



**Moscow City Council
Workshop
Sanitation Master Plan**

Laurie M. Hopkins

City Clerk

~Agenda~

208.883.7015

www.ci.moscow.id.us

Monday

5:30 PM

Council Chambers

October 29, 2018

206 E. Third St.

Call To Order

1. Welcome - Mayor Bill Lambert

2. Presentation Of The Draft Comprehensive Sanitation Master Plan – Tim Davis

Development of the plan focused on evaluation of sanitation system infrastructure and programs including; recycling program review including program evaluation and information on considerations for relocating the Moscow Recycling Center; a capital improvement plan for relocation of the Recycling Center including yard-waste drop off facilities; and a feasibility study of develop a material recovery facility to process recyclables in Moscow. As with other plans the City has developed, a steering committee was developed to provide perspective on the planning process from many facets of the community. Additionally, the City conducted a three-phased survey approach. Following the written survey, three opportunities were provided for citizen engagement through focus groups

Documents:

DRAFT SANITATION MASTER PLAN .PDF
TECH MEMO 1 - EXISTING SYSTEM REVIEW.PDF
TECH MEMO 2 - PROTOTYPICAL REYCLING CENTER.PDF
TECH MEMO 3A - MRF FEASIBILITY STUDY.PDF
TECH MEMO 3B - SOLID WASTE PROGRAM REVIEW.PDF
SANITATION SURVEY EXECUTIVE SUMMARY.PDF
MATRIX SUMMARY TABLE.PDF

3. City Council Discussion And Direction (ACTION ITEM)

Adjourn

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City of Moscow

Comprehensive Sanitation System Master Plan

DRAFT

September 2018

Prepared by:



City of Moscow

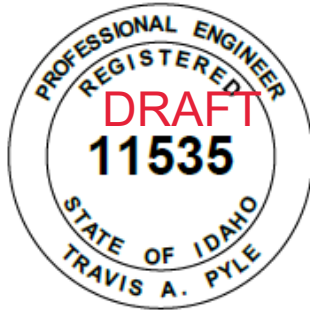
Comprehensive Sanitation System Master Plan

Prepared for
City of Moscow, Idaho

September 2018

Prepared By





This document was prepared under the direct supervision of
Travis A. Pyle, a registered Professional Engineer in the State
of Idaho, employed at Great West Engineering, Inc.

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1.0 Introduction

The City of Moscow retained Great West Engineering, Inc. (Great West) to provide a review of the City's Sanitation system and programs, including evaluation of the solid waste and recycling programs, and recommendations for improvements. This report is the final step in the Comprehensive Sanitation System Master Planning Project, which is being conducted in accordance with the contract between Great West and the City of Moscow, dated February 26, 2018.

1.1 Purpose and Objectives

This report summarizes the findings and results from multiple evaluations conducted as part of a comprehensive review of the City's Sanitation services in order for the City to continue its mission of "... actively exploring and assessing viable new technologies and opportunities in the management of the waste stream which protects the health, safety and cleanliness of the City."

This multi-step project began by first assessing the condition and level of service provided at the existing Moscow Recycling Center (MRC). The evaluation was predicated on: (1) possibly needing to move the MRC to a new location so that the City could use the property for another purpose; (2) eliminating the processing/baling components of the center and moving those systems to Latah Sanitation, Inc.'s (LSI's) Solid Waste Processing Facility (SWPF), southeast of town; and (3) providing the City an opportunity to improve on the services, safety and accessibility of the center.

The project then moved into evaluating the possibility of the City hosting a material recovery facility (MRF) for themselves and their quad-city area neighbors of Lewiston, Idaho and Pullman and Clarkston, Washington at the SWPF. Meanwhile, the City administered a public outreach program that gathered input on the City's current sanitation system through written surveys, intercept (interview) surveys and focus group interviews. The City also formed an Advisory Group made up of City residents and stakeholders that provided input through each step of the project. Intel from these sources, coupled with industry best design and operational practices, established the basis for the prototypical layout concepts for a new recycling center.

At the time this report was published, the City was researching possible properties to locate a new recycling center.

1.2 Background

The City of Moscow is located in Latah County, Idaho approximately 35 miles north of the City of Lewiston and 8 miles east of Pullman, Washington, and is the home of the University of Idaho. Moscow has a population of approximately 25,500 full-time residents and is the largest city in Latah County. In addition to the full-time residents in Moscow, the University has another 10,000+ students that are not considered full-time residents. Latah County has approximately 39,500 full-time residents.

The population of the City of Moscow is expected to grow an average of 1.15% per year, while Latah County, without the City, is anticipated to grow at a rate of 0.56% per year (per the City's Finance Department – refer to **Exhibit 1**). The County, including the City of Moscow, is expected to grow at an aggregate rate of 0.92% per year. As Latah County continues to grow, so will its generation of solid waste.

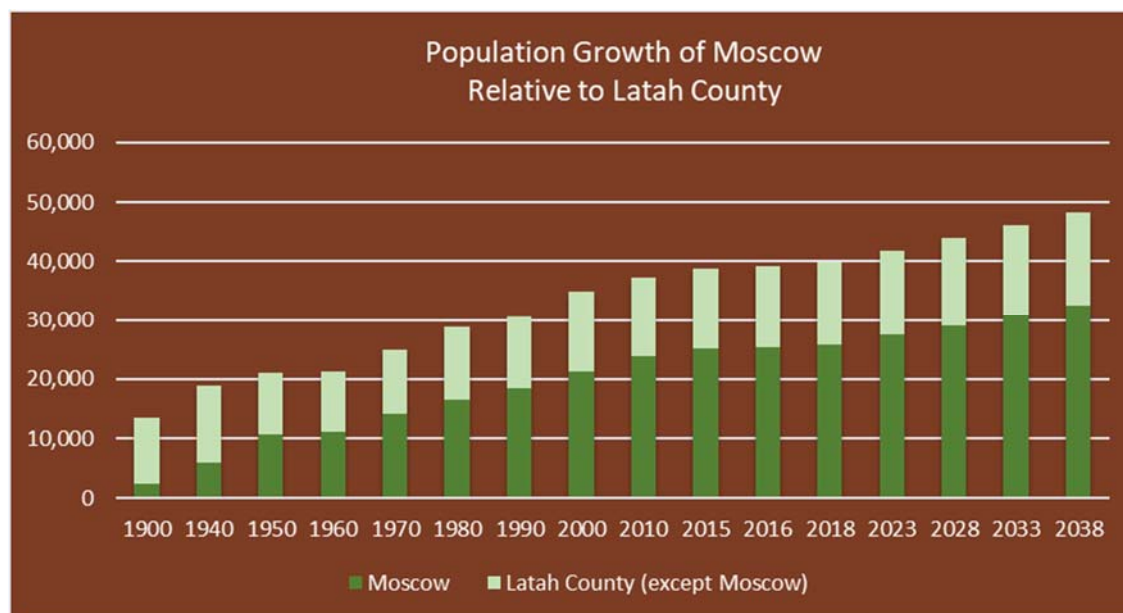


Exhibit 1. Population Growth of Moscow Relative to Latah County (Courtesy of Moscow)

1.3 Moscow Sanitation Services

Moscow's Sanitation Division is administered through the City's Finance Department. Tim Davis is the Sanitation Operation Manager and oversees the entire program for the City. Mr. Davis works closely with the City's sanitation service provider, LSI. The sanitation program includes the SWPF, the MRC, and the curbside collection program for municipal solid waste (MSW) and single-stream recyclables.

In 2015, the City granted a franchise agreement extension to LSI for an additional 20-year term. The agreement is for: (1) MSW and single-stream recyclable collection services within the City; and (2) operation of the waste transfer station at the SWPF, the MRC, and associated solid waste facilities.

LSI owns, operates and is responsible for all capital assets and equipment utilized in the sanitation system operations, except for the MRC which is owned by the City. It is anticipated that the City will continue to receive sanitation services under the current franchise agreement with LSI until the end of the agreement term. Through the franchise agreement with LSI, the City of Moscow provides curbside collection of MSW weekly and recycling collection biweekly (every other week). In January 2018, the City extended the curbside collection program to businesses. Additionally, the City contracts with Waste Connections for waste transport and disposal (T&D) services. MSW is long-hauled to Waste Connection's Finley Buttes Landfill in Boardman, Oregon.

1.4 City's Sanitation Division Goals

The Sanitation Division strives to build community confidence by actively exploring and assessing viable new technologies and opportunities in the management of the solid waste stream to protect the health, safety, and cleanliness of the City. The Sanitation Division's goals are to:

- Deliver quality, efficient and effective solid waste sanitation services and programs to the community at a good value.
- Deliver a system that encourages the reduction of solid waste and remains flexible and readily adaptable to the complexities of growth, change and customer service needs.
- Design sanitation programs which recognize the fiscal and environmental responsibilities entrusted in the City.

The Sanitation Division continues to strive to improve neighborhood collection day aesthetics and conditions, promotes product stewardship and producer responsibility, and informs the public through the waste reduction education program efforts to rethink, reduce, reuse, and recycle.

Solid waste is regulated under the City's Solid Waste Ordinance (Chapter 9 of the Title 9 – Business Regulations). Solid Waste fees, along with other City-service fees, are set through City resolutions. The current resolution setting fees were adopted on August 15, 2016 (Resolution No. 2016-15).

2.0 Overview of Solid Waste Generation

This section presents an overview of solid waste generation in the City of Moscow and Latah County. The next section, Section 3.0, provides a summary of the solid waste program overall and the systems and facilities that make-up Moscow's Sanitation Services.

