the current facility is at capacity with limited space to store material as well as limited capacity to load out materials under current operating hours. CTR is also currently deficient in the space needed for self-haul customers to unload. This problem in exacerbated on weekends

when as many as 900 vehicles use the facility on a typical weekend day between April and October. The transfer station was expanded in 1992 when the Leichter Landfill was closed and there have been no major investments or expansions since.

Population projections made by the Office of Financial Management (OFM) shows that Clark County is expected to grow by 132,000 people by 2035. Using information from the Growth Management Plan (GMP) most of the growth will occur in the north-central portion of the County. This includes the UGB areas in the central county area as well as the northern cities of Battleground, Ridgefield, and La Center. It is difficult to predict how much growth will occur inside or outside the UGB and therefore, how much future waste will be generated and collected and delivered to CTR. Conservatively, however, it may be as much as 75% of this growth would be served by the CTR due to its proximity and access by the most populated portion of the County. Table 5.1 uses the population projections to estimate the amount of additional waste that could be received at CTR over the next 15 years.

Table 5.1: Estimated Growth CTR Service Area (2035)

Growth Assumptions	**Added Population**	**Additional Waste at CTR *(1,614 lbs./person/ yr.)***
50% UGB Growth in CTR Service Area*	77,642	62,657 TPY
75% UGB Growth in CTR Service Area*	92,839	74,921 TPY
* Remaining population growth is expected to occur within the current City limits of Vancouver and in the eastern portion of the County including Camas and Washougal.		

Using these growth projections, CTR could receive between 62,000 to as much as 75,000 additional tpy. For planning purposes, it is assumed that 75,000 tpy will be added to the already 230,000 tpy. The result is an additional 1,442 tons per week or 288 tons per day (over 5 days). To account for peak periods, it would be safe to assume as much as 300 additional tons per day will be received at CTR, thus bringing the total waste to 1,300 tpd or an increase of 30%.

Table 5.2: Waste Projections

Item	**Tons Per Year**	**Estimated Peak Tons Per Day**
CTR (2019)	230,000	1,000
Expected Increase	75,000	300
Total Tonnage	**305,000**	**1,300**

5.2.2 – Customer Traffic

Provided there are no major changes to the collection policies and practices serving the northern cities and the urbanized area of unincorporated county it can be assumed the customer traffic using the transfer station system will also increase by 30%. During the non- peak periods between November and March, CTR receives on average 524 self-haul and cash customers. On weekends, almost 600 vehicles arrive at the facility. The exception is after long holidays such Thanksgiving and Christmas. However, during the months of April through October weekday

traffic increases to about 700 vehicles per day during the week and about 800 on the weekend. At times during this peak period, CTR can receive over 1,000 customers on a weekend day.

In Table 5.3 the current traffic was increased by 30%. These projected traffic totals far exceed the current design capacity of CTR.

Table 5.3: Self Haul / Cash Customers

Customer Traffic	Current	Estimated 30% Increase	Total Projected
Self-Haul	**Vehicles/Day**	**Vehicles/Day**	**Vehicles/Day**
Ave. Weekday	524	157	681
Ave. Weekend	596	179	775
Peak Weekday	696	209	905
Peak Weekend	778	233	1011

The existing CTR facility will need to make investments to manage the current customer traffic notwithstanding any new traffic as shown in Table 5.3. CRC is proposing improvements to the entrance to eliminate traffic from queueing offsite. However, the floor space at the existing transfer station is not large enough to provide sufficient unloading stalls and space to handle surge in waste volumes' additional space is needed to adequately handle the current traffic. Options to increase unloading space could range from adding a separate building on the west property owned by CRC to expanding the existing transfer station building.

5.2.3 – Transfer / Load Out Capacity

Providing sufficient capacity for loading and transferring future waste quantities will also need to be considered. Currently, CTR provides a single compactor that is used to load trailers for transport to the barge site in the Port of Vancouver. This compactor unit can load a trailer every 25 minutes or 1,000 tpd in 14 hrs. assuming 30 tons per trailer. As the waste quantities increase to 1,300 tpd the time to load out all waste each day will approach 18 hours. Also, this approach does not provide for a backup if the compactor is out of service for repair. For these reasons, any option for managing the waste from growth in the north service area should provide for additional load out capacity.

These represent the primary considerations for making improvements to service the north county area that are discussed in the following section.

5.3 Description of North Area Options

The CTR facility assessment identified several deficiencies in the infrastructure to manage the current waste quantities and customer traffic received particularly during peak periods that span from April to October. The options for meeting the service needs of the central and northern portions of the County are described in the following section. For each option, it is assumed that the CTR entrance will be modified to include dedicated lanes for vehicles entering and existing the station. The new entrance will allow two dedicated lanes, one each for vehicles approaching from the north and the south on Highway 503. Also, it is expected that a new inbound scale will

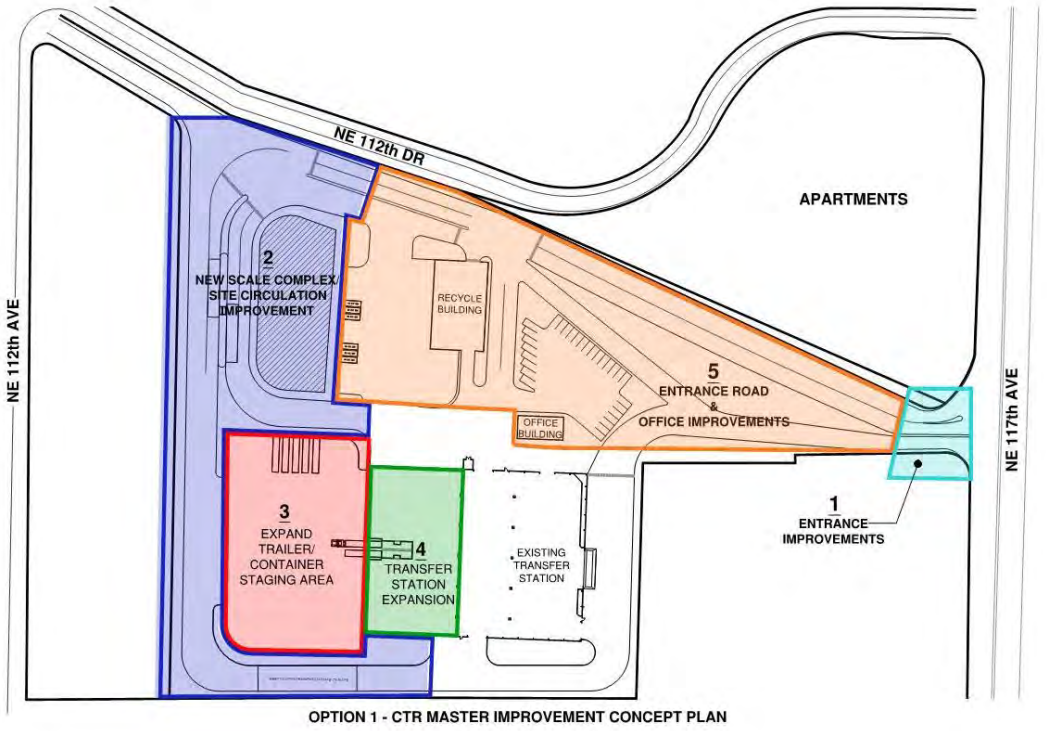
be needed to provide additional queue space and increase in inbound processing capacity. Other improvements to address site circulation, unloading and material handling capacity will be dictated by what option is chosen for providing long term service to this area.

5.3.1 – Option 1: Make Major Improvements to Address Current and Future Service Needs

This option assumes the CTR transfer station will make major improvements to address the current operational deficiencies and provide the infrastructure to manage waste resulting from growth in the central and northern part of the County. Facilities will be upgraded to meet capacity needs for the next 25+ years.

JRMA has prepared several concept site plans that incorporate significant improvements to meet the needs of CTR for the future conditions. These have been reviewed by the County and CRC and are the basis the improvements listed; however, more analysis will be needed to develop a final site master plan. A primary guiding principle in developing the new site plan has been the need to construct the facilities while maintaining the current operations. Therefore, the facilities would be constructed in a phased approach to ensure that CTR will not be closed to customer services. These improvements are captured in Figure 5.1 below.

Figure 5.1: Option 1 – CTR Improvements



The improvements are expected to include the following features:

1. Improve the entrance off Highway 503 to accommodate two dedicated ingress lanes and a right turn only exit lane. This change to the entrance is in the design and permitting phase for approval from WSDOT.

Benefits: Improves access and safety of vehicles entering CTR and will reduce potential for offsite queue.

2. Utilize the adjacent property currently owned by WCW to provided additional scales to increase capacity to process inbound and outbound customers. It would also be desirable to provide new software to improve transactions times.

   Benefits: Improve onsite queue and circulation.

3. Regrade and pave the back property to provide area for staging trailer/containers for transport to disposal site. Note: It may be possible to find property offsite in close proximity to CTR that could serve this purpose if it is found to be cost effective.

   Benefits: Increase capacity to loadout more efficiently and improve site circulation.

4. Expand the transfer station by constructing a 26,000 sq. ft structure adjacent to the existing building.

   Benefits: Expanding the transfer station facility has several benefits as follows:
   - Increases space to provide needed stalls for self-haul and cash customers to unload more safely.
   - Provides separation of self-haul vehicles from WCW collection trucks.
   - Increases needed capacity to loadout waste and provide redundancy for compacting waste.
   - Provides floor space for managing different waste streams. Space can be allocated for green waste, C/D materials from cash customers, food waste, and recyclable materials.
   - Improves overall site circulation and minimizes intersections.
   - Should reduce double handing of materials and/or improve efficiency of managing materials.

5. Regrade the front entrance roads and construct a new office and employee building.

In addition to the features listed above, to enhance current operational conditions and provide capacity for future growth, the Improvements can include features to reduce impacts to adjacent property owners. CRC does a good job to mitigate impacts to neighbors but with more residential development occurring enhancements to reduce impacts may be considered.

5.3.1.1 – Capital Cost

Based on preliminary concepts provided by the consultant team a planning level construction cost estimate has been prepared. To make the improvements to CTR for managing the waste and recyclables in the central and north service area for the next 25 years is estimated to cost between $12M and $17M. This includes the cost of the new entrance improvements. These estimates are planning level and carry an order of magnitude of +15/-10% accuracy.

5.3.1.2 – Operations Cost Impacts

The efficiency of the current CTR operation can be enhanced by improving site circulation and adding more space to manage surge piles and for unloading customers. The current cost to operate CTR is $22.16 per ton. A preliminary assessment of the operating expenses indicates that with major improvements to the facility labor cost may be reduced. First, with a more efficient site circulation fewer onsite flaggers and spotters are needed. Second, the equipment operating hours may be reduced because of the increased loadout capacity as well as the addition of floor space for managing surge capacity. Accounting for some labor savings due to efficiencies for this this analysis, it is assumed the operating expense is $18 per ton for the expanded CTR in today's dollars.

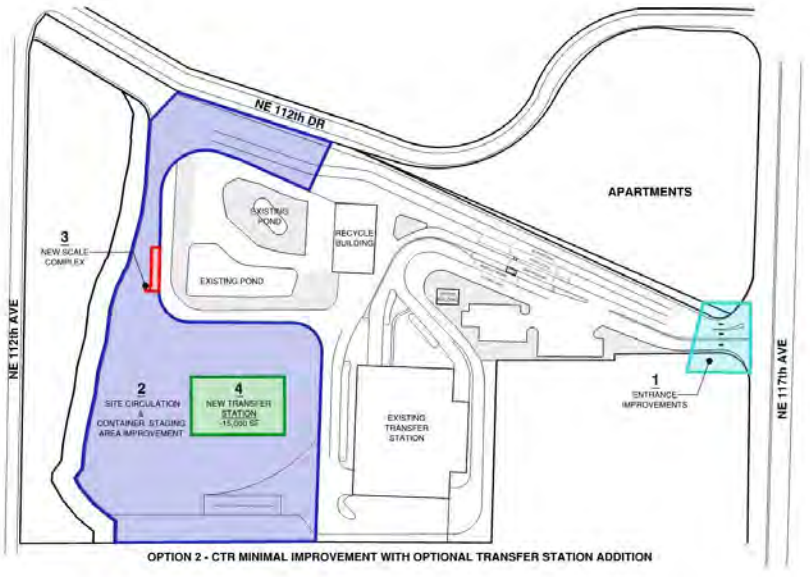
5.3.1.3 – System Cost Impacts

The CTR transfer station is in a central location to serve the area. It is also conveniently located within about 3 miles from WCW's collection truck yard where vehicles are parked and maintained. This central location means collection trucks travel less miles each day to begin and end their routes. Investing in CTR as a permanent location for this services area means that impacts to collection cost are minimized.

5.3.2 – Option 2: Make Minimal Improvements at CTR and Site/ Build a New North Satellite Transfer Station to Accept Primarily Waste from Self Haul Customers.

This option assumes minimal investments at CTR. The improvements are targeted to improve onsite conditions to handle existing traffic. It recognizes that adding any more traffic with access off Highway 503 and accepting more waste at CTR as the region grows is less desirable. However, CTR is centrally located and with minimal investments the facility can handle current traffic more efficiently. Figure 5.2 depicts the proposed improvements to the existing CTR facility to address the immediate needs. In addition to improving site circulation and eliminating offsite queueing a small building constructed on the west side of the existing transfer station may be feasible. This new structure is considered an optional investment to address self-haul customer traffic and provide additional unloading stalls.

Figure 5.2: Option 2 – CTR Improvements



The improvements to CTR are expected to include the following features:

1. Modify entrance to accommodate lane separation for onsite queue and possibly construct access to adjacent property on west side similar to Option 1.

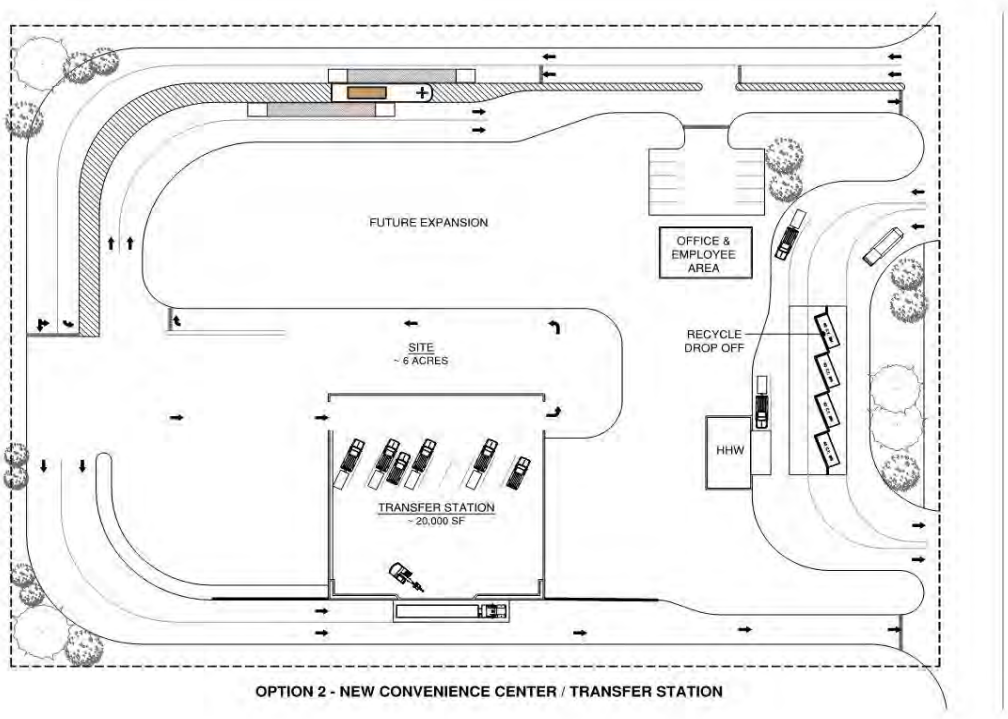
2. Regrade and pave the back property to provide area for staging trailer/containers for transport to disposal site. An access ramp to south side of transfer station would be constructed. Note: It may be possible to find property offsite but nearby that could serve this purpose if it is cost effective.

3. Add new scales and gatehouse to handle self-haul traffic during peak hours on WCW property on the west side of CTR.

4. Optional - Build a small transfer station (15,000 sq. ft.) to handle traffic and excess waste under peak conditions on WCW property.

These are minimal improvements to mitigate near term operating deficiencies assuming a long-term plan of siting and building a new transfer station /convenience center to serve the north area. This facility would serve the Cities of Battleground, Ridgefield, and La Center as well as the northern unincorporated/ rural County. Depending on the final location, it may also attract customers that currently use CTR, thus improving operations at the facility. Figure 5.3 shows the proposed concept site plan for a new northern satellite station.

Figure 5.3: Option 2 – CTR Satellite Station



Features for a new northern area transfer station may include:

1. A minimum site of 6-acres of commercial / industrial zoned property located on a minor arterial road.
2. A new convenience center / transfer Station (16,000 sq. ft. building) to handle up to 400 tpd
3. Recycling / HHW drop-off center.
4. Scale complex with 1 inbound and 1 outbound scale and gatehouse
5. Top load trucks from floor and no compactor

It would be expected to take a minimum of 3 years to site and permit the new facility. Construction would occur over a 12-month period meaning a new facility would take a minimum of 4 years before it would be operational. Most likely the new facility would be opened in 5 years assuming a site can be located and does not incur a lengthy permitting process.

Benefits of this new north area facility include:

1. Improves onsite queue and improve circulation issues at CTR.
2. Increases scale capacity and assumes new scale house software to improve transaction times.
3. Increases space to provide needed for stalls for self-haul and cash customers to unload more safely during peak conditions if new building is constructed.
4. Provides some separation of self-haul vehicles from WCW collection trucks under peak conditions.
5. May increase needed capacity to loadout waste
6. Provides additional floor space to provide flexibility for managing different waste streams.
7. Adds new facility to serve the northern most County more efficiently.
8. May reduce overall traffic at CTR when new facility is constructed reducing drive times for self-haul customers.

5.3.2.1 – Capital Cost

Under Option 2, the improvements at CTR would be constructed as soon as possible, while locating a site for a new transfer station to serve the northern most County is being conducted. The cost for constructing the entrance improvements and adding a new scale and scale house in conjunction with re-grading and paving the west side is estimated to cost about $4M or to as much as $6.2M if a new public transfer station was built on the west side property (approximately 15,000 SF). This is a planning level estimate since no detailed plans have been made to date with exception of the new entrance.

The cost to construct a new north transfer station is estimated to be about $9M. This includes the estimated cost of purchasing a 6-acre site at $200,000 per acre. The cost of siting the new station may be $500,000 to $800,000 depending on the environmental permitting requirements to complete an Environmental Impact Statement.

The total cost of this option to the system is estimated to be between $13.5M and $16.2M.

5.3.2.2 – Operation Cost

Operational costs are expected to be more than Option 1 or 3 since there will be two separate transfer stations facilities needed to serve the area. In addition, there will be additional costs for transporting waste in transfer trailers from the new north station. The trailers hauling waste could be transported directly to Wasco County Landfill or they could be transported to West Van and re-loaded by compactor into containers for transport to Finley Buttes.

Since this alternative includes some improvements to the CTR's site circulation and with no projected significant increase in waste volumes, the cost to operate the upgraded CTR transfer station is assumed to be $18 or like Option 1. The cost to operate the new North Transfer Station is expected to be $42 based on ultimately managing anywhere from 200 tons to 300 tpd. This cost of service is similar to the cost to manage the self-haul waste stream at West Van.

5.3.2.3 – System Cost Impacts

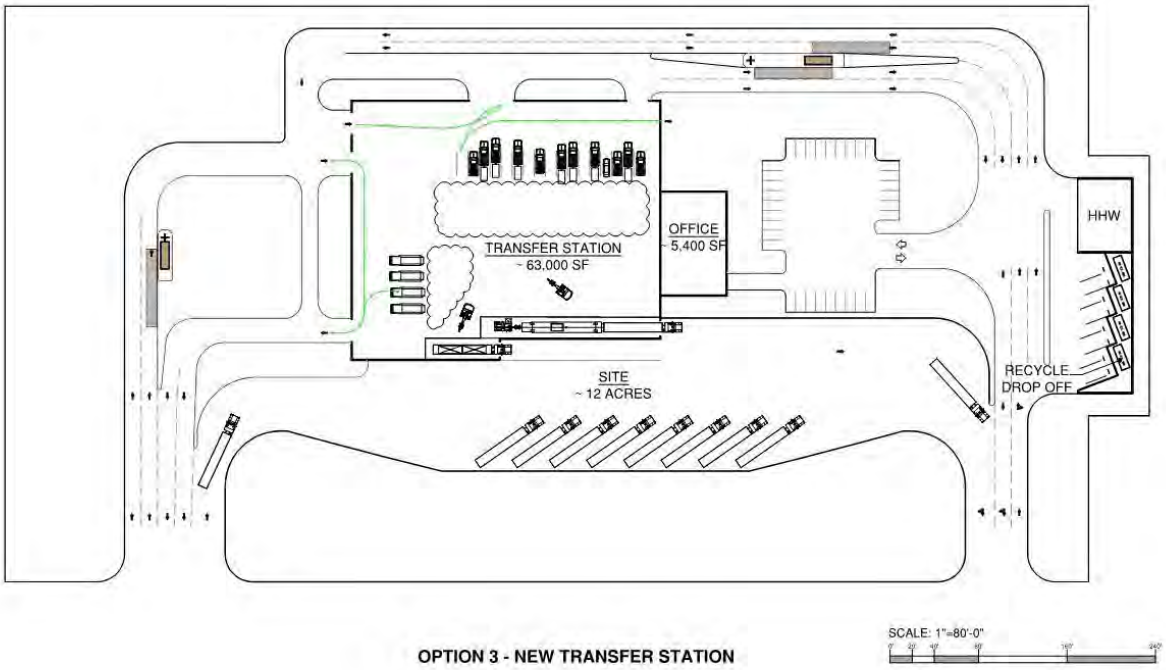
There should be no major impacts to the collection system with this option. Many self-haul customers in the northern most part of the County would drive less miles to use the new transfer station. Collection trucks serving Battleground, Ridgefield, La Center and Yacolt could also use the northern transfer station thus reducing their time to conduct a second route versus traveling to CTR and back to the route. In the afternoon or second route they could use CTR since it is assumed, they would be parking in the evenings at the main WCW hauling yard on NW 94th Avenue.

5.3.3 – Option 3: Replace CTR with New Transfer Station at a New Location

The CTR transfer station was not designed to handle the traffic and quantities of waste currently being received. Over the past 5 to 7 years there have been many new developments in the surrounding properties. This includes new residential developments as well as institutional operations (i.e., new school and church). With the expected growth, investing in the current CTR site may not be the best long-term site. One option is to make minimal investments in CTR and establish a new location to serve for the long term.

To provide for the future waste management and recycling services a modern transfer station would be sited and constructed somewhere north of the existing location. Ideally, the new station would still be somewhat central to the majority of the population it serves and be located on commercial /industrial zoned property with access off an arterial or major collector street. It would be located to serve the current service area as well as the growing area of the north County cities. Figure 5.4 on the next page shows the proposed concept site plan for a new transfer station to replace CTR.