2.1 Total Solid Waste Generation

The amount of total solid waste generated in Latah County averages approximately 38,000 tons per year, based on 2013-2017 waste tonnages (refer to **Table 1**). Total solid waste is the cumulative amount of all the various waste types generated, including waste that is landfilled (MSW and NMSW) and materials that are diverted from the landfill. Materials that are diverted include conventional recyclables, yard waste and biosolids that are composted, and other diverted materials. Total solid waste specifically includes the following materials:

- **Municipal Solid Waste (MSW)** – Collected curbside in the City by LSI, collected in the County by LSI (other cities and towns and unincorporated areas of the county), and direct-hauled waste to the SWPF by residents and commercial customers.
- **Non-Municipal Solid Waste (NMSW)** – Inert and construction and demolition (C&D) wastes collected from commercial accounts in the City, and also waste direct-hauled to the non-municipal solid waste landfill (NMSWLF) at the SWPF.
- **Conventional Recyclables** – Single-stream (co-mingled) recyclables collected at the curb from both residential and commercial accounts in Moscow, as well as rural collection areas in Latah County and presorted materials dropped off at the MRC. These materials typically included plastics, cardboard, mixed paper, aluminum cans, and steel cans. Glass is also collected at the MRC.
- **Yard Waste** – Collected at the MRC or direct-hauled to the SWPF for grinding and composting. Yard waste materials include lawn clippings and brush. Clean wood waste is also collected at the SWPF for composting.
- **Biosolids** – Dewatered and stabilized sludge generated from the City of Moscow's Wastewater Treatment Plant, which is direct-hauled to the SWPF for composting.
- **Other Diverted Materials** – Materials direct-hauled to the SWPF, including scrap metal, whitegoods (large appliances), and tires.

Household hazardous waste (HHW) is also collected at the SWPF for city and county residents. The material is collected, bulked and packaged, and sent offsite for proper management diverting it from the landfill. Materials such as used oil is recycled and, in some cases, used as a heating oil. HHW is a small fraction of the overall waste generation in the county and is not included in the total waste and diversion figures.

Of the 38,000 tons of total solid waste generated by Latah County each year, about 26,000 tons (or 68%) is municipal and non-municipal garbage that is landfilled. Of this amount, approximately 9,000 tons of MSW (or 47%) is collected curbside in Moscow.

Table 1 – County-Wide Total Solid Waste Generation Tonnages

Waste	2013	2014	2015	2016	2017	Average
Solid Waste	26,493	24,442	25,489	26,910	26,985	26,064
MSW	18,207	18,266	18,690	19,527	20,059	18,950
NMSW	8,286	6,176	6,799	7,383	6,926	7,114
Total Recyclables/Diverted Materials	11,977	12,080	11,699	12,620	12,498	12,175
Conventional Recyclables ⁽¹⁾	3,638	3,605	3,417	3,538	3,433	3,526
<i>Moscow Curbside Pickup</i>	514	524	454	537	697	545
<i>Moscow Recycling Center</i>	3,124	3,080	2,963	3,001	2,736	2,981
Yard Waste	3,842	3,891	3,761	4,335	4,381	4,042
Biosolids	4,000	4,000	4,000	4,000	4,000	4,000
Other Materials ⁽²⁾	497	584	521	747	684	606
Total Waste	38,470	36,522	37,188	39,530	39,483	38,239
Diversion Rate	31%	33%	31%	32%	32%	32%

Notes:

1. Conventional Recyclable include standard materials such as plastics, mixed paper, cardboard, glass, and aluminum and steel cans.

2. Other materials include scrap metal, whitegoods (large appliances) and tires that are collected at the SWPF and diverted from landfilling.

As Latah County continues to grow, so will the generation of solid waste. Solid waste is currently anticipated to increase at the same rate as the population growth rate (recycling is expected to follow the same pattern). **Exhibit 2** shows the 20-year growth projection of total solid waste in Latah County (both MSW and NMSW).

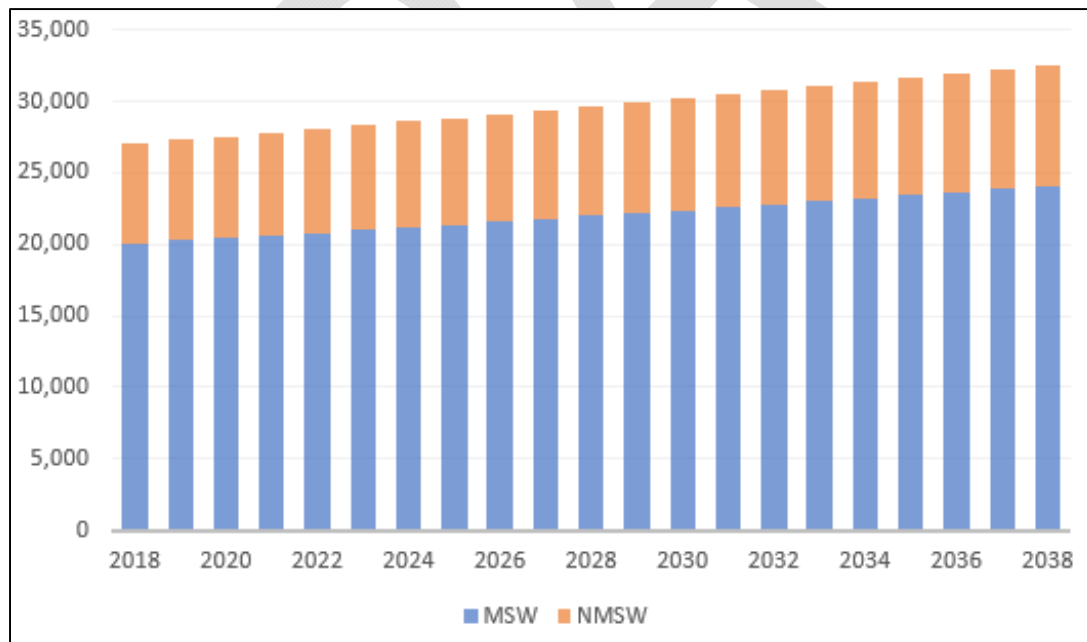


Exhibit 2. Solid Waste Growth Projection – Latah County

Approximately 19,000 tons of the total 38,000 tons of solid waste generated each year in the County is MSW (or 50%), The remaining 10,000 tons is generated from City and County

residents that direct haul their MSW to the SWPF and MSW collected by LSI in the rest of Latah County (other towns and cities and unincorporated areas).

The remaining 19,000 tons of annual waste produced by the County are a combination of:

- Recyclables (plastics, ferrous and non-ferrous metals, cardboard, glass and mixed paper) collected from both Moscow's single-stream program, rural container sites, and pre-sorted materials at the MRC
- Yard waste (brush, branches, and yard clippings) and biosolids (wastewater sludge from Moscow's Wastewater Treatment Plant) that are composted
- White goods (large appliances), scrap metal, and tires
- Non-municipal solid waste materials [construction and demolition (C&D) debris, asbestos, and other inert wastes] that are disposed in the NMSW landfill at the SWPF

2.2 Recycling/Waste Diversion

Approximately 12,000 tons of solid waste materials are diverted from landfilling each year in Latah County by recycling and composting programs, which equates to a diversion rate of approximately 32% county-wide (refer to **Table 1**). The total amount of conventional recyclables collected county-wide averages approximately 3,500 tons per year¹, based on 2013-2017 tonnages (refer to **Table 1**). At the curb, Moscow residents are currently (2017 figure) recycling about 700 tons per year (or 20%) of the total 3,500 tons of recyclables. Comparing curbside recycling to curbside waste collection weights, only about 9% of the waste stream is currently diverted in the City through the curbside collection program.

In addition to curbside collection, a good portion of the City's resident's drop-off pre-sorted recyclables directly at the MRC. The center, however, is used by a combination of city and county residents, and a small fraction of out-of-county residents. A recent 2018 intercept survey at the MRC indicated that 67% of the users are from the City of Moscow. Assuming that this same percentage corresponds to the total tonnage of recyclables collected at the center, the amount of materials diverted by Moscow increases to over 2,000 tons per year, and the diversion rate increases from 9% to approximately 20%.

With the implementation of the single-stream recycling program in February 2016, the annual amount of conventional recyclables collected at the curb in Moscow increased by over 130%². The total amount processed at the MRC, however, has remained relatively steady over the last 5 years (2013-2017). The single largest amount of any one recyclable is corrugated cardboard, which accounts on average of 1,500 tons per year (or 43% of the total recyclable weight). Of the 1,500 tons of cardboard collected annually, an estimated

¹ This total tonnage includes, on average, approximately 50 tons of "out-of-county" recyclables, which are collected from a bordering Nez Perce County site that LSI operates.

² Previous to the roll-out of the single-stream program, the City also collected glass curbside, as part of the pre-sorted curbside collection program. Glass collection was not included in the single-stream collection program. Subtracting the amount of glass collected previously and comparing the two one-year periods of February-January 2015 (281 tons) and February – January 2016 (651 tons), curbside recycling increased by over 130% in accordance with the City's estimates.

300 tons are from direct drop-off at the MRC, and the remaining 1,200 tons are collected from City businesses.

Based on the current population estimate, the City and Latah County residents together recycle approximately 180 pounds per person per year of conventional recyclables, including all the cardboard collected by both businesses and residents. Subtracting business-collected cardboard, approximately 120 pounds per person per year is recycled.³

At this point in time, recycling in Latah County is expected to grow at a rate equal to the population growth rate. The City of Moscow implemented a commercial curbside collection program in January 2018, which is expected to increase the amount of recyclables collected per capita. However, this is also expected to be offset by a reduction in the types and amounts of materials that can be recycled with the changing global market. As a result, the City is embarking on an educational outreach program to inform the community of upcoming modifications and will be changing the types of recyclables collected both curbside and at the MRC.

Exhibit 3 shows the 20-year growth projection for conventional recyclables collected at the curb and at the MRC. **Exhibit 4** shows the 20-year growth projection for all materials recycled and diverted from landfilling. The category “Other Diverted Waste” includes yard waste, biosolids and other miscellaneous materials (scrap metal, appliances and tires).

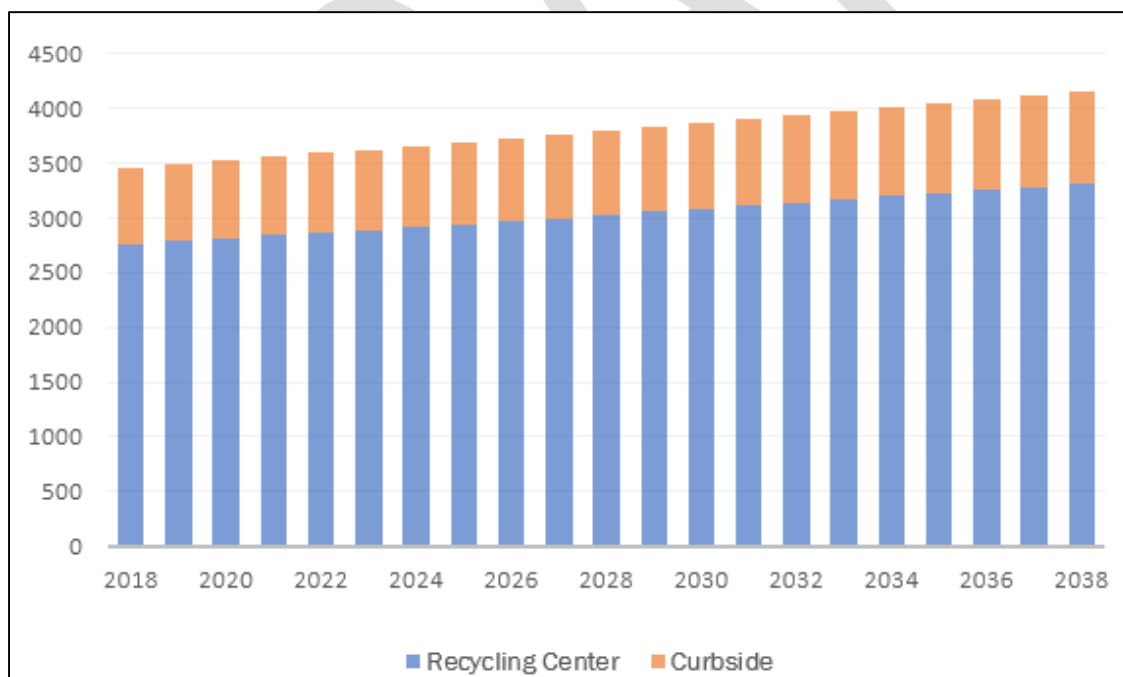


Exhibit 3. Latah County Recycling Growth Projections – Conventional Recyclables

³ The per capita recycling figures only include full-time residents in Latah County. Out-of-county residents that drop-off recyclables and students at the University are not included.

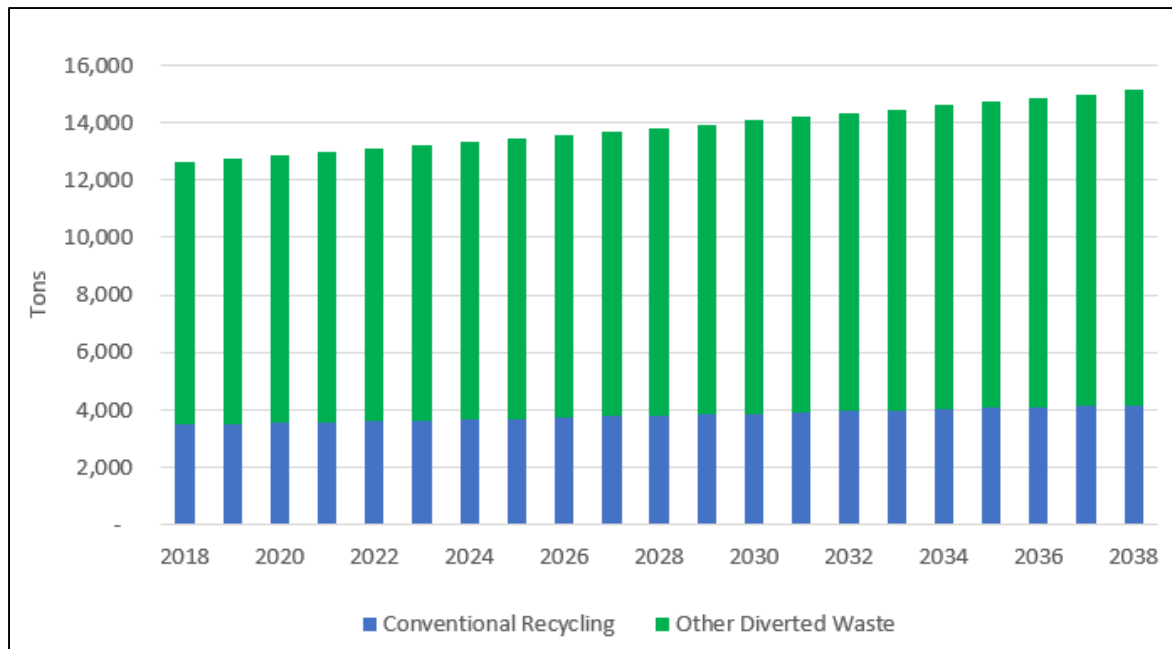


Exhibit 4. Latah County Recycling Growth Projections – Total Waste Diversion

3.0 Solid Waste Program Review

This section presents a general review of the City's sanitation system for the solid waste and recycling programs, with the objectives of providing: (1) a summary of the services provided by the City; and (2) a relative cost comparison of Moscow's collection services with other similar size programs in the Pacific Northwest.

3.1 Moscow Sanitation Facilities

The City of Moscow offers the following sanitation facilities and programs:

- **Solid Waste Processing Facility (SWPF)** – located approximately 5 miles southeast of Moscow, this facility provides drop-off and collection of MSW, NMSW, whitegoods (large appliances), scrap metal, yard and clean wood waste, biosolids, asbestos, and household hazardous waste. The SWPF also has a NMSWLF and compost facility.
- **Moscow Recycling Center (MRC)** – located in the City of Moscow, the MRC provides a convenient location for residents to drop-off pre-sorted recyclables. The center also accepts car batteries and has a redemption center for metals and aluminum cans.
- **Curbside Collection Program** – MSW is collected weekly and single-stream recyclables are collected biweekly (every other week) at the curb in the City limits of Moscow.

Each of these facilities and programs are further explained in the following subsections.

3.1.1 Solid Waste Processing Facility

The SWPF is located approximately 5 miles southeast of the City of Moscow on Highway 8 (3299 ID-8) (refer to **Exhibit 5**). LSI owns and operates the SWPF. The facility accepts both MSW and NMSW such as demolition debris, clean wood waste, yard waste, large appliances (whitegoods), scrap metal, asbestos, household hazardous waste (HHW), and tires.

The SWPF is open from 8:00 am to 4:00 pm, Monday through Saturday. The HHW facility is open every Saturday from 8:00 am to 3:30 pm from April through October, and the first Saturday of each month from November through March, during normal SWPF business hours.

The SWPF generally consists of the following buildings and infrastructure:

- A single in-ground platform scale with a scale shack at the entrance that is used for both inbound and outbound customers;
- A waste transfer building (WTB) used for MSW drop-off and top-loading of long-haul waste trailers;
- A non-municipal solid waste landfill – both closed and active areas;
- A composting facility with yard waste/woody debris piles and grinding operations (and biosolids drop-off area);
- A household hazardous waste facility;

- Collection points for appliances, scrap metal and tires; and
- Various supporting facilities and infrastructure, including an office/administration building, maintenance shop building, fueling station, roads, and stormwater management systems.

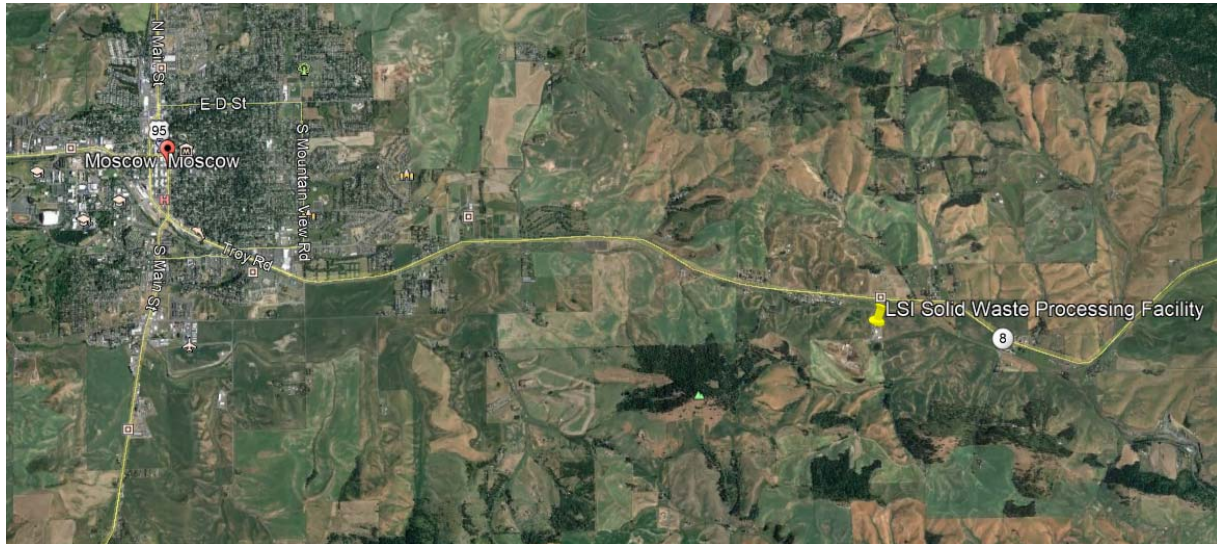


Exhibit 5. Location of the Solid Waste Processing Facility

Composting Facility

Composting operations are conducted at the SWPF as part of the franchise partnership with LSI. Compost is produced from two primary feed stocks – biosolids and yard waste. The City produces approximately 4,000 tons of dewatered sludge (biosolids) annually from the Moscow Wastewater Treatment Plant. Approximately 3,500 tons of yard waste (grass clippings, tree limbs, brush and the like) are collected annually from a number of sites in Moscow and Latah County, including: the MRC, the City of Potlatch and the City of Genesee. Material is also self-hauled directly to the SWPF.