Figure 5.4: Option 3 – New Transfer Station



The following describe the key features of a new Transfer Station:

1. A minimum site of 12-acres of commercial / industrial zoned property located on minor arterial road.
2. A new transfer station building (approx. 66,000 sq. ft. building) to handle up to 1,500 tpd.
3. Minimum of two (2) load out ports equipped with compactors and one top load to be used as back up and for other materials.
4. A recycling / HHW drop-off center.
5. Preferably a separate or split access drive for collection trucks to separate from self-haul traffic for safety reasons.
6. Separate scales for weighing collection trucks with RFID readers and capability to weigh out vehicles.
7. Parking area for staging trailers and containers.
8. Office and employee break/restroom and training area.
9. Possible education center for tours.

This facility would also incorporate green design features such as natural lighting, recycled-content building materials, water conservation features, renewable energy features, and modern odor, and dust control systems.

5.3.3.1 – Cost Impacts

The cost to construct a new transfer station is estimated to be between $25M and $30M. This includes the cost of land assumed to be about $200,000 per acre in 2020 dollars. It should be noted that siting and permitting a new station will require a two to three-year effort and may be subject to addition environmental reviews and possible legal challenges. The time to complete the design and construction would be 2 years.

5.3.3.2 – Operations Cost

Operational cost should be lower than the current CTR as the new facility will incorporate means to better manage materials, eliminating any double handling and minimize need for spotters and traffic management personnel. For this option, the cost to operate the new North Transfer Station is assumed to be $18 per ton.

5.3.3.3 – System Impacts

The new transfer station is expected to be located north of the current CTR station. This is based on the availability of land and the difficulty to locate a suitable site in the more urbanized area. Therefore, the cost of the collection system is expected to increase as vehicles will travel more miles to unload. The drive time for collection trucks may increase from 3 miles per trip to perhaps 6 miles. The increase in collection cost may range from $1.2M to $1.6 M per year.

5.4 Analysis of the Options

In discussing each of the options, the relative cost impacts were presented. In this section, a comparison of the cost impacts of each option is presented. The purpose is to evaluate the cost to provide services and operate the facilities considering which option is pursued.

Using the capital and operating cost discussed previously, the following tables show the comparison of the cost to operate the system in 2035 assuming the North Area will need to manage 305,000 tons per year.

As shown in Table 5.4 on the next page above, the lowest operating cost would be to make major improvements to CTR versus building a second satellite transfer Station or totally replacing it with new larger North Transfer to serve the norther portion of the County. Cost to operate either Option 2 or 3 will also result in added system cost. For instance, under Option 2 the system would operate two separate transfer stations (CTR and satellite facility) to serve the north central portion of the County. This results in higher operating cost and the system will incur added expenses needed to transport waste from the satellite station to either the Port for reloading for barging or to drive further to Wasco Regional Landfill.

Table 5.4: Comparison of the Capital and Operating Cost in 2035

North Area Service Options		Option 1	Option 2		Option 3
Description		*Major Improvement*	*Minor Improvement*	*North County Satellite TS*	*New North County TS*
Estimated Capital Cost (2020$)		**$ 16,000,000**	**$ 6,000,000**	**$ 9,000,000**	**$ 30,000,000**
Annual SW Tons (2020)	230,000				
Route Tons	156,000				
SH / Com Tons	74,000				
Route Ton Ratio	68%				
2020)					
CTR Operations Cost/Ton (2020)	**$ 22.00**	**$ 18.00**	**$ 18.00**	**$ 42.00**	**$ 18.00**
2035 Waste Quantities - North Area					
2035 Solid Waste -Tons/Yr.	305,000				
2035 Operations Cost/Ton	**$ 28.65**	**$ 23.44**	**$ 23.44**	**$ 54.70**	**$ 23.44**
Annualized Capital Cost (20 yr. @ 5%)		**$ 1,283,881**	**$ 481,456**	**$ 722,183**	**$ 2,407,278**
Incoming Solid Waste Tons/Yr.		305,000	207,400	97,600	305,000
Annualized Capital Cost /Ton		**$ 4.21**	**$ 2.32**	**$ 7.40**	**$ 7.89**
Summary of Operating Cost /Ton -2035					
North Service Area - Cost/ Ton		**$ 27.65**	**$ 25.77**	**$ 62.10**	**$ 31.34**
System Cost Impacts					
1. Additional Transport Cost		$0.00	$0.00	$2.00	$0.00
2. Additional Cost for Collection		$ -	$ -	$ -	$ 1,673,006
Add. Collection Cost per Ton					$ 5.49
TT&D + collection Cost per Ton		**$ 27.65**	**$ 25.77**	**$ 64.10**	**$ 36.82**

**Key Assumption: Unit operating cost are assumed to increase by 1% per year and waste is projected to increase by an average or 2.2% per year for the next 15 years.*

Under Option 3 replacing the CTR with a new larger transfer station farther north, nearer to Battleground and Ridgefield, would add to the cost of the collection system.

Another factor to consider is how much waste will be managed by a new satellite transfer station which cannot be predicted. To understand the cost impacts two scenarios were analyzed. The first scenario assumes 30% of the north area uses this station. The average cost of operating both CTR and the satellite would over $37 per ton. This is presented in Table 5.5 on the next page.

Table 5.5: Comparison of Operating Cost Assuming 30% of Waste Generated Uses New North Satellite Station

Annual Operating Cost Comparison	**$8,434,530**	**$11,405,231**	**$9,557,927**
Assumes 30% of North Area Uses New Convenience Center			
Comparison of Operating Cost Per Ton	**$27.65**	**$37.39**	**$31.34**

Table 5.6 assumes only 20% of the waste generated in the north area uses the satellite. In this scenario, the average cost to operate the transfer station system is less than $34 per ton.

Table 5.6: Comparison of Operating Cost Assuming 20% of Waste Generated Uses New North Satellite Station

Annual Operating Cost Comparison	**$8,434,530**	**$10,261,128**	**$9,557,927**
Assumes 20% of North Area Uses New Convenience Center			
Comparison of Operating Cost Per Ton	**$27.65**	**$33.64**	**$31.34**

5.4.1 Findings

In comparing the options for serving the north and central part of the County, the most cost-effective approach would be to pursue Option 1 and make major investments in CTR. Not only is the lowest capital cost but also results in lower long-term operating costs. One consideration for implementing this option is the compatibility with the surrounding properties. While all new development occurred knowingly of the existing operations the overall area has changed in purpose. In planning and designing new improvements at CTR there are physical changes that can be made to enhance visual and other perceived impacts. Both Option 2 and 3 are reasonable solutions for meeting the long-term service needs but both will require siting a new facility. This can prove to be contentious and difficult to find an acceptable location. While it may take several years to site and build, the ability to make improvements to CTR can be achieved more expeditiously. Also, major improvements to CTR can be constructed in phases in order to keep the facility operating during the construction period.

Appendices

Appendix A

To be determined – Financial Analysis Summary

Appendix B

Limited Structural and Exterior Site Improvement Conditions Assessment

Clark County Central Transfer and Recycling (CTR) is a privately owned solid waste transfer station that serves residents and commercial users of Clark County, Washington. The facility is in the Orchards neighborhood of unincorporated Clark County, along Northeast 117th Avenue (Washington State Route 503), approximately a half-mile north of the intersection with Padden Parkway (State Route 500) and Northeast 117th Avenue (State Route 503). The address of the facility is 11034 NE 117th Ave. Vancouver. An aerial view of the facility is shown in Figure 1.

Figure 1 – Aerial View of Clark County CTR

The facility resides on an irregularly shaped parcel of land and includes three main structures that make up the facility operations. The solid waste transfer station is the main structure. There is also a recycling building, a household hazardous waste (HHW) building, and an administrative and operations office building. The facility was originally constructed circa 1970s. In 1991, a new 20,000-SF transfer station was added to replace the original transfer building. The original building was expanded and converted to the recycling and HHW building. An automatic scale system for route trucks was installed in 2012.

In 2019, the County commissioned J.R. Miller & Associates, Inc. (JRMA) to conduct an overall facility existing conditions review as part of Task 4 of the Clark County Regional Solid Waste System Study's scope of work. The goal of this assessment was to observe, determine the condition of the assets, and make rehabilitation recommendations. This document summarizes our assessment findings and will be included in the final Clark County Regional Solid Waste System Study.

The walk-through assessment was conducted on September 24, 2019, by Doug Drennen and Krystal Li, P.E., of JRMA; and Michael Summers, P.E., of AKS Engineering and Forestry (AKS). They were accompanied by Derek Ranta and Brian Treptow of Waste Connections. The assets listed on the next page were included in the walk-through assessment:

1. Transfer Station
2. HHW Building
3. Source-Separated Recycled Material Building
4. Scale House
5. Office
6. Site Access
7. Drive Aisles/Paved Areas
8. Sanitary Sewer Utilities
9. Stormwater Drainage Utilities
10. Domestic Water Utilities
11. Retaining Walls/Landscape Buffers

The assessment did not involve a detailed inspection of all building structural elements nor the site's civil-related assets. Limited as-built documents from the 1991 facility expansion were available for review. Destructive and non-destructive material testing and inspection were not performed. The following general information for each asset was determined based on limited observation made during the site visit, limited as-built information, and conversations with facility staff.

1) Transfer Station

The Transfer Station is a pre-engineered metal building (PEMB) with a metal roof deck, metal siding, and concrete wainscot at the base. A compactor tunnel is located at the east end of the building. The tipping floor is constructed with reinforced concrete slab-on-grade. The following deficiencies were observed and should be addressed in the future.

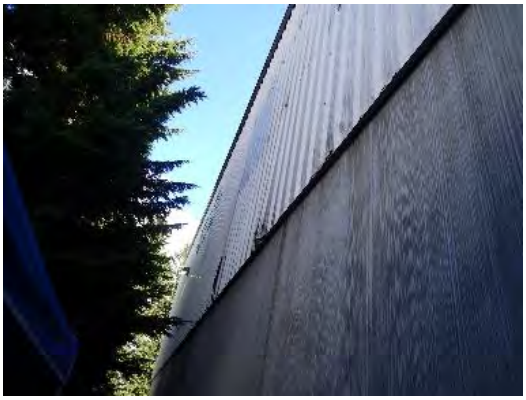
- Three steel columns with warped column flange were observed along the north wall of the transfer building, shown in Figure 2 and Figure 3. The damage most likely was caused by loader impact. We recommend the warped column flange be reinforced soon.

Figure 2– Warped Column Flange

Figure 3 – Damaged Columns

- Areas of the existing metal siding (shown in Figure 4) were damaged. Although the damages are not considered structural in nature, we recommend replacing the damaged siding to prevent future structural damage.

Figure 4 – Transfer Station, Damaged Metal Siding



- Some hairline cracks and rust stains were observed in the exterior concrete wall surface, as seen in Figure 5.

- Exposed wall reinforcements at various locations were observed in the exterior concrete wall, also seen in Figure 5.

Figure 5 – Rust-Stained Exposed Reinforcements in Exterior Wall

- Damaged/spalled concrete abuse wall was observed near the entrance, as displayed in Figure 6.

Figure 6 – Damaged Concrete Near Entrance

- The concrete tipping floor with asphalt overlay, shown in Figure 7, is generally in **good** condition.

Figure 7 – Tipping Floor

- The concrete ramp in the tunnel (Figure 8) shows sign of wear.

Figure 8 – Concrete Ramp in the Tunnel

Recommendations

Our assessment revealed that the Transfer Station building is in **good** overall condition. We recommend the following improvements to the building:

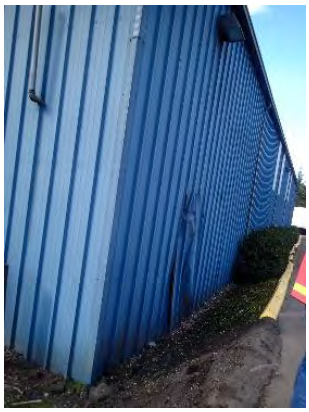
- ✓ Repair the damaged steel column.
- ✓ Replace damaged metal siding.

2) HHW Building

The HHW building is a PEMB with a metal roof and metal siding on three sides. The floor is constructed with reinforced concrete slab-on-grade. The following deficiencies were observed.

- Damaged siding, as seen in Figure 9.

Figure 9 – Damaged Siding on HHW Building



Recommendations

Our assessment revealed that the HHW is in **good** overall condition. Our recommendation is to:

- ✓ Replace damaged siding.

3) Recycling Building

The Recycling Building is a PEMB and was the original building on the site. The floor is constructed with reinforced concrete slab-on-grade. The following deficiencies were observed.

- Damaged concrete piers supporting building columns, as displayed in Figure 10 on the next page.

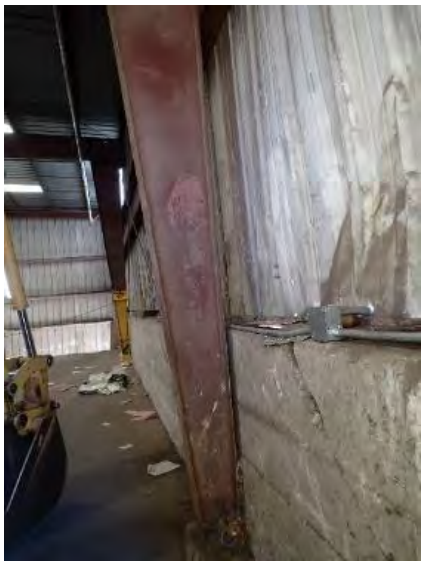
Figure 10 – Damaged Pier Supports on Recycling Building

- Cracked concrete abuse wall, as shown in Figure 11.

Figure 11– Cracked Concrete Wall

- Warped steel column flanges (Figure 12).

Figure 12 – Warped Steel Column Flanges

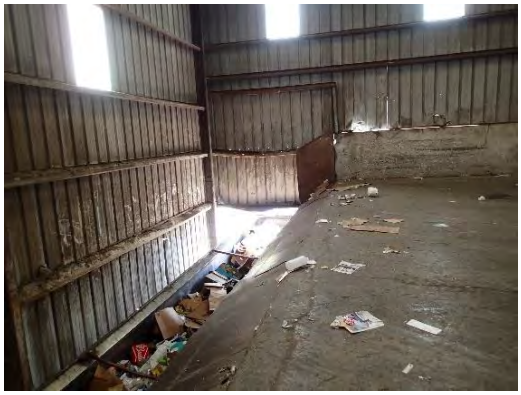


- Cracked concrete floor (Figure 13).

Figure 13 – Recycling Building's Cracked Floor

- Rusted steel wall panels and wall girts (Figure 14).

Figure 14 – Recycling Building Wall Panels



- Buckled steel rod brace (Figure 15).

Figure 15 – Buckled Steel Wall Brace

Recommendations

Our assessment revealed that the Recycling Building is in **poor** overall condition. We recommend the following improvements to the building:

- ✓ Repair damaged columns
- ✓ Replace the damage and rusted steel panels and secondary members
- ✓ Repair damaged concrete supports and abuse wall.
- ✓ Seal cracked floor.

4) Scale House and Booth

According to the facility operator, the scale house (pictured in Figure 16) and the booth are scheduled to be replaced soon. Therefore, no assessment was performed on these buildings.

Figure 16 – Scale House

5) Administrative Building

The administrative building (Figure 17) is a modular building with a metal roof and metal siding. No obvious structural deficiencies were observed.

Figure 17 – Administrative Building

Recommendations

Our assessment revealed that the Administrative Building is in **fair** overall condition. No structural repair is recommended.

6) Site Access

CRT is accessed from Northeast 117th Avenue (State Route 503), a Washington Department of Transportation highway. The site access is a concrete driveway approach at the highway. The remainder of the drive aisle to the interior of the site is paved with asphalt. The access is constrained on both the north and south sides by neighboring site improvements and franchise utility infrastructure along both sides of the driveway approach.

- The concrete driveway approach (Figure 18) is in **fair** condition and includes a depressed curb with lip and a concrete sidewalk.

Figure 18– Concrete Driveway Approach Access

7) Drive Aisles and Paved Areas

The drive aisles that course through the site are paved with asphalt concrete pavement. The as-built depth of the pavement is unknown. There are areas that require rehabilitation in various portions of the facility, mainly along the eastern drive aisle of the solid waste transfer station.

- This section of pavement along the eastern drive aisle (Figure 19 on the next page) shows significant deterioration of the wearing surface and is in **poor** condition. This pavement section shows significant wear and cracking by the eastern landscape buffer, which is a 3- to 4-foot-wide landscape strip with 12- to 16-inch evergreen trees spaced every 10–15 feet.

Figure 19 – Pavement Along Eastern Drive Aisle

- There is a continuous length of concrete extruded curb on the top of the asphalt pavement section that bounds the landscape strip. This extruded curb (Figure 20) is in **poor** condition due to buckling and cracking from the adjacent trees and tree roots.

Figure 20 – Concrete Extruded Curb

8) Sanitary Sewer Utilities

The facility is served by public sanitary sewer within Northeast 117th Avenue. The sewer purveyor is Clark Regional Wastewater District (CRWWD). The onsite sewer collection system is a gravity system that serves the interior drains for the solid waste, recycling, and office buildings. The scale house and drain also are served by the onsite gravity system. Due to the terrain of the site, the gravity sewer system is collected to a central sanitary sewer private pump station located in the interior of the site. The pump station discharges via a pressure force main to a gravity lateral that resides in the site access at Northeast 117th Avenue. The pump station is a duplex pump system with two pumps that alternate pumping discharge of the sanitary sewer effluent.

- According to facility staff, one of the pumps failed in September 2019, but it was replaced in the fall of 2019.

9) Stormwater Drainage Utilities

The CTR facility was constructed circa 1991. The stormwater infrastructure includes a gravity collection system for drive aisles and structure roof drains that collect stormwater runoff. As originally designed runoff was conveyed to settling ponds, then through an oil/water separator, and then to an underground infiltration facility, which consists of a series of perforated drainpipes surrounded by drain rock that allows the runoff to infiltrate into the ground. Stormwater does not discharge offsite from this facility.

The stormwater system was upgraded in 2017 and 2018 to enlarge the stormwater infiltration basin and improve collection. The plans for the stormwater facility upgrade were not available as part of this assessment. The upgraded stormwater system includes an infiltration basin component (pictured in Figure 21) that provides infiltration below ground into the underlying subgrade. As part of the 2017 and 2018 construction, the initial infiltration pipe system was removed because it was no longer functional.

Figure 21 – Stormwater Runoff

The facility is in **good** condition, based on our visual observation and anecdotal discussion with Waste Connections staff. No design plans were available for review during our site visit. If the design plans for the storm facility upgrade were available, along with operations and maintenance records, a more refined assessment could occur.

10) Domestic Water Utilities

The CTR Facility is served with domestic water by Clark Public Utilities. The onsite facility is a public system that is owned and maintained by Clark Public Utilities. The domestic water facilities were not assessed as part of this report.

11) Retaining Walls and Landscape Buffers

The boundary of CTR contains a combination of landscape buffers or landscape and wall buffers. The east and south buffers are a combination modular block wall, approximately 8 to 10 feet tall, and evergreen trees.

- The north boundary is a landscape buffer with evergreen trees and shrubs and is in **good** condition.
- The south boundary buffer is in **good** condition.
- The east boundary buffer (Figure 22) is in **poor** condition due to trees and tree roots impacting the pavement section and curb.

Figure 22 – Stormwater Runoff

Conclusion and Recommendations

Our limited structural and site improvement conditions assessment reveals most of the assets at the site are in relatively fair-to-good condition, except for the recycling building, areas of pavement, the east boundary retaining wall, and the infiltration portion of the stormwater system.

- The transfer station and HHW building, the north boundary retaining wall, and the south boundary retaining wall are generally in **good** overall condition.

- The recycling building next to the HHW building is in relatively **poor** condition. We observed a deteriorated roof and wall panels and secondary framing members as well as a cracked concrete floor and a damaged concrete wall. The rusted panels and the rusted secondary framing members are most likely caused by water infiltration. Localized repair or reconstruction should be expected. It is our recommendation that a detailed structural investigation be implemented as part of the planning process.

- The drive aisles that course through the site are paved with asphalt concrete pavement. Areas of the paving are in very **poor** condition that require rehabilitation. The problem areas are in various portions of the facility, mainly along the eastern drive aisle of the solid waste transfer building. We recommend the worn surface areas be repaired or replaced.

- The east boundary buffer is in **poor** condition due to trees and tree roots impacting the pavement section and curb. The pavement section and the damaged curb should be repaired or replaced.
- The stormwater system was constructed circa 1991and was upgraded circa 2017 in response to updated regulations and the deficient infiltration facility. The facility is in fair condition based on our visual observation and anecdotal discussion with Waste Connections staff.
- The existing pump station for the sanitary sewer system is a duplex pump system with two pumps that alternate pumping discharge of the sanitary sewer effluent. According to facility staff, one of the pumps failed in September 2019 and was replaced in the fall of 2019. The pump station is in **good** condition.
- The scale house and the scale booth were not assessed since they will be replaced soon.
- Also, the domestic water system was not assessed since it is owned and maintained by Clark Public Utilities.

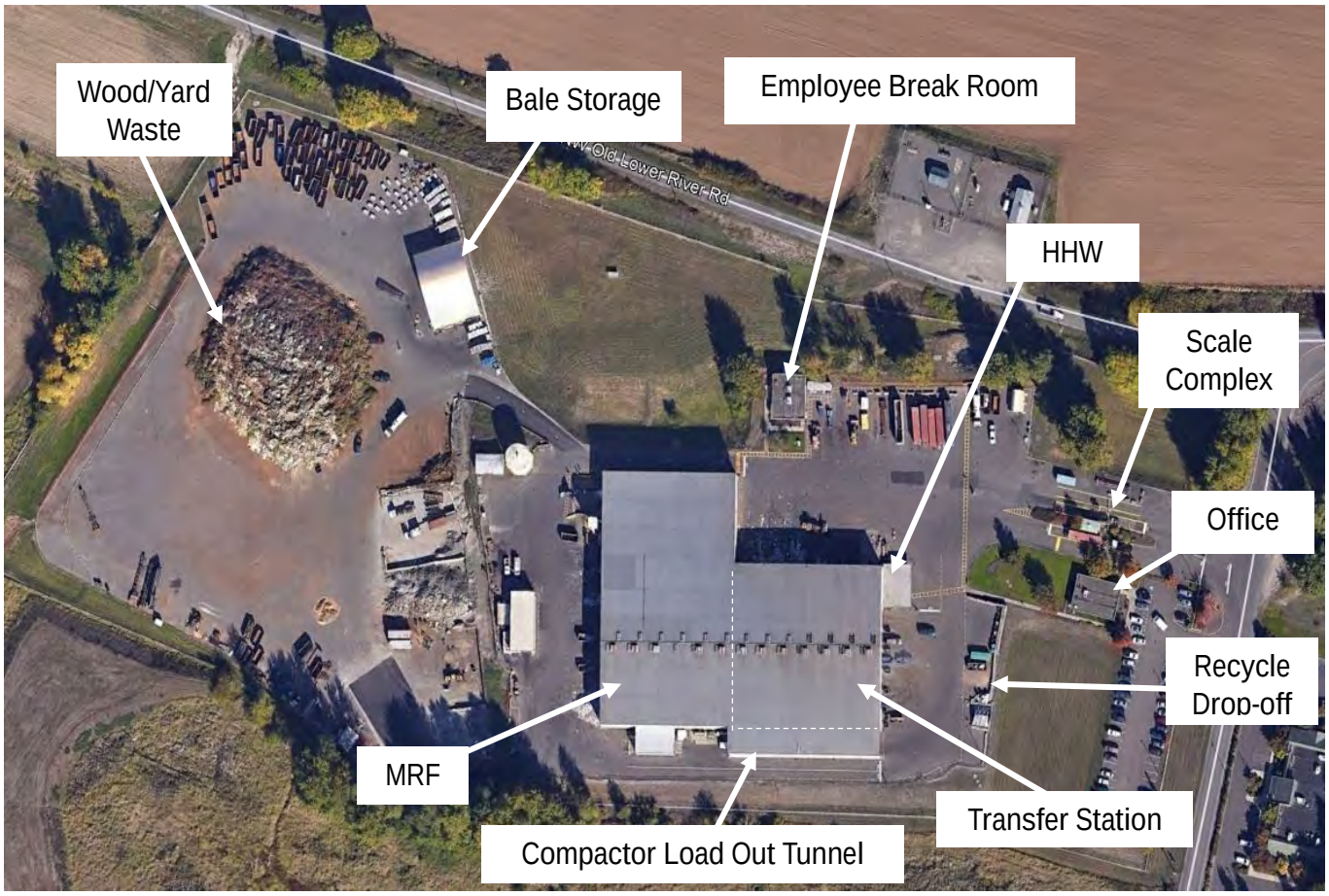
Our structural and civil conditions assessments were limited to those areas that are readily accessible and visible to field staff. Concealed conditions that become exposed in the future may change our current recommendations made here.