The composting operation also includes collection of clean wood waste. Collection of this material started as a pilot program in October 2014 and has gained popularity ever since. Woody materials containing nails and screws are accepted and can be processed, the metals being removed by magnets. Other metals and foreign materials that could cause damage to the grinding equipment are not accepted. Clean lumber materials that are unpainted and untreated are accepted (e.g., pallets and scrap dimensional lumber). Plywood, wafer board, and particle board-type lumber that contain glues are not accepted.

Once received at the SWPF, the yard waste and clean wood waste is ground, using a large grinder, then blended with the biosolids at approximately a 5 or 6 to 1 ratio, by volume. The blended material is then piled in covered bays that are equipped with a sophisticated static pile aeration system built into the concrete floor. **Exhibit 6** shows the aerated static pile bays. Composting is an aerobic process that begins as air is forced into the piles. This increases the temperature of the pile. Temperatures are constantly monitored at various depths and locations in the piles, to a point where pathogen destruction and reduction of vector attraction occurs. This process is typically completed in 15 to 30 days.



Exhibit 6. Static Pile Composting Operations at the SWPF

After the process of pathogen reduction is complete, the piles are then moved outside to windrows to cool and cure (refer to **Exhibit 7**). The curing piles are sampled and tested before the screening and distribution takes place to ensure the material meets the requirements for Class A material, in conformance with EPA 40 CFR 503 regulations. The composting facility and process is regularly inspected by regulatory agencies and the City of Moscow.



Exhibit 7. Curing Compost Piles at the SWPF

Moscow offers compost free of charge to residents of the City and Latah County; compost is available at the SWPF during normal business hours. LSI advises the use of compost in accordance with the following best practices:

- It is safe for use on lawns, turf, and as landscape mulch; and
- It is not recommended for use in vegetable or flower gardens. Trace residues of broadleaf herbicide may be present and potentially affect sensitive plants.

3.1.2 Moscow Recycling Center

The MRC is located at 401 N. Jackson Street in the City of Moscow. Moscow Recycling is a public/private partnership between the City of Moscow and LSI and offers recycling services for both commercial and residential customers with over 30 commodities accepted. The center sits on a parcel of land with an area of approximately 72,900 square feet (or 1.67 acres) and is situated between N. Almon Street to the west, N. Jackson Street to the east, private property to the north, and C Street to the south. **Exhibit 8** shows a photograph of the MRC.



Exhibit 8. View of Recycling Center and Redemption Office Looking Northwest

The facility is open 24 hours a day, 7 days a week for drop-off of recyclables and yard waste. The buyback office and main office hours are Tuesday through Saturday, 9:30 am to 5:30 pm. The facility offers large volume drop-off Tuesday through Saturday from 10:00 am to 4:00 pm. Much of the property is enclosed by perimeter chain link fencing. There is a grade-break with a z-wall (retaining wall) between the main building and the yard waste drop-off area located on the west side of the property along N. Almon Street..

In 2013, the City reported that there was insufficient expansion capacity at the MRC. Recycling had grown from approximately 2,424 tons annually in 1995, to 3,644 tons in 2013, over a 50% increase since the center was opened. Operating within the original 1993 design, it was reported that warehouse/dry storage areas of the MRC were becoming inadequate and there were safety concerns with vehicles/equipment interfacing with people. These issues will continue to become increasingly problematic with continued population growth and increased volumes of recyclables.

The long-term goals reported by the City in 2013 were to:

- Increase the overall capacity and capability of the City’s recycling program and facilities;
- Reduce the number of risk factors involved with public interaction with forklift/skid steer equipment at the Recycling Center; and
- Decrease the frequency and length of wait times at the MRC.

As part of this project, a site assessment of the MRC was conducted by Great West. A summary of the assessment is provided in **Appendix A** . For a summary of the key components of the City’s current system, with recommendations for alternatives and changes, refer to the matrix table in **Appendix B**.

3.1.3 Curbside Collection Program

The City of Moscow provides curbside collection of MSW and single-stream recyclables, through its franchise agreement with LSI. MSW is collected on a weekly-basis. The curbside recycling program began in 1999, with collection of pre-sorted materials in individual plastic bins. This program continued until February 1, 2016 when the City implemented single-stream (“no sort”) recycling collection biweekly (every other week) with single family customers collected on one week and apartment complexes and Good Samaritan Society duplexes collected on alternating weeks. The single-stream curbside recycling program costs are included in the customer’s refuse rates, whether one chooses to participate in the program or not. In January 2018, the City extended the curbside collection program to businesses. Residents can choose either a 65 or 95-gallon recycling roll cart. Materials that are currently accepted in the single-stream bins are shown in **Exhibit 9**. Glass is not collected curbside but is collected at the MRC.

The original intent of single-stream recycling programs was to add convenience and customer participation in order to increase diversion rates and reduce the amount of garbage going to landfills. However, changes in the global recycling markets are affecting the types of materials that can be readily recycled and are causing challenges with single-stream collection programs. Many communities across the U.S. are reassessing their programs. Moscow is embarking on such a program with educational outreach to inform the community about these changes and plans to revamp the list of materials that are collected for recycling. For example, there is currently no market for #3 through #7 plastics. Comingled plastics collected in single-stream programs are baled and hauled to regional material recovery facilities, which only to require them to sort out #1 and #2 plastics. The rest of the plastics are landfilled. This adds extra costs for hauling and handling of these materials that could otherwise be avoided if they were not collected in the first place.

Moscow residents are encouraged to drop-off extra recyclable materials at the MRC or wait until the following week for the next curbside pick-up. If residents try to put more garbage than will fit into their roll carts, they are charged additional fees. Residents that produce more waste, pay more, under this “volume-based” system. Volume-based billing reflects the idea that residents who produce more waste should be charged accordingly. Tailoring the size of the roll cart to the amount of waste produced and charging a higher fee for larger cart sizes encourages residents to recycle and reduce the amount of waste they produce.

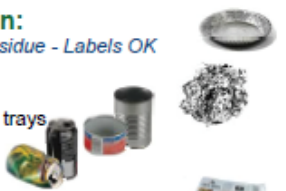
 YES 	 NO 
These kinds of things go in the recycling cart.	These kinds of things DO NOT go in the recycling cart.
Plastic: <i>Empty, Rinse and Remove lids & caps</i> <i>Labels OK</i> #1 through #7 Milk, water, juice & pop bottles Yogurt, dairy & margarine tubs Shampoo & conditioner bottles Bathroom, kitchen & window cleaner bottles Detergent & fabric softener bottles Plastic bags (<i>must be combined, bagged & tied tightly within a plastic bag</i>) Clean plastic cups Clean plastic plant pots  Metal, aluminum & tin: <i>Empty and rinse out food residue - Labels OK</i> Beverage cans Food cans Clean aluminum foil and foil trays Pots and pans  Mixed paper & newspaper: <i>Keep it loose - don't bundle, bag or tie</i> Newspaper, inserts and advertising Junk mail, envelopes, and office paper Shredded paper (<i>bagged in clear plastic bags</i>) Cereal & dry food boxes (<i>remove liner</i>) Paperback books, magazines, catalogs & phone books Non-foil wrapping paper Frozen food and juice boxes Milk, juice and broth cartons Clean paper cups  Cardboard: Flatten <i>(less than 3 ft x 3 ft)</i> 	Glass: NO glass of any kind!  Plastic: NO Styrofoam of any kind! NO Plastic caps or lids NO Plastic plates or utensils NO Plastic clothes hangers NO Plastic motor oil or anti-freeze containers NO Plastic prescription containers NO Candy wrappers or chip bags NO Ziploc bags  Metal, Aluminum & tin: NO Caps, rings or lids (<i>under 3 inches</i>) NO aerosol spray cans NO Paint cans NO Sharp or greasy metal NO Metal clothes hangers  Paper: NO Food-soiled food boxes NO Disposable diapers NO Ribbons or foil wrapping paper NO Wax or plastic-coated cardboard NO Paper towels, plates or napkins NO Dirty or soiled paper or facial tissue NO Hardback books* <i>*Tip: remove covers & binding for garbage (pages are recyclable)</i>  Miscellaneous: NO CD's or DVD's, Blu-rays or cases NO Household batteries NO light bulbs or fluorescent bulbs NO Ceramics or dishes NO Electronics  When in doubt leave it out

Exhibit 9. Acceptable and Unacceptable Recyclable Materials for the Curbside Collection

Currently, aluminum cans, tin/steel cans, cardboard, mixed paper, shredded paper, plastic grocery sacks, and plastics #1-7 are accepted for recycling both curbside and at the MRC. Glass is not accepted at the curb but is accepted at the MRC. Lightbulbs, window glass, lead glass, fluorescent bulbs, ceramics, and dishes, are not accepted at the MRC.

The SWPF is owned by LSI and provides several other sanitation services in addition to MSW transfer, including household hazardous waste collection, yard waste (and biosolids) drop-off and composting operations, the non-municipal solid waste landfill for construction and demolition debris, other inert wastes, and asbestos, and collection of white goods (large appliances), scrap metal, and tires. The site is also the location to pick up finished compost material from the composting operations.

3.2 Waste Services Collection Rates Comparison

Waste services collection rates for residential customers in the City of Moscow were compared to other communities of similar size in the Pacific Northwest, including Pullman, Walla Walla, and Wenatchee, Washington and Lewiston and Rexburg, Idaho (refer to **Table 2**).