Appendix C

Limited Structural and Exterior Site Improvement Conditions Assessment, West Vancouver Transfer and Recycling Facility

Clark County's West Vancouver Material Recovery (WVAN) facility is a privately owned solid waste facility. It is the secondary solid waste facility in the Clark County regional system. WVAN also served as the primary material recovery facility (MRF) for all commercial and residential recyclables collected throughout the county. The facility opened in 1993 and is located within the city limits of Vancouver. The address of the facility is 6601 NW Old Lower River Road, Vancouver, Washington. An aerial view of the facility is show in Figure 1.

Figure 23: Aerial View of Clark County WVAN



The facility consists of an upper and lower yard. The upper yard consists of the process building and other service building structures to support the operations of the facility. Within the process building is a material handling system that sorts recyclable materials. The upper yard vehicle entrance has inbound and outbound large truck scales with scale house and booth. There is an administrative office building and employee building with a locker room and break room. The upper yard structures are surrounded by paved drive aisles to support vehicle maneuvering for

material handling and general facility operations. The upper yard pavement is sloped to a series of catch basin inlets to collect runoff and drain to the north around the structures. Stormwater is conveyed to a large biofiltration water-quality swale for runoff treatment. There is a stormwater oil/water separator for oil control prior to discharge of stormwater into the large biofiltration swale. The structures are served with domestic sewer with an onsite septic system with septic tank and drain field.

The lower yard is a large paved area surrounded with concrete curb. The lower yard is an outdoor storage area for wood waste, glass recycling, concrete rubble, and a recycling storage shelter. The pavement is sloped toward the northwest to a low point in the curb. The low point drains into a stormwater detention pond at the northwest corner of the site. The detention pond discharges stormwater into a biofiltration water quality swale.

The County commissioned J.R. Miller & Associates, Inc. (JRMA) to conduct an overall facility existing conditions review as part of Task 6 of the Clark County Regional Solid Waste System Study's scope of work. The goal of this assessment is to observe, determine the condition of the assets, and make rehabilitation recommendations. This document summarizes our assessment findings and will be included in the final Clark County Regional Solid Waste System Study.

The walk-through assessment was conducted on February 11, 2020, by Doug Drennen and Krystal Li, PE, of JRMA; Rick Kattar of Swordfish; and Michael Summers, PE, of AKS Engineering and Forestry (AKS). They were accompanied by Yuta Naganuma, Quinn Gonder and Derek Ranta of Waste Connections of Washington (WCW). The following assets were included in the walk-through assessment:

1. Process Building
2. Scale House and Scales
3. Administration Office
4. Employee Facility
5. Recycling Shelter
6. Pump House
7. Maintenance Building
8. Used Oil Storage
9. Upper Yard
10. Lower Yard
11. Storm Facilities
12. Sanitary
13. Water

The assessment did not involve a detailed inspection of all building structural elements nor the site civil-related assets. Limited as-built documents were available for review. Destructive and non-destructive material testing and inspection were not performed. The following general information for each asset was determined based on observation made during the site visit, limited as-built information, and conversations with facility staff.

12) Process Building

The process building (Figure 2) is an 82,000 square-foot pre-engineered metal building (PEMB) with metal roof deck, metal siding and 12-foot-tall concrete masonry unit (CMU) abuse wall at the base. The floor is constructed with reinforced concrete slab on grade and is protected with asphalt overlay. The building itself is supported by solid grouted steel piles that are 100 to 110 feet long. The rigid frames span in a north-south direction with interior support columns.

Figure 2: Process Building

Some of the interior columns were replaced recently with new steel columns with concrete encasement, as shown in Figure 3.

Figure 3: Recently Replaced Interior Columns with Concrete Encasement

The processing building is in overall fair condition. The following conditions were observed.

- Structural frames are in good condition, as shown in Figure 4, except for the columns located next to the rollup doors and the compactor, as shown in Figures 5–10. It should be noted that the damage on Bay 8 column (Figures 7 and 8) was repaired since the site visit.

Figure 4: Structural Steel Frames in Good Condition

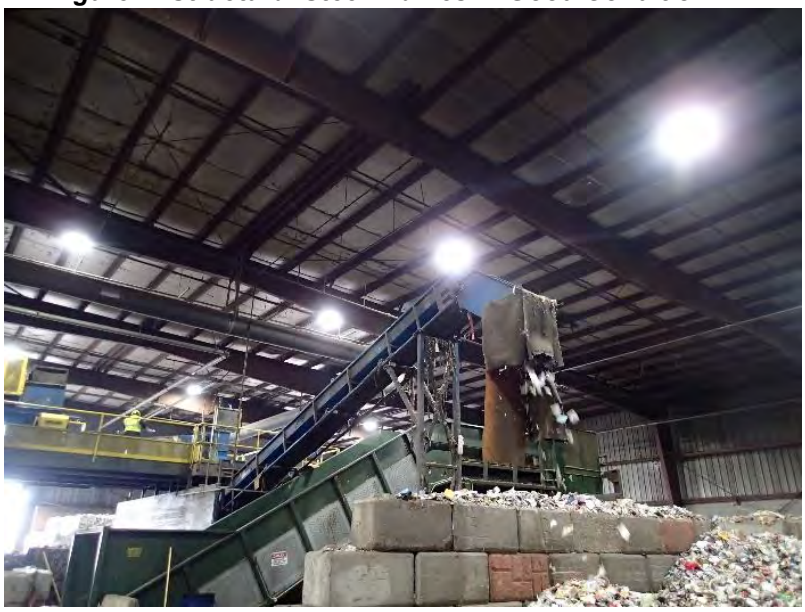


Figure 5: Damaged Column at Public Unloading Bays

Figure 6: Damaged Column Flange at Commercial Unloading Bays

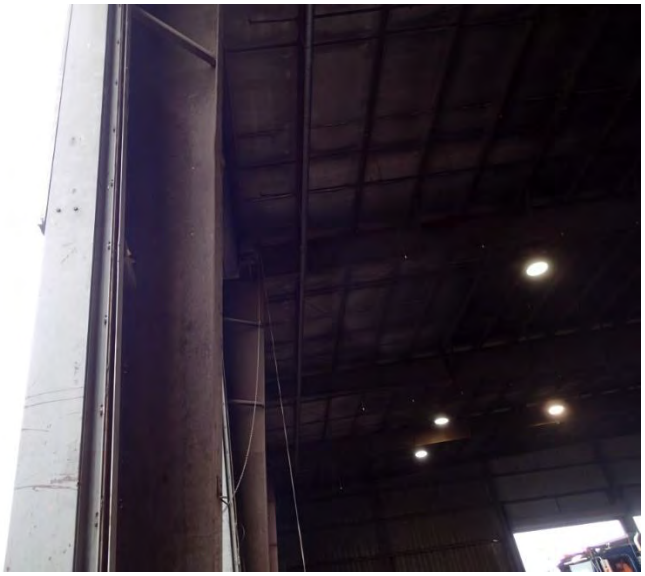


Figure 7: Recently Damaged Column, Abuse Wall and Bollard at Bay 8 (Repaired)

Figure 8: Recently Damaged Column, Abuse Wall and Bollard at Bay 8 (Repaired)

Figure 9: Damaged Column at Compactor Bay

Figure 10: Damaged Rollup Door at Bay 12

- The concrete floor (Figures 11–13) with wearing surface is in fair condition. No exposed floor reinforcing was observed.

Figure 11: Concrete Floor in the Commercial Bays

Figure 12: Floor in the Public Unloading Area

Figure 13: Floor in the Bale Storage Area

- Metal siding are generally in **fair** condition except for areas near the public and commercial unloading areas that are in **poor** condition, as shown in Figure 14.

Figure 14: Damaged Siding

- Exterior CMU abuse walls are generally in **good** condition, as shown in Figure 15.

Figure 15: Exterior CMU Abuse Wall

- Settlement issues were observed around exterior of the building, as shown in Figure 16.

Figure 16: Signs of Settlement

Recommendations

Our assessment revealed that the process building is in **fair** overall condition. We make the following recommendations for improvements to the building:

- ✓ Repair the damaged columns (short-term repair)
- ✓ Replace the damaged siding
- ✓ Replace the damaged rollup door at Bay 12

13) Scale House, Scale Booth and the Scales

The scale house and the scales (Figures 17 and 18) are in **good** condition.

Figure 17: Scale House

Figure 18: Scale House and Scales

Recommendations

Our assessment revealed that the scale house and the scale booth are in **good** overall condition. Our recommendation is:

- ✓ None

14) Administrative Building

The administrative building (Figure 19) is a pre-fab modular building. No obvious structural deficiencies were observed.

Figure 19: Administrative Building

Localized old water stains were observed on ceiling tiles, as shown in Figure 20.

Figure 20: Water Stains on Ceiling Tiles

Recommendations

Our assessment revealed that the Administration Building is in **fair** overall condition. Our recommendation is:

- ✓ None

15) Employee Facility

The employee facility (Figure 21) is a pre-fab modular building. No obvious structural deficiencies were observed.

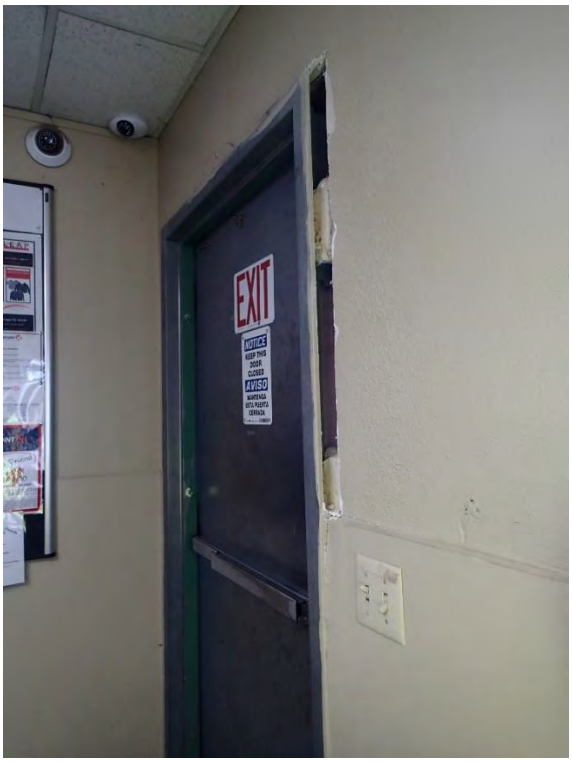
Figure 21: Employee Facility

Some old water stains were observed on the ceiling tiles, shown in Figure 22, and some ceiling tiles were loose.