Although within a few dollars of the others, Moscow's rates are slightly higher than the other cities' rates. The City of Moscow's long-haul of solid waste is one of the longest, if not the longest of all the communities that were compared. This is most likely the primary driver for the higher rate. The City also offers exceptional sanitation services based on the survey results and the Sanitation Division's community outreach. Providing a centralized and convenient recycling center in the community comes with a price.

In addition to curbside collection and the MRC, the City of Moscow allows its residents access to the SWPF. The SWPF offers residents the following waste items to drop-off:

- Municipal and non-municipal solid waste
- Household hazardous waste
- Scrap metal, appliances and tires
- Yard waste and clean wood waste

Compost is offered free of charge to residents of the Moscow and Latah County and is available at the SWPF during normal business hours.

Table 2 – Moscow's Waste Collection Fees Compared to Other Cities' Rates

City	35-Gallon	65-Gallon	95-Gallon
City of Moscow	\$20.50	\$26.30	\$32.30
City of Pullman, WA ¹	\$18.14	\$24.14	\$30.13
City of Lewiston, ID ²	\$13.23	\$20.11	\$24.81
City of Rexburg, ID ³	NA	NA	\$21.34
City of Walla Walla, WA ⁴	NA	NA	\$23.30
City of Wenatchee, WA ⁵	\$12.40	\$17.36	\$22.37

Notes:

¹ Instead of the 35, 65, and 95-gallon bins, Pullman offers 32, 64, and 96 respectively. Also, they offer 10 and 20-gallon bins, as well as an option for two and three bins. Pullman garbage collection is every week, and recycling is bi-weekly.

² Lewiston offers 32, 64, and 96 bins. Rates include solid waste, yard waste, and curbside recycling. Commercial rates are the same as residential rates. Garbage collection is every week and recycling is bi-weekly. Yard waste collection is once a week from the last week of March through November and once a month from December through the first week of March.

³ Rexburg only offers a 90-gallon bin. Weekly pickup of garbage costs \$21.34. Bi-weekly pickup of garbage is \$12.78, and monthly pickup is \$6.50. Recycling is collected bi-weekly. The first recycling bin is free and additional bins cost \$9.00 per month.

⁴ Walla Walla only offers a 96-gallon bin with weekly pickup. Recycling is also collected with a 96-gallon bin, is picked up every other week, and costs an additional \$4.76 a month. Green waste is accepted in a 64-gallon container and will cost an additional \$17.80 a month.

⁵ Wenatchee offers 35, 64, and 96-gallon bins. Rates are for weekly pickup of garbage. Other options such as monthly pickup of the 35-gallon bin and weekly pickup of up to 6 cans are offered. Every other week recycling is \$8.40 and yard waste is \$9.90.

4.0 Public Outreach

The City of Moscow utilizes several social media platforms to reach their citizens and keep them informed and educated on new policies, programs and events, such as Facebook, Instagram, Twitter and YouTube. In addition to these platforms, the City conducted public outreach activities as part of this project. A “three-pronged” public outreach approach was administered by the City that included mailed written surveys, focus group interviews, and intercept surveys at the MRC. This section provides an overview of these public outreach activities. The City’s full report is provided in **Appendix C**.

4.1 Mailed Written Surveys

The City mailed out 1,200 surveys to randomly-selected City residents. Each of the households was first mailed a postcard explaining that they would be receiving a survey the following week. The survey packet included a cover letter from the mayor, the survey form, and a self-addressed-stamped envelope. Of the 1,200 surveys, 35 were returned non-delivered and 274 were completed and returned for a response rate of 24%. This response rate was reported by the City to provide a sufficient sample size to result in a 95% confidence interval for most questions, making it statistically valid and representative of all citizens of Moscow. Twenty-four questions were included in the survey. Eight of the twenty-four questions were asked with five possible answers, resulting in a means to statistically measure the results on a Likert scale in a percentage format. The remaining questions were a mixture of “open-ended,” yes/no, or multiple choice.

The overall take-aways from the written survey pertaining to recycling services included:

- The overall majority (90%) of the respondents rated the City’s solid waste services as “good” or “excellent.”
- 41% of the respondents knew that free compost was available to the public at the SWPF.
- 74% of the respondents indicated that they participate in the single-stream curbside collection program; those that didn’t participate noted that they lived in apartment complexes⁴, dropped off their recyclables at the Moscow Recycling Center, lived on the U of I campus, had no container, did not know about the program, or other similar reasons.
- When asked about the recycling collection service type, 72% of the respondents indicated they use a roll cart and 5% used a shared roll cart.

⁴ Recycling at apartments in Moscow is available. Many of the multi-family units have recycling carts; however, at some multi-family complexes, recycling has been stopped because of past contamination issues. Property managers/owners have chosen not to provide the services for their tenants. All multi-family units pay a monthly “recycling base fee” in the City of Moscow whether they choose to participate or not. The City has rolled out two major “contamination education efforts” where LSI tags the contaminated carts and writes on the tag what the issues are. If not corrected after three consecutive stops, the carts are removed. It has been challenging for the City to provide recycling services to some multi-family units if the property managers are unwilling to pass on information to their tenants on how to properly recycle. The City continues educating the property managers/owners, and in some cases, the tenants are demanding recycling services from the property managers/owners.

- The majority of respondents rated their level of satisfaction with the overall curbside collection program as Excellent & Good.
- When asked if they are interested in seasonal yard waste collection at the curb, over 60% of the respondents indicated that they were not interested. About 12% indicated that they would pay an extra \$4 per month for seasonal collection.
- Overall, general comments about the curbside collection program mostly included remarks pertaining to not providing glass pick up anymore, high cost for limited service, needing larger containers, more frequent collection (weekly rather than biweekly), providing seasonal fees/pay-per-use system, offering recycling at apartment complexes, and being happy with dropping off yard waste at the MRC.
- When asked about the types of materials that they drop-off at the MRC, the majority were glass (64%), corrugated cardboard (60%), yard waste (56%), aluminum cans (37%), magazines (35%), and mixed paper (32%).
- The survey included questions for rating virtually all services provided by the MRC. Over 80% of the respondents rated general satisfaction as Excellent & Good. Almost 80% of respondents rated wait times as low. Although still rated high, some of the other aspects of interaction with staff and equipment were rated lower relative to the other services.
- When asked about the most important consideration to them, regarding relocation of the MRC, the majority of respondents wanted it kept within city limits (74%). They also wanted to keep yard waste drop-off (54%), provide better accessibility (46%), and continue to provide sorted material drop-off (30%).
- Other improvement suggestions for the recycling center included: accepting full-length fluorescent bulbs, providing battery recycling, providing better lighting and safer parking, providing larger containers, providing recycling at apartments (see footnote 3), and improving traffic flow.
- The survey asked about the level of satisfaction for the yard waste drop-off area at the MRC. The majority of respondents indicated their level of satisfaction with wait time and general satisfaction as “Good.” Adequate traffic flow, safe and convenient access, and space to maneuver rated in the “Fair” and “Poor” range.
- When asked about a new location for yard waste drop-off, respondents indicated that they prefer to have it within the city limits (55%), easy to access (53%), be safe and convenient (37%), and have a larger service area (31%).
- Other comments pertaining to the yard waste drop-off area include: accommodating more vehicles, better traffic flow, keeping it free, provide a drive-through, and enhance safety.

4.2 Focus Group Survey

Following the written survey process, the City organized community focus groups with only moderate success. Initially, the City invited 100 randomly-selected utility payers to participate. Only a few responded that they would attend, and so, the City turned to social media to request participation from City residents. Those that were interested were asked to come to the City Hall during one of three 1-hour time slots on May 31, 2018, at either 7 am, 12 pm, or 5:30 pm. All sessions had at least one participant, with three participants at the 5:30 pm session. The City facilitated each of the sessions and topics including site

accessibility, seasonal curbside yard waste collection, and use of the MRC and the center's redemption service. The following were take-aways from the focus group sessions:

- Moscow residents are eco-conscious and tend to over-utilize the recycling facility by sorting recycling materials themselves, even when single-stream ("no sort") is available at the curb.
- When it comes to safety and accessibility, the participants are concerned with the size of the Moscow Recycling Center, especially pedestrian safety and navigating around the center.
- The primary barrier for proper recycling is a lack of knowledge and confusion as to what can and cannot be recycled, or the proper methods of recycling.
- The cost of recycling was also a major concern and the focus group participants viewed the use of the facility by non-County residents as "theft of service." Several recommendations included monitoring the MRC for non-residents and limiting access for non-paying members.
- Adding curbside collection for yard waste and glass would be good additional services that could increase the use of the single-stream collection program.

4.3 Intercept Surveys

As a final step in the community outreach, the City conducted intercept surveys at the MRC to better understand the residents' actual practices and use of the center. The surveys were designed to collect basic demographic information about individuals using the center and their recycling attitude, behavior and knowledge, as well as awareness and participation in the single-stream recycling program. A total of 98 users were surveyed. The first survey was conducted on Friday, June 22nd and the second on Saturday, June 30th. The two days were purposely selected to cover a week day and a weekend day.

A previous intercept survey was conducted in 2016 by the Sanitation Division and included 485 respondents. The 2016 survey served as the general guideline for the approach and questions for this survey. Four questions were asked and are summarized below with the results:

- **Residency: Do you live in Moscow? If no, where do you live?** These questions were asked to determine what percentage of the users were from Moscow, Latah County, or non-county residents. Of the respondents, 67% were from Moscow, 23% from Latah County, 9% from out of county, and 1% not provided. Only 4 respondents stated they were from Pullman. In comparison to the 2016 survey, 48% of the respondents were from Moscow, 39% from Latah County, and 13% from out of county.
- **Sorted Materials: What types of sorted materials did you bring today?** This question was asked to get a sense of the materials types that users are willing to drop-off at the center. Glass (20%) and cardboard (20%) were the two items that were brought the most respondents, making up 40% of the overall recyclables, followed by plastics (16%), aluminum (15%), paper (14%), and newspaper (8%). In 2016, glass (45%) and cardboard (31%) were the majority as well, but at a much higher combined

percentage of 76% , followed by plastics (12%) and newspaper (8%). Aluminum was not included as an item in 2016.

- **Single-Stream Curbside Recycling: Do you participate in the curbside recycling program (only for residents of Moscow)? If no, why do you prefer to separate the material?** These questions were asked to determine if users were also participating in the curbside program and why they were choosing to drop off recyclables at the center. 60% of the respondents in 2018 did not participate in curbside recycling as compared to 45% in 2016. The reasons for not participating in single-stream and delivering materials to the recycling center included: living in apartment complexes, bringing glass anyway, curbside is not available where they live (live out of town), having large amounts of cardboard, and preferring to drop-off, as it allows them to recycle everything.
- **Overall Quality: How do you rate the quality of the recycling at the Moscow Recycling Center (with list of multiple choices – a) Excellent, b) Very Good, c) Neutral, d) Poor, e) Very Poor, and f) Don't Know.** This question was asked to get a sense of the overall satisfaction of the recycling center. 94% of the respondents rated the quality as Excellent or Very Good. This question was not asked in 2016.
- **Other Sites: Do you use any other-off sites (yes or no)? If yes, please indicate which other site you use.** This question was also not asked in 2016. 51% of the respondents indicated that they use the yard waste drop-off area, 38% use the transfer station (SWPF), and 11% indicated they use out of town sites.

4.4 Survey Summary

Overall, the survey results indicated that the community is satisfied with the recycling services provided by the City, including those at the MRC. The community wishes to have the recycling center remain within the City limits should the center need to move. The facility is used extensively by people that want to “do the right thing” and recycle as much as they can, even though they have, and may also participate in, the City’s curbside single-stream collection program. County and non-county people alike also use the facility, although there is some expressed concern from City residents of people using the facility that are not paying members.

The cost of recycling is a priority to the community and respondents want the City to consider a ‘pay-as-you-use fee’ while also continuing to provide free yard waste drop-off. Although the focus group identified both glass and yard waste for curbside collection, the written survey indicated that curbside collection for yard waste was not a priority, and residents didn’t want to pay the extra cost for its collection. Continuing to provide yard waste drop-off at the new convenience center is a top priority of users, but with better access and safety than is currently provided at the MRC.

Curbside glass collection was ceased with the adoption of the single-stream program in February 2016. It continues to be a large percentage of the recyclables dropped off at the MRC. Reinstating curbside glass collection was mentioned as a possible program improvement based on survey comments and the focus groups. However, collection of glass with comingled materials is fraught with issues. Glass is heavy and is notorious for breaking and contaminating other recyclables. Moscow’s quad-city neighbor, Whitman County, is

eliminating glass from their single-stream collection program because of these very issues. Another option would be to collect glass in a separate curbside container. This would add an additional pickup and increase cost to the program. Based on survey feedback, the community's priority is to keep the program inexpensive, so separate glass is probably not viable.

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5.0 Local MRF Feasibility Assessment

This section presents a summary of the feasibility study to evaluate the viability of the City of Moscow investing in and/or hosting a local MRF. The MRF would be used to process single-stream recyclables from the quad-city area, which includes: (1) Moscow/Latah County, Idaho; (2) Lewiston/Nez Perce County, Idaho; (3) Clarkston/Asotin County, Washington; and (4) Pullman/Whitman County (and Washington State University), Washington. The details of the study are provided in **Appendix D**.

5.1 Overview of a Material Recovery Facility

A MRF is a production plant that sorts, separates, bales, sells, and transports to market recyclable materials. Its primary function is to segregate recoverable materials for use as input materials for manufacturing and/or processing.

Like most manufacturing and processing facilities, operations can be performed by labor or mechanical equipment, or a combination of the two. Labor is the largest cost in the operation of most MRFs. Automated processing is more cost effective than manual processing for larger facilities but requires a larger capital investment upfront.

The five basic (and typical) commodities that are targeted at MRFs are cardboard, also known as old corrugated cardboard (OCC), mixed paper, plastics, non-ferrous metals (aluminum), and ferrous metals (tin and steel). More advanced MRFs have the capability to further sort out materials such as mixed paper and plastics.

5.2 Recycling Market Changes and Uncertainties

For a MRF to be successful, stable, and reliable, recycling markets must be identified and established for the recyclable materials that are targeted for sorting. The recycling market depends on the cost of recovering the raw materials and the quality of the materials generated by the MRF, as compared to virgin, raw materials.

For decades, China was accepting mixed recyclables from the United States and had significant capacity to handle and reuse the materials. However, the global recycling ban in China that was implemented earlier this year has completely changed the market. China instituted a new policy banning the import of 24 types of solid waste including unsorted paper products and low-grade plastics. They also instituted a new contamination threshold of 0.5% and suspended licenses for many recyclers in China. The Chinese government is extending this ban as of the latest reporting in the industry.

Collection and processing are both very expensive, and without stable and dependable markets, some materials should not be targeted for recycling. However, there is also the political will of local government and habitual practices (“wishful recycling”) that are hard to change and could influence what recyclables are collected. Public education and outreach will become even more important to inform communities of what can and cannot be recycled.

5.3 Recycling Materials Collection Programs

5.3.1 Quad-City

Table 3 presents the estimated tonnages of recyclables for Moscow and its quad-city neighbors. The 2017 figures are based on available data provided by Moscow and the other cities and counties in the quad-city area. Projected amounts are based on population growth rates provided by Moscow and published by state-available census data and the United States Census Bureau. The estimated amounts do not account for changes in the diversion rate, market trends, or other variable factors.

Table 3 – Estimated Recycling Tonnages for 10 Years (Quad-City Area)

Program/Population	Recycling Tonnages									
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Moscow/Latah Co.	3,433	3,464	3,496	3,528	3,561	3,594	3,627	3,660	3,694	3,728
<i>Population (0.92%)⁽¹⁾</i>	39,440	39,803	40,169	40,539	40,913	41,290	41,670	42,054	42,441	42,832
Pullman/Whitman Co.	3,487	3,504	3,520	3,537	3,553	3,570	3,587	3,604	3,620	3,637
<i>Population (0.47%)⁽¹⁾</i>	47,250	47,472	47,695	47,919	48,145	48,371	48,598	48,827	49,056	49,287
Washington State U.	1,427	1,434	1,440	1,447	1,454	1,461	1,468	1,475	1,482	1,489
<i>Population (0.47%)⁽²⁾</i>	20,286	20,381	20,477	20,573	20,670	20,767	20,865	20,963	21,061	21,160
Lewiston/NezPerce Co.	1,732	1,741	1,749	1,757	1,766	1,774	1,783	1,791	1,800	1,809
<i>Population (0.48%)⁽¹⁾</i>	33,030	33,188	33,348	33,508	33,669	33,830	33,993	34,156	34,320	34,484
Clarkston/Asotin Co.	518	521	524	527	530	534	537	540	543	547
<i>Population (0.60%)⁽¹⁾</i>	22,535	22,670	22,806	22,943	23,081	23,219	23,359	23,499	23,640	23,782
<i>Total Recyclables (tons)</i>	10,597	10,663	10,730	10,797	10,864	10,932	11,001	11,070	11,139	11,209
<i>Total Population Base</i>	162,540	163,515	164,496	165,483	166,477	167,477	168,484	169,497	170,518	171,545

Notes:

¹. Annual growth rates provided by state statistical websites and the US Census Bureau.

². Student body (and faculty) population for WSU was assumed to grow at the same rate as Pullman/Whitman Co. (0.47%).

Table 4 presents the estimated tonnages from single-stream recycling programs in the quad-city area for 2017 and the next 10 years.

Table 4 – Estimated Tonnages for Single-Stream Recyclables – 10-year Projection (Quad-City Area)

Program/Population	Single-Stream Recycling Tonnages									
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Moscow/Latah Co.	740	747	754	761	768	775	782	789	796	804
<i>Population (0.92%)⁽¹⁾</i>	39,440	39,803	40,169	40,539	40,913	41,290	41,670	42,054	42,441	42,832
Pullman/Whitman Co.	1,798	1,806	1,815	1,823	1,832	1,841	1,849	1,858	1,867	1,876
<i>Population (0.47%)⁽¹⁾</i>	47,250	47,472	47,695	47,919	48,145	48,371	48,598	48,827	49,056	49,287
Washington State U.	330	332	333	335	336	338	339	341	343	344
<i>Population (0.47%)⁽²⁾</i>	20,286	20,381	20,477	20,573	20,670	20,767	20,865	20,963	21,061	21,160
Lewiston/NezPerce Co.	1,732	1,741	1,749	1,757	1,766	1,774	1,783	1,791	1,800	1,809
<i>Population (0.48%)⁽¹⁾</i>	33,030	33,188	33,348	33,508	33,669	33,830	33,993	34,156	34,320	34,484
Clarkston/Asotin Co.	0	0	0	0	0	0	0	0	0	0
<i>Population (0.60%)⁽¹⁾</i>	22,535	22,670	22,806	22,943	23,081	23,219	23,359	23,499	23,640	23,782
<i>Total Recyclables</i>	4,600	4,625	4,651	4,676	4,702	4,727	4,753	4,779	4,806	4,832
<i>Total Population Base</i>	162,540	163,515	164,496	165,483	166,477	167,477	168,484	169,497	170,518	171,545

Notes:

1. Annual growth rates provided by state statistical websites and the US Census Bureau.

2. Student body (and faculty) population for WSU was assumed to grow at the same rate as Pullman/Whitman Co. (0.47%).

Comparing **Tables 3 and 4**, less than half of the total amount of recyclables in the quad-city area are from single-stream programs that utilize a MRF to sort and process the materials. The remaining portion of the materials is source-separated and is mostly cardboard collected from businesses. Future quantities are based solely on population growth with no changes to the diversion rate. The diversion rates may increase in time if there is a local MRF that can offer more cost-effective programs to these communities and if the communities are committed to helping make the local MRF viable for the host community.