Figure 22: Ceiling Tiles

A hole in the interior wall was also observed, as shown in Figure 23

Figure 23: Hole in Wall



Recommendations

Our assessment revealed that the administrative building is in **fair** overall condition. No visible structural damages were observed. Localized water stains, loose ceiling tiles, and a hole in the wall were observed. Our recommendation is to:

- ✓ Replace stained ceiling tiles and pop loose tiles into place
- ✓ Patch the hole in the wall

16) Recycling Shelter

The recycling shelter (Figure 24) is a fabric structure located at the lower yard area. The structure is generally in good condition.

Figure 244: Recycling Shelter

Recommendations

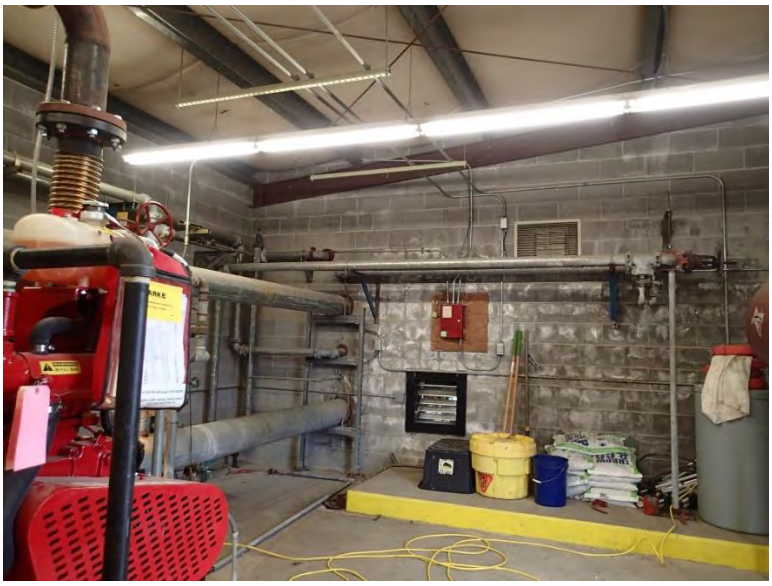
Our assessment revealed that the recycling shelter is in **good** overall condition. Our recommendation is:

- ✓ None

17) Pump House

The pump house (Figure 25) is a CMU building. The structure is generally in **good** condition.

Figure 25: Pump House



Recommendations

Our assessment revealed that the pump house is in **good** overall condition. Our recommendation is:

- ✓ None

18) Maintenance Building

The maintenance building (Figure 26) is a PEMB with metal roof panel, metal siding, and a CMU abuse wall at the lower part of the exterior wall. The structure is generally in **fair** condition.

Figure 26: Maintenance Building

Areas of siding show signs of damage, as shown in Figure 27.

Figure 27: Damaged Siding Above the Rollup Door

Recommendations

Our assessment revealed that the maintenance building is in **fair** overall condition. Areas of sidings show signs of damage. Our recommendation is to:

- ✓ Repair damaged siding

19) Used Oil Storage Facility

The used oil storage facility (Figures 28 and 29) is a PEMB with metal roof deck and metal siding. The structure is generally in **good** condition.

Figure 28: Used Oil Storage Facility

Figure 29: Interior of Used Oil Storage Facility

Recommendations

Our assessment revealed that the used oil facility is in **good** overall condition. Our recommendation is:

- ✓ None

20) Upper Yard

The upper yard pavement (Figure 30) has some wear in various portions of the drive aisle areas. Most of the wear in paved areas consists of areas where large trucks make turning movements.

Figure 30: Upper Yard Pavement

Other areas of pavement wear are located west of the process building, where material handling equipment traverse the drive aisles. In general, the pavement is in **fair** condition except for the maneuvering areas and the drive aisle at north and west of the process building that are in **poor** condition, see Figure 30 and 31.

Figure 31: Paved Area North of Process Building

Recommendations

Our assessment revealed that the upper yard pavement is in **fair** condition except for the maneuvering areas and the drive aisle at the north and west of the process building. Those areas are in **poor** condition.

Our recommendation is to:

- ✓ Repair or replace the worn pavement in maneuvering areas and the drive aisle west of the process building

21) Lower Yard

The lower yard pavement (Figure 32) has wear in the center of the lower yard paved area, mainly where large trucks and material handling equipment make turning movements.

Figure 32: Lower Yard Pavement

Recommendations

Our assessment revealed that the lower yard is in **fair** overall condition except for the large trucks and equipment maneuvering areas, which are in **poor** condition. Our recommendation is to:

- ✓ Replace the worn pavement surface and base aggregate as required

22) Stormwater Facilities

The stormwater facilities are separated into upper- and lower-yard facilities.

- The upper yard bio-filtration stormwater facility (Figure 33) is in **good** condition.
- The oil/water separator within the upper yard facility was not assessed as part of this report.
- The lower yard facility (Figure 34) is in **good** condition as well.

The operations and maintenance staff regularly keep the exterior paved areas clean and clear of recyclables and debris, which aids in keeping debris out of the stormwater facilities.

Figure 33: Upper Yard Swale

Figure 34: Lower Yard Swale

Recommendations

Our assessment revealed that the stormwater facilities are in **good** overall condition. Our recommendation is:

- ✓ None

23) Sanitary System

The onsite sanitary system was not assessed with this report, yet anecdotal information from the operator indicates the system is functioning appropriately with no issues.

Recommendations

The onsite septic system was not assessed. According to the operator, the system is functioning appropriately. Our recommendation is:

- ✓ None

24) Water

Water facilities around the site were not assessed, because most of the domestic water infrastructure at this facility is public water infrastructure owned and maintained by the City of Vancouver.

Recommendations

Water facilities were not assessed.

Conclusion and Recommendations

Our limited structural and site improvement conditions assessment reveals that most of the assets at the site are in good condition. Areas of pavement are in fair condition.

- The process building is in **fair** condition. Many columns in the public unloading and commercial unloading areas were damaged. The column damages are considered structural in nature and should be repaired soon. Siding near the public and commercial unloading bays was damaged. The damage is not structural in nature. However, the damaged siding should be repaired to prevent any potential corrosion problems due to moisture penetration.
- The scale house and scales, recycling shelter, pump house, and used oil storage facility are in **good** overall condition. No short-term action is needed.
- The administrative building, employee facility, and maintenance building are in **fair** overall condition. No short-term action is needed.
- The upper yard and lower yard areas are paved with asphalt concrete pavement. In general, the paving is in **fair** condition except for in heavy traffic areas, which are in **poor** condition. We recommend the worn surface areas be repaired or replaced.
- The stormwater facilities are in overall **good** condition. No short-term action is needed.
- The sanitary system and the water system were not assessed. Therefore, no recommendation is made.

Our structural and civil conditions assessments were limited to those areas that are readily accessible and visible to field staff. Concealed conditions that become exposed in the future may change our current recommendations.

Appendix D

Limited Structural and Exterior Site Improvement Conditions Assessment, Washougal Transfer Station

Clark County Washougal Transfer Station (WTR) is a privately owned solid waste transfer station. It is the primary solid waste handling facility for route truck deliveries from the cities of Washougal and Camas as well as for self-haul use on a limited schedule. The facility was constructed in 2008–2009 and is located within the city limits of the City of Washougal on about 4.5 acres. The address of the facility is 4020 S. Grant Street, Washougal, Washington. An aerial view of the facility is show in Figure 1.

Figure 25: Aerial View of Clark County WTR

The facility includes a transfer station, a household hazardous waste (HHW) facility, a public recycling area, a scale plaza and an administration office. The transfer station is a three-bay building with a single lift-and-load trailer-loading bay on the east side of the building. The HHW building is a drive-through canopy with a secured storage area for citizens to drop off HHW material. The recycling area consists of drop boxes on concrete slab on grade without canopy. The scale plaza has an inbound and an outbound vehicular truck scale and a scale house. There is a modular administration office onsite as well.

The facility has various areas of asphalt pavement that provide vehicle maneuvering areas for large trucks and community members using the facility. There is a gravel storage area within the center of the site that is used for large trailer storage. Sanitary sewer is collected from the administrative office and transfer station. The sewer discharges through a coalescing plate

oil/water separator before discharging into the public sewer system within Grant Street. The stormwater runoff of the roof area and paved areas is collected via a series of stormwater catch basin inlets. The catch basin inlets drain into a biofiltration swale for water quality treatment.

The County commissioned J.R. Miller & Associates, Inc. (JRMA) to conduct an overall facility existing conditions review as part of Task 6 of the Clark County Regional Solid Waste System Study's scope of work. The goal of this assessment is to observe, determine the condition of the assets, and make rehabilitation recommendations. This document summarizes our assessment findings and will be included in the final Clark County Regional Solid Waste System Study.

The walk-through assessment was conducted on February 12, 2020, by Doug Drennen and Krystal Li, PE, of JRMA; and Michael Summers, PE, of AKS Engineering and Forestry (AKS). They were accompanied by Yuta Naganuma and Jeff Smith of Waste Connections of Washington (WCW). The assets listed on the next page were included in the walk-through assessment:

1. Transfer Station
2. HHW Canopy
3. Scale House
4. Administration Office
5. Transfer Station Vehicle Maneuvering Area
6. Gravel Storage Area
7. Public Recycling Area
8. Storm Facilities
9. Sanitary
10. Water

The assessment did not involve a detailed inspection of all building structural elements nor the site civil-related assets. Limited as-built documents were available for review. Destructive and non-destructive material testing and inspection were not performed. The following general information for each asset was determined based on limited observation made during the site visit, limited as-built information, and conversations with facility staff.

25) Transfer Station

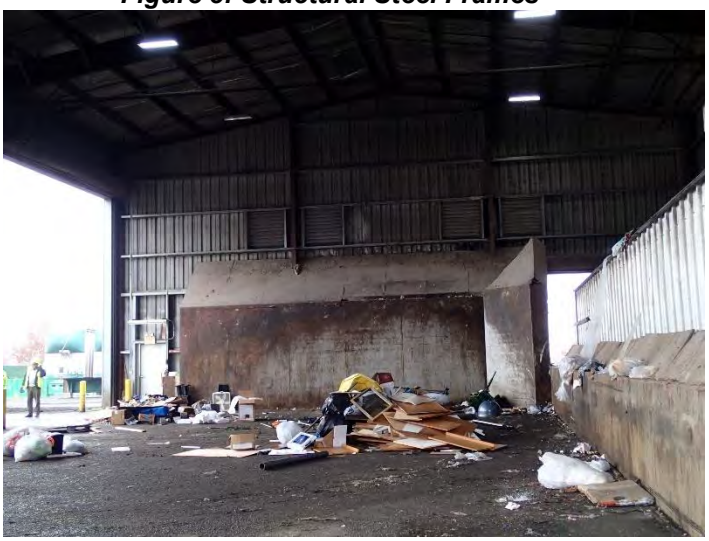
The transfer station, shown in Figure 2, is a pre-engineered metal building (PEMB) with metal roof deck and metal siding. A lift-and-load partial tunnel is located at the east end of the building. The tipping floor is constructed with reinforced concrete slab-on-grade. The building columns are protected by steel push walls or steel bollards.

Figure 2: Three-Bay Transfer Station

The transfer station is in overall **good** condition. The following conditions were observed.

- Structural frames (Figure 3) are in good condition. No obvious damage was observed.