5.3.2 Moscow

Table 5 presents the composition of the single-stream recycling from the City of Moscow's curbside program. Also shown in **Table 5** are the current commodity prices and commodity rates (i.e., the composition fraction of each material multiplied by the price is equal to the rate) as provided by the City.

Table 5 – Moscow’s Single-Stream Recycling Composition and Current Pricing

Material	Composition Fraction ⁽¹⁾	Commodity Pricing (\$/ton) ⁽²⁾	Commodity Rate (\$/ton) ⁽³⁾
OCC	16.31%	\$55.00	\$8.97
Mixed Paper/ONP	58.72%	-\$33.00	-23.49
PET Plastic	3.70%	\$135.00	\$5.00
HDPE Plastic (Natural)	1.0% (est.)	\$340.00	\$3.40
HDPE Plastic (Color)	1.83%	-\$5.00	-\$0.09
Tin	4.07%	\$130.00	\$5.29
Glass	0.0%	-\$30.00	\$0.00
Aluminum	1.02%	\$1,460.00	\$14.89
Mixed Plastics	3.63%	-\$120.00	-\$4.36
Residue/Waste	9.70%	-\$120.00	-\$11.66
Total/Comingled Rate	100%		-\$2.07
Baling Fee			-\$38.82
Bale Breaking Fee			-\$5.00
Processing Fee			-\$89.67
Hauling Fee ⁽⁴⁾			\$30.00
Cost per Ton			-\$165.56

Notes:

1. The Composition Fraction of recyclables was provided by Moscow from Republic Services (June 2018).

2. Commodity Pricing is for baled materials as reported by Republic Services (June 2018).

3. Composition Fraction multiplied by the Commodity Pricing = Commodity Rate.

4. Hauling Fee to ship materials from Moscow to Seattle averages 26 tons per load at \$800 per load, or approximately \$30/ton.

Based on these rates, it is costing Moscow more than \$166 per ton to recycle. The processing fee is expected to climb to more than \$100 per ton in the coming months.

5.4 Assessment Overview and Findings

A MRF to serve the City and its quad-city area (and possibly regional) partners would be sized to handle the maximum quantities expected for the planning horizon. The total capital cost is then assumed to be paid through City-issued certificates of participation over a 20-year period at a 6% interest rate. This results in an annual capital cost of \$801,000.

Assuming that only Moscow and Latah County would contribute recyclables to this program (and all are single stream), it would cost each Moscow customer \$8.56 per month to process, minus prospective revenues, which is a fee increase of over 700%.

By comparison, if Moscow can attract the projected amount of single-stream recyclables that are available today in the quad-city area of approximately 5,000 tons, the cost per customer would be \$2.00 per month or an increase of approximately 97%. Assuming that this local MRF would attract others in addition to the quad-city area and max out the facility’s

throughput capacity of 20,000 tons per year, the monthly fee would go down to \$0.78 per customer – a decrease of about 23% of what each account is paying today. This, however, is unlikely with competing large MRFs operated by large waste companies in the region.

The City should consider discussing the option of investing in a local MRF with their long-time waste contractor, LSI, to see if they have the resources and capabilities to build and operate a MRF. The City should also consider a collaborative partnership with Whitman County who is also assessing the viability of hosting a MRF.

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6.0 Prototypical Recycling Center

This section presents the prototypical concept layouts for the new MRC, while addressing the known issues and deficiencies at the existing center and improving on the level of service and safety.

6.1 Approach and Methodology

The prototypical layout concept for the new MRC is based on two sets of information: (1) findings and recommendations from the first phase of the project that identified issues/deficiencies at the existing center along with suggested improvements (refer **Appendices A and B**); and (2) community outreach that was administered by the City as summarized in Section 4 (and **Appendix C**). The Solid Waste Advisory Group also provided key input and helped to prioritize the services and amenities for the new center.

The general approach for developing the prototypical recycling center was to decouple the processing and baling components of the current center's function but still provide a drop-off location for recyclables and yard waste for the residents. The new MRC will require development of property in town to continue to provide convenience.

6.2 Prototypical Layout Features and Priorities

Based on industry best design/layout practices for these types of intermediate handling facilities, the following features and priorities were established and set the basis for the prototypical layout concept:

- **Site Location:** Although the prototypical layout is not designed for any particular property or location, the community desires to keep the recycling center within the City limits. Improved accessibility in and out of the site is a high priority. The Sanitation Division is currently researching potential properties within the City that will satisfy the minimum acreage needed with good accessibility for the public.
- **General Services:** Site services will include drop-off stations for pre-sorted and comingled recyclables, glass, yard waste, e-waste and batteries as well as an area to pick-up finished compost material and a redemption center. The facility will continue to be staffed during normal business hours and will likely remain necessary to be open 24-hours a day, 7-days per week, as requested by the public in the surveys.
- **General Layout:** The site will feature a grade-separation with public traffic and material drop-off located at the main site grade. The lower grade will be created with retaining walls and will be located around the perimeter of the main site. Operations and drop off boxes will be located at this lower grade keeping public and operations completely separate.
- **Entrance Area/Facilities:** An Office Building will be provided near the entrance of the new facility for office space, a breakroom and restrooms. Storage for collected materials will be located in a storage area attached to the office building. Entrance into the facility will be off a main surface street and will be one-way into and out of

the facility at the main site level. The facility will be enclosed by a perimeter chain link fence with gates at the public and operations entrances and exits.

- **Traffic Flow and Support Facilities:** Traffic will be designed to flow in a one-way, counter-clockwise pattern around the site with right-hand-side pull-outs and parking at the various drop-off stations. This circular pattern will minimize interaction of pedestrians with vehicles and equipment. Only the general public will be permitted to use this facility. All commercial vehicles will be routed directly to the new, proposed recycling building at the SWPF. Operations will use a separate access for the lower yard area where the majority of the operations will take place.
- **Recyclables Drop-Off:** The drop-off area for recyclables will be positioned in such a way that the public accesses it from the front of the container at the main site grade and operations services it from the back at a lower grade. Forty-cubic yard (cy) rectangular, open-top (roll-off) containers will be placed on the lower grade adjacent to a z-wall pattern retaining wall. The containers will be located under shed covers. Containers will be available for corrugated cardboard, mixed paper, aluminum, and co-mingled materials (“no sort”). Thirty-cy roll-off container(s) will also be provided in the public access area for glass.
- **Yard Waste Drop-Off:** Similar to the recycling drop-off area, 40-cy roll-off containers will be positioned in a z-wall configuration separate of the recycling area and with increased room for vehicle maneuverability. There will be room for multiple vehicles to back-in to spaces in front of the containers and unload at the same time without restricting pass-through traffic.

The first prototypical layout concept incorporates the full list of desired site features and priorities (**Figure 1** – attached), and includes: (1) a combined office and redemption building with e-waste collection and covered storage near the front entrance to the facility; (2) a circular, counter-clockwise traffic pattern with right-hand-side pull-outs; (3) two recyclables drop-off stations to park and unload with covered z-walls, each housing four 40-cy roll-off containers (total of 8 containers); (4) two at-grade drop-off locations for glass using 30-cy roll-off containers; (5) one large yard waste drop-off area with five 40-cy roll-off containers with a large maneuvering area for trucks and trailers to back-in and out; (6) a bunker for pick-up of finished compost material with a separate access; and (7) adequate space for extra container storage and operations maneuverability in the lower yard area along with a separate set of accesses for large trucks and equipment. This site layout is 400 ft by 330 ft, or approximately 3 acres.

The second layout concept assumes a smaller property is available in the City and incorporates the highest priority facility needs and features (**Figure 2** – attached). Similar to the 3-acre layout, this concept also features the same office and support facilities at the facility entrance along with a counter-clockwise traffic flow pattern and right-hand-side pull-outs. This smaller option, however, only has a single recyclables drop-off station, one glass container, and a smaller yard waste drop-off station with four containers instead of five. Also similar to the first concept, operations would access the lower yard to keep the traffic separate from the public users. The size for this option stays at the same width of 400 ft but decreases in length to 280 feet, reducing the overall site to 2.5 acres.

A three-dimensional isometric view of the preferred, larger 3-acre layout concept is provided (**Figure 3** – attached).

6.3 Engineer's Opinion of Cost

Order-of-magnitude cost estimates are provided for the two prototypical layout concepts in **Table 6**. The estimates include cost allowances and costs per square foot for certain items. The estimates do not include the cost to buy or permit the property, if it needs to go through rezoning or conditional use permit process(es). It is assumed utilities are available at the property limits to service the site and only onsite improvements will be required. Fire protection is assumed to be in the form of street hydrants. The property is also assumed to be relatively flat with suitable soils to use for cut/fill construction along with importing fill to create the topographic relief between the main service grade level and the lower operations yard.

The estimates assume the project will be complete on a competitive bid basis. Contractors will have a reasonable amount of time to complete the work given a reasonable project schedule with no liquidated damages and the project will be constructed under a single contract. The actual cost of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, schedule, final design, and other factors. As a result, the actual cost of the project will vary. Because of these factors, funding needs must be carefully reviewed by the City prior to making specific financial decisions or establishing final budgets. The cost estimates are in 2018 dollars (2018\$). Refer to **Appendix D** for a breakdown of costs.

Table 6 – Engineer's Opinion of Cost for Prototypical Recycling Center Concepts

Layout Option	Low Range -30%	Estimate Range Base Estimate ⁽¹⁾	High Range +50%
3-Acre Site Concept	\$1,936,000	\$2,766,000	\$4,149,000
2.5-Acre Site Concept	\$1,464,000	\$2,091,000	\$3,137,000

Notes:

¹. Includes 25% contingency.