Figure 3: Structural Steel Frames



- The concrete floor (Figure 4) is in fair to good condition. No exposed floor reinforcing was observed.

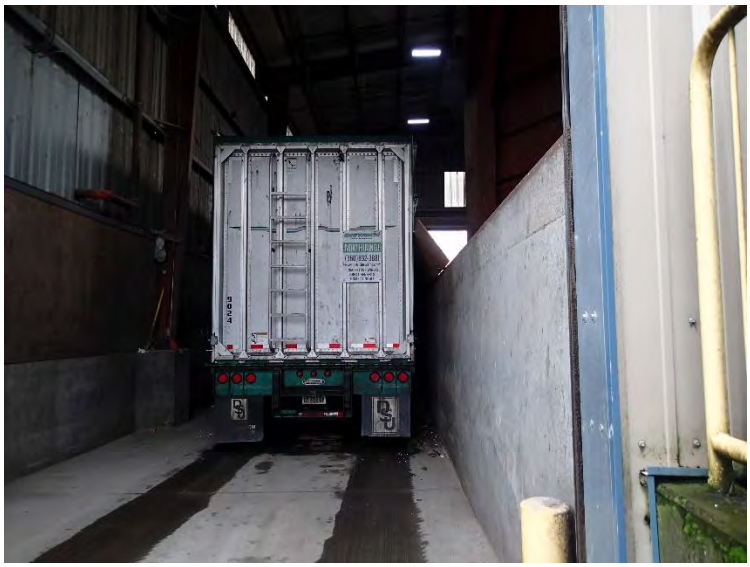
Figure 4: Concrete Floor

- The metal roof deck and metal siding are generally in **good** condition, except for the siding located immediately behind the lift-and-load trailer area, as shown in Figure 5. The damage is mainly due to the waste loading operation. JRMA recommends adding a “trash deflector” to the back side of the partial tunnel to guide the waste material into the trailer while loading.

Figure 5: Damaged Siding

- The concrete walls and floor in the partial tunnel (Figure 6) are in good condition.

Figure 6: Partial Tunnel



Recommendations

Our assessment revealed that the transfer station building is in **good** overall condition. We make the following recommendations for improvements to the building:

- ✓ Replace the damaged siding
- ✓ Add trash deflector around the lift-and-load area to protect the metal siding

26) HHW Facility

The HHW facility is a PEMB with a metal roof and partial metal siding. The floor is constructed with reinforced concrete slab-on-grade. The canopy and the concrete slab (Figures 7 and 8) are in good condition.

Figure 7: HHW Canopy and Concrete Slab

Figure 8: HHW Canopy

Recommendations

Our assessment revealed that the HHW building is in **good** overall condition. Our recommendation is to:

- ✓ None

27) Scale House and Scales

The scale house and the scales (Figure 9) are in good condition.

Figure 9: Scale House and Scales

Recommendations

Our assessment revealed that the scale house and the scales are in **good** overall condition. Our recommendation is to:

- ✓ None

28) Administrative Building

The administrative building (Figure **17** 10) is a modular building with three-ply roof and Hardie Board siding. No obvious structural deficiencies were observed.

Figure 10: Administrative Building

Recommendations

Our assessment revealed that the administration building is in **good** overall condition. Our recommendation is to:

- ✓ None

29) Transfer Station Vehicle Maneuvering Area

The drive aisles that course through the site are paved with asphalt concrete pavement. The as-built depth of the pavement is unknown. There are various areas of the paved drive aisles that are showing wear, as shown in Figures 11 and 12. The areas of wear are mainly in the vehicle maneuvering areas for large trucks. The pavement surface is generally in good condition with some areas in fair condition.

Figure 11: Paved Areas in Front of the Transfer Stastion

Figure 12: Cracked Pavement at Transfer Truck Exit

Recommendations

Our assessment revealed that the transfer station vehicle maneuvering area is in **good** overall condition with areas in **fair** condition. Our recommendation is to:

- ✓ Repair worn paved surface as required

30) Gravel Storage Area

The gravel storage area (Figure 13) is in good condition. With a visual inspection the gravel appeared to be regularly maintained with grading and compaction of maintenance rock.

Figure 13: Gravel Storage Area

Recommendations

Our assessment revealed that the gravel storage area is in **good** overall condition. Our recommendation is to:

- ✓ None

31) Public Recycling Area

The public recycling area is adjacent to the HHW building along the north boundary of the site. The container bins for this area are on a concrete pavement surface, while the drive-through areas for public traffic are an asphalt pavement area. There is some cracking in the concrete pavement, shown in Figure 14, at the joint of the pavement and transition with the asphalt pavement.

Figure 14: Cracked Pavement at Public Recycling Area

Recommendations

Our assessment revealed that the public recycling area is in **good** overall condition. Our recommendation is to:

- ✓ Repair cracked paved surface as required

32) Stormwater Facilities

The stormwater facility is in good condition. The biofiltration swale (Figure 15) is in good condition with regular maintenance of the grassed vegetation. The biofiltration swale begins with a sediment trap or concrete box to capture sediment. The sediment trap is in good condition as well.

Figure 15: Swale

Recommendations

Our assessment revealed that the stormwater facilities are in **good** overall condition. Our recommendation is to:

- ✓ None

33) Sanitary System

The sanitary sewer facilities onsite are in good condition. The coalescing plate oil/water separator has convenient access with a traffic-rated lid. The plates and interior baffles are kept clean with regular maintenance and are in good condition.

Recommendations

Our assessment revealed that the sanitary system is in **good** overall condition. Our recommendation is to:

- ✓ None

34) Water

The facility is served with domestic water and has a fire water system for the transfer station building. There is a fire hydrant located adjacent to the administrative office structure that appears in good condition. The fire riser room in the rear of the transfer station was conveniently accessible and in clean, good condition.

Recommendations

Our assessment revealed that the water system is in **good** overall condition. Our recommendation is to:

- ✓ None

Conclusion and Recommendations

Our limited structural and site improvement conditions assessment reveals most of the assets at the site are in good condition except areas of pavement, which are in fair condition.

- The transfer station is in **good** condition. Siding damage behind the trailer lift-and-load area was observed. The damage is not structural in nature. However, the damaged siding should be repaired to prevent potential corrosion problems due to moisture penetration.
- The HHW canopy, the scale house and administration office are in **good** overall condition. No short-term action is needed.
- The gravel storage area is in **good** condition. No short-term action is needed.
- The public recycling area is in **good** condition. Small areas of cracked pavement were observed. No short-term action is needed. The cracked pavement should be repaired in the future.
- The drive aisles that course through the site are paved with asphalt concrete pavement. In general, the paving is in **good** condition except for in the truck maneuvering areas. We recommend the worn surface areas be repaired or replaced.
- The storm facilities, the sanitary system, and the water system are in overall **good** condition. No short-term action is needed.

Our structural and civil conditions assessments were limited to those areas that are readily accessible and visible to field staff. Concealed conditions that become exposed in the future may change our current recommendations made here.

Appendix E

February 15, 2020

Mr. Doug Drennen, PE

JRMA Architects Engineers

14206 NE 102nd Street

Vancouver, WA 98682

RE: Waste Connections MRF Equipment Condition Assessment

Dear Mr. Drennen:

Thank you for the opportunity to work with your firm regarding the equipment condition assessment of the Material Recovery Facility that serves Clark County.

Our site visit and inspection were completed in two days during the week of February 10th. During this time the operator, Waste Connections, gave us complete access to the plant and the freedom to interact with MRF staff members including sorters, equipment operators, maintenance team, and managers. The Maintenance Manager was very engaged in the process and was most helpful.

The plant has been processing since 1992 with a major retrofit completed in or around 2008 and it is in remarkably good shape. The balers, process system conveyors, and components are functioning as designed although at much lower run rates than originally designed. The plant equipment is in good operating condition; however, it is relatively inefficient by comparison to current systems that employ the latest applications of screening, robotics, optical sorting, and air classification technologies.

Although MRF operational practices were not a direct component of our equipment assessment, observations that were made during the inspection process that impacted system equipment functionality and related product outputs are included in this report.

Since 1992, Swordfish Consulting personnel have served the recycling industry managing operations designing equipment processing systems, managing equipment retrofits, and turning around struggling recycling operations. The insights we have gained during the past 28 years have been applied to the following equipment condition assessment.

Sincerely,

Richard Kattar

Principle and Managing Director

Swordfish Consulting Services, Inc.

DRAFT

Waste Connections Material Recovery Facility

Clark County, Vancouver, WA

Equipment Condition Assessment

Presented to:

JRMA Architects Engineers

Submitted by:

Swordfish Consulting Services, Inc.

Recycling Management Services and Production System Development

1589 Blackwood Ct, Erie, CO 80516

303-589-5864

February 15, 2020

Table of Contents

1. PROJECT OVERVIEW

Swordfish Consulting Services, Inc. (SFC) conducted an Equipment Condition Assessment of the recycling processing system at the Waste Connections Material Recovery Facility (WCMRF) in Vancouver, WA. SFC inspected the entire processing system observing all components while idle and while processing in order to assess current operational condition.

The SFC team consisted of Richard Kattar, who was on site Tuesday, February 11, and Wednesday, February 12, 2020. Day 1 of the inspection process we completed a team introduction and received a business and operations briefing from the Waste Connections' leader team. This was proceeded by a plant and site walk through with the Maintenance Manager.

Preparation for the inspection included:

a. review of 1992 and 2008 system as-built drawings,
b. review of plant operations with Lead-Point team leaders (Lead-Point supplies all sorter labor for the plant),
c. review of plant program material composition,
d. review of current state plant production statistics,
e. review of maintenance costing data provided by WCMRF.

Day 1 we focused on understanding the basics, system design, inbound material volume and composition, flow of material through each workstation, and the outputs of each system component. Our initial objective was to understand what production throughput-burdens the system was experiencing at the observed run rate. The system is rated to process at between 27 and 32 tons per production run hour without glass. As observed, we guesstimate that the run rate was approximately 20 tons per production run hour. The operating team later confirmed an 18 to 20 ton per production run hour performance level. Once we understood the actual system production run rate, we could better determine equipment functionality. At the time of our inspection, it appeared that all manned critical system sorting positions were occupied and product quality was exceptional.

Day 2 our focus was on system equipment condition and functionality at the current production run rate. Each component was observed during different times of the inspection period to assure we noted operations with different composition flows. Observing each component input and output tells us how well each component handles product flow and usually exposes process bottle necks which effect quality. We also spent time with the sorting team leaders to get a feel for material flow and related production issues and mechanical challenges. The sorting team has great knowledge of the plant's operating challenges including component mechanical challenges.

2. SCOPE OF WORK: Conduct WCMRF Equipment Condition Assessment

The WCMRF equipment condition assessment included an inspection of all system mechanical, electrical, and hydraulic components for evaluation of current state condition and operational functionality. In our review we focused primarily on fixed equipment. All rolling stock appeared to be operating well and fit the application they were dedicated to perform. The following apparatus was included in the inspection and evaluation:

1. Drum feeder
2. Conveyor chassis
3. Shafts
4. Bearings
5. Motors/gear boxes
6. Equipment support structure
7. Head and tail pulleys
8. Disc screens
9. Vibratory screens
10. Belts and belt splices
11. Magnet
12. Eddy-current
13. Slider beds
14. Return rollers
15. Balers
16. Dust control system

3. WCMRF EQUIPMENT INSPECTION

A. Existing Equipment Condition Report

The operational condition along with comments are described in Table 1 below. Photographic and video presentation of certain components are presented as exhibits.