7.0 Summary

The City of Moscow continues to adopt a progressive waste management mission to deliver quality, affordable and fiscally-responsible services to the community. The City also strives to build the community's confidence in management of solid waste and recycling services in order to protect the health, safety and cleanliness of the City. As part of this multi-step project, the City has proactively engaged the community through the development of this Comprehensive Sanitation Service Plan by conducting surveys and interviews, and organizing an Advisory Group made up of solid waste enthusiasts and experts.

The Sanitation Division is mindful of the City's three goals of: (1) delivering quality and effective sanitation services and programs; (2) delivering a system that encourages the reduction of waste but remains adaptable; and (3) designing programs that recognize the fiscal and environmental responsibilities entrusted in the City. This project is an example of the City's dedication for achieving its goals.

Moscow's sanitation services are stable and secure for many years to come. The City is under a 20-year franchise agreement with their long-time waste partner, LSI, and more recently procured a longer-term agreement with Waste Connections for MSW transport and disposal. The City continues to provide excellent solid waste and recycling services to its residents through a variety of programs and facilities. In addition to curbside collection of MSW and single-stream recyclables, the MRC provides a convenient location for residents to drop-off pre-sorted recyclables and yard waste. LSI's SWPF also provides a location on the southeast side of town to direct haul MSW and NMSW as well as dropping off HHW, whitegoods (large appliances), and scrap metal.

Relocating the MRC will give the City an opportunity to improve on the services and safety of the facility. By decoupling the processing and baling components of the MRC, the City can focus on the safety and services of the facility. Through input from the City's public outreach program and the Advisory Group, two prototypical recycling center concepts were developed that further show the City's commitment to the residents to provide excellent sanitation system services. These concepts will be carried forward in the search for new property for the City to purchase that is convenient inside the City limits and accessible.

FIGURES

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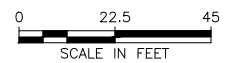
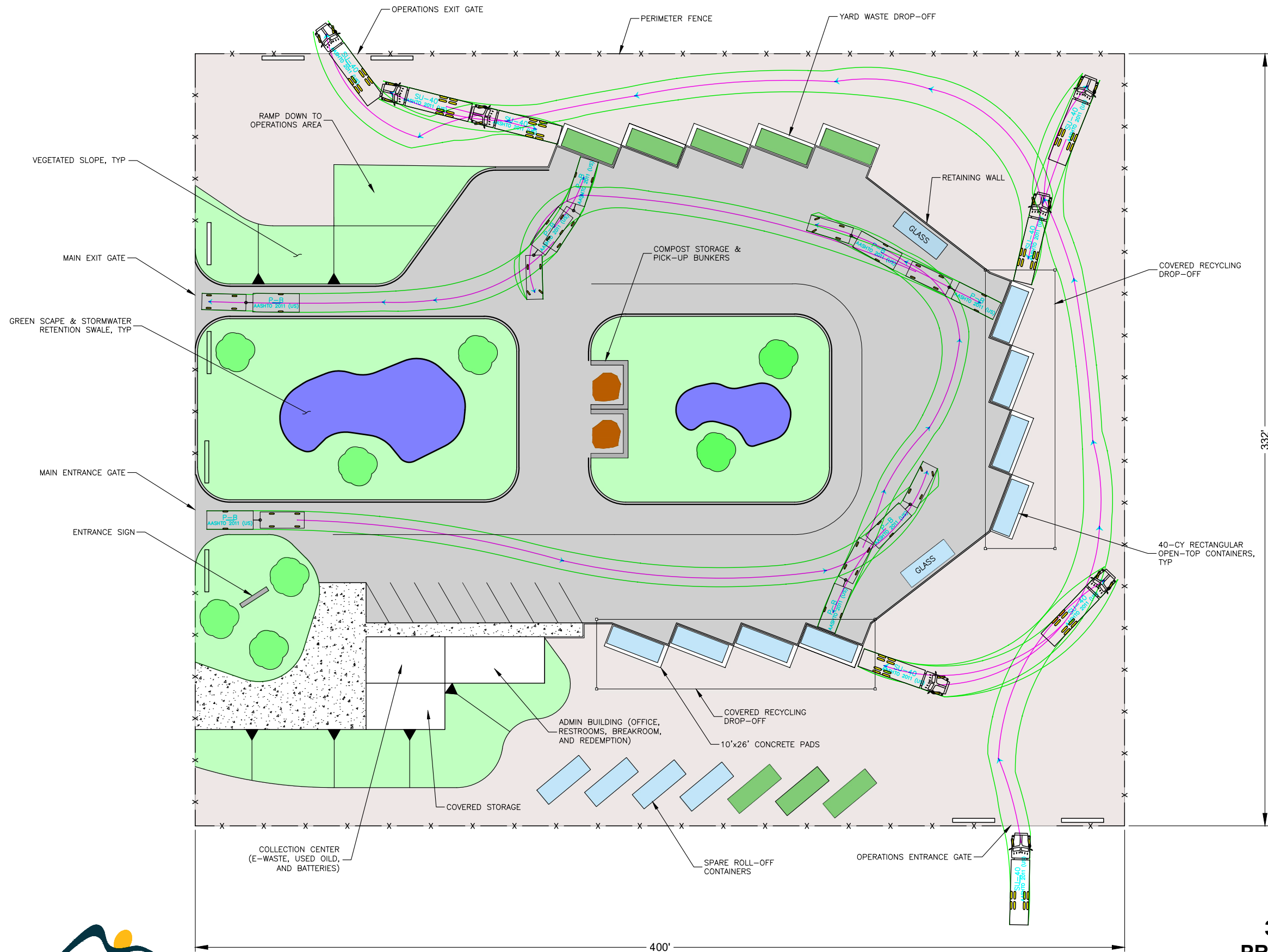


FIGURE 1
3.0 ACRE RECYCLING CENTER
PROTOTYPICAL LAYOUT CONCEPT

CITY OF MOSCOW
COMPREHENSIVE SANITATION SYSTEM MASTER PLAN

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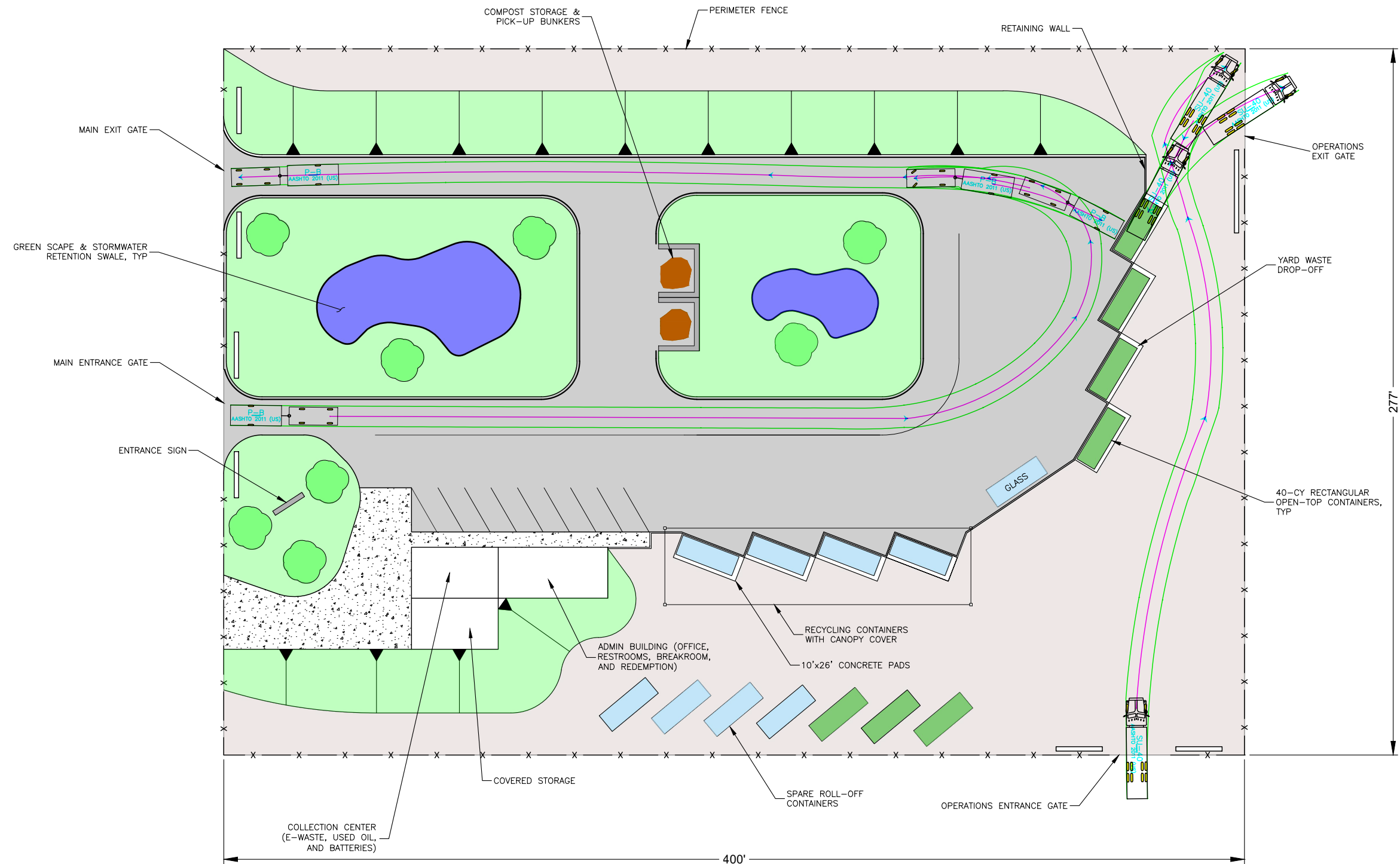