TABLE 1

EQUIPMENT	CONDITION	COMMENTS
Drum Feeder and Take-away Conveyance	Good operational condition	Narrow drum feeder and product conveyance away. Wider units would reduce burden depth and material surging.
General Conveyor Chassis		Original Harris baler (Gorilla) chain conveyor would benefit

	All conveyor chassis inspected were in good operational condition.	by more regular lubrication. Conveyor PIT drainage may be problematic. Auto oiler may be appropriate.
Shafts	All shafts appeared in good working condition.	Inspection was not completed with guards removed. General note that guarding was very robust throughout the plant.
Bearings	All bearings observed were in operating condition, free of wrap with Zerks in place and used.	No comment
Motors/Gear boxes	All motors and gear boxes appeared in good working condition.	All gear boxes inspected were cool to the touch. Most motors were free of dust and debris. No motors were observed rocking.
Equipment Support Structure	All equipment supports appeared to be in good shape.	We observed no excess vibration or platform swaying. We did not observe any structural damage that appeared to be problematic.
Head and Tail Pulleys	All head and tail pulleys appeared in good operational condition.	We observed no excess buildup or wrap on any pulleys.
Disc Screens	All screens were in good operating shape. Scalping screen, 2-inch screen, newspaper screens 1, 2, and 3 were all screening properly. Cardboard screen is old with wide spacing.	This is where we advise operators to begin planning for newer screening technology. Reduced wrapping disk screens and ballistic screens are all better than current state. The operator indicated that the cardboard screen was being replaced with a new Machinex tight-spaced 2-deck screen.

Vibratory Screen	The container line metering vibratory screen was functioning as designed.	The current screen is not effective with the changing stream composition. A ballistic screen would provide better fiber/container screening and would provide a clean flow to future container line optics or robotics.
Belts and belt splicing	Most belts were in good operating shape. Many of the wide-screen feeding belts could use better under supports or tightening.	We observed several wide feed belts operating in such a way as to accelerate wear. Some belts were observed that could be better tracked to center. These were worn belts that may be planned to replace soon. Replacing belts that have worn cleats will help mitigate process flow surging and missed sorts on the container line.
Magnet	The magnet was observed to be operating as designed.	The magnet appears old and a newer unit might provide more yield at higher designed run rates
Eddy-Current	The eddy-current was observed to be operating as designed.	This is a small and under-designed unit for the system and its current produced composition. A wider and more powerful unit should be explored in the near future. Robotics quality control (QC) on the aluminum QC sort line should be explored.
Slider Beds (associated with most sorting conveyors)	Slider beds that we were able to observe all appeared in good shape.	WCMRF maintenance team indicated that they have been rebuilding most beds. The older original 1992 sort line conveyors and belts are all ready for change out.

Return Rollers	All return rollers observed were in good working order. No major wrap was observed.	Very good sign as wrap leads to belt wear and downtime.
Balers – Harris Gorilla and Centurion 2 Ram	The 2 balers both appeared in good working condition. Wire tie systems are always a challenge in a MRF and they appeared normal.	Baler infeed conveyors appeared in working order. Obvious water impact was observed. It appears that the chain conveyors could use more lubrication. WCMRF maintenance indicated that relines were completed on both balers recently.
Dust Control Systems	The plant dust mitigation system appeared to be working as designed.	Good stuff for employee comfort and fire prevention. Also big regarding bearing wear.

B. Assessment of Current Equipment Maintenance Practices

With consideration of the age of the system and the environment the equipment is operating, the WCMRF is in good operating condition and is not burdened by excessive downtime and system bottle necks. We would grade maintenance practices as better than average. The maintenance team appears very engaged and was actively part of assuring smooth operations. The maintenance shop is well equipped and organized. The task board was observed to have scheduled PMs identified for the day as well as notes regarding potential issues. The Maintenance Manager indicated that they were working to employ a computerized maintenance management system (CMMS) in the near future. This would be very important going forward with future equipment enhancements like optics and robotics.

C. Useful Life Protection

The system, though fully functional and in good operating condition, is several generations behind current technology and, by comparison, relatively inefficient. The plant's current reduced production run rates are directly correlated to the huge material composition changes realized over the past 10 years and the current technology employed to process it. While newspaper generation continues its decline, cardboard composition has dramatically increased, challenging most traditional paper screening machines. In the short term (2-4 years), the plant

should consider continuing its current practice of targeted component replacements. The cardboard screen is scheduled for replacement soon. We recommended other potential targeted components in the condition report section. In particular we recommend those components that can be easily installed and then removed for use in a future greenfield application. Robotics, ballistic screen and optical sorters in that order are fairly easy to integrate into an existing system and are usually easy to plug and play into a new system at a later date. Long term, considering the dramatic change in material composition, age of the existing system, the County's progressive approach to recycling and the prospects for expanding the environmental programs offered to residents and businesses, the total redesign and replacement of the existing MRF system will yield greater environmental and financial benefits than retrofitting the existing system.

D. Recommendations for Operational Improvement

As with most MRFs, there is always opportunity to better grade incoming loads and avoid processing material over the system that would be better redirected to less costly processes. Expanding tip floor grading practices to better direct material to the best "process application" would be a huge time and cost savings while contributing to improved yield and quality. A second opportunity which happens to also be people centric, regards sorter retention and production awareness. We recommend that the team bring more "Lean Manufacturing" tools to the sorting platforms. Color coding sorting chutes and installing chute pictures would help increase product quality and give staff a better understanding of what each sort station does. Workstation information boards might also be considered. Identify key drivers for each workstation and post. Example: priority picks, picks per minute expected, PPE required, sorting threats and any other work station specific standard procedures. Workstations might include presort, cardboard QC, fiber sorting platform and container sorting platform. We also recommend that the Gemba board (production board) be placed in the plant on the fiber work station platform. It should be reviewed with line leads and operators 3 times a day to assure production performance success.

E. Potential Improvements Projected with New System

There are several advanced technologies that are absolute requirements for future processing. As it relates to the WCMRF, the following technologies should be reviewed and employed.

1. Plastic's optical sorting on #1, #2, and #5 plastic resins (increased yield and speed)
2. Robotic sorting on post aluminum residue reduction line (increased yield and speed)
3. Robotic QC sorting of aluminum (increased quality and speed)
4. Ballistic screens to replace vibratory screen and possibly newspaper screens (increased yield and quality)
5. Reduced wrap star screens to replace newspaper screens #1 and #2 (increased uptime, increased paper/container separation)
6. Enhanced Eddy Current (increased yield and quality)
7. Larger drum feeder (reduced surging and increased yield and speed)

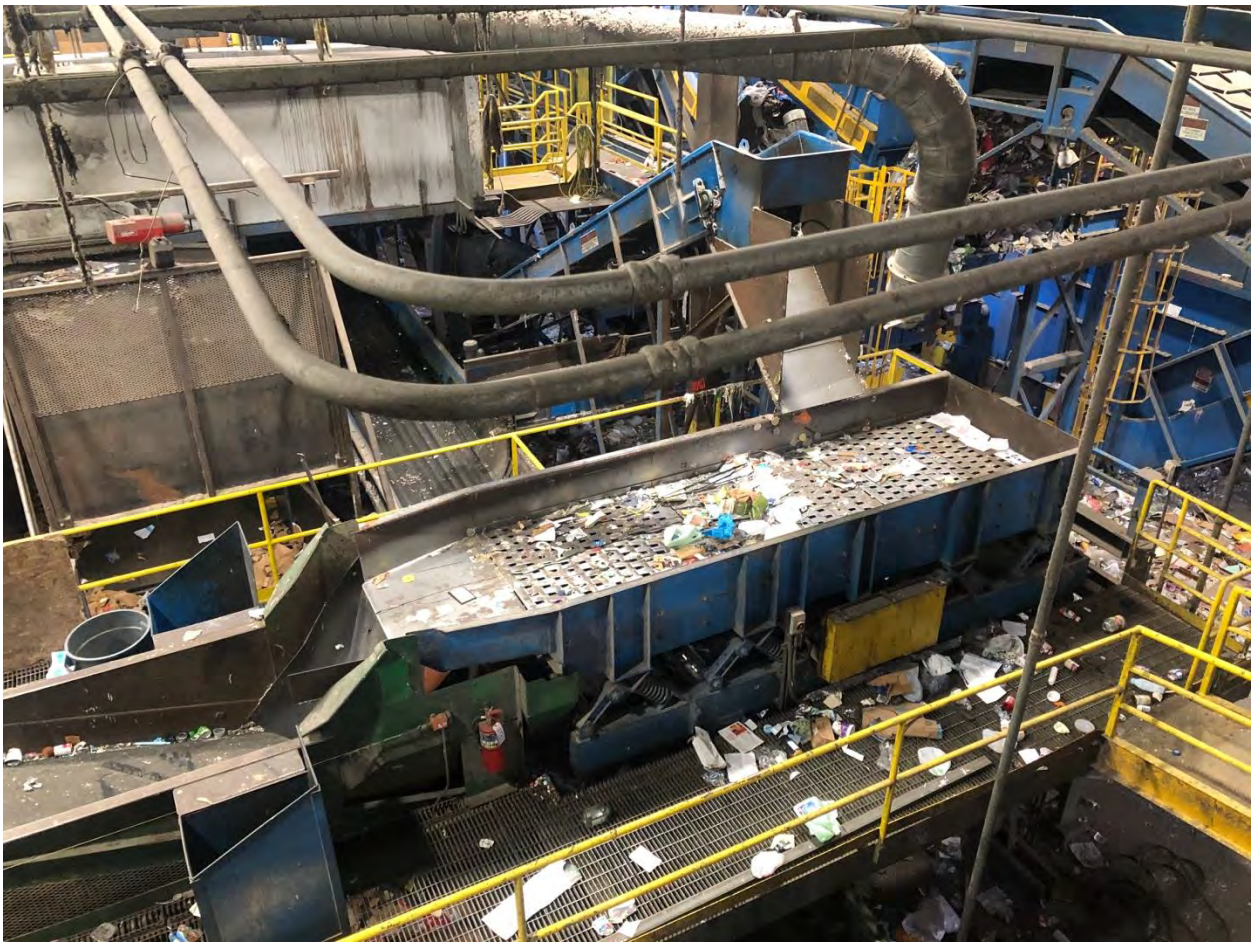
8. Paper optical sorting on fiber line (reduced mixed paper, increased cardboard yield, reduced labor, increased quality)

In the opinion of SCS, the total replacement of the MRF system will:

1. Increase production run rates by 5-10 tons per hour
2. Increase plant capacity
3. Decrease labor cost per ton produced
4. Decrease maintenance cost per ton produced
5. Improve yield and quality.

EXHIBIT A: PHOTOS

A. Vibratory screen feeding the container line. We recommend replacing with a ballistic-type screen to better remove fiber for increased container yield down-stream.



B. Fiber Screen #1 (6” Scalping, 2” Fines, Newspaper Star Screen)

The yellow chain guards for the 3 different screens are shown below. We recommend you consider new shaft-wrapping reduction screens now available. They have extra large diameter shafts that resist plastic film and clothing wrapping.

C. Fiber Screen #3 (Finishing Screen)

We recommend you consider a possible upgrade to a ballistic-type screen. The ballistic screen is more efficient at small fiber and container separation, and because it has no shafts and stars, it is much less expensive to operate.

D. Eddy-Current

This unit is small and will struggle with yield and quality at design speeds. We recommend the review of a more powerful and wider unit. This is also the platform area that robotics application would be optimal.

E. Baler Chain Conveyor

We recommend that the lubrication processes be reviewed and that an auto-oiler system be considered.

F. Fiber Sorting Platform

This is an area where future optical sorting will help reduce mixed paper production and increase #56 residential fiber pack. Labor reductions should decrease processing costs.

This was designed originally as a two-sided, sort platform. It has been modified for a one-sided, toss-across sorting which is more efficient. This is another area where optical sorting could greatly enhance operations and reduce cost.

4. Exhibit B – Video

A video guide of the system flow with audible is a stand-alone attachment.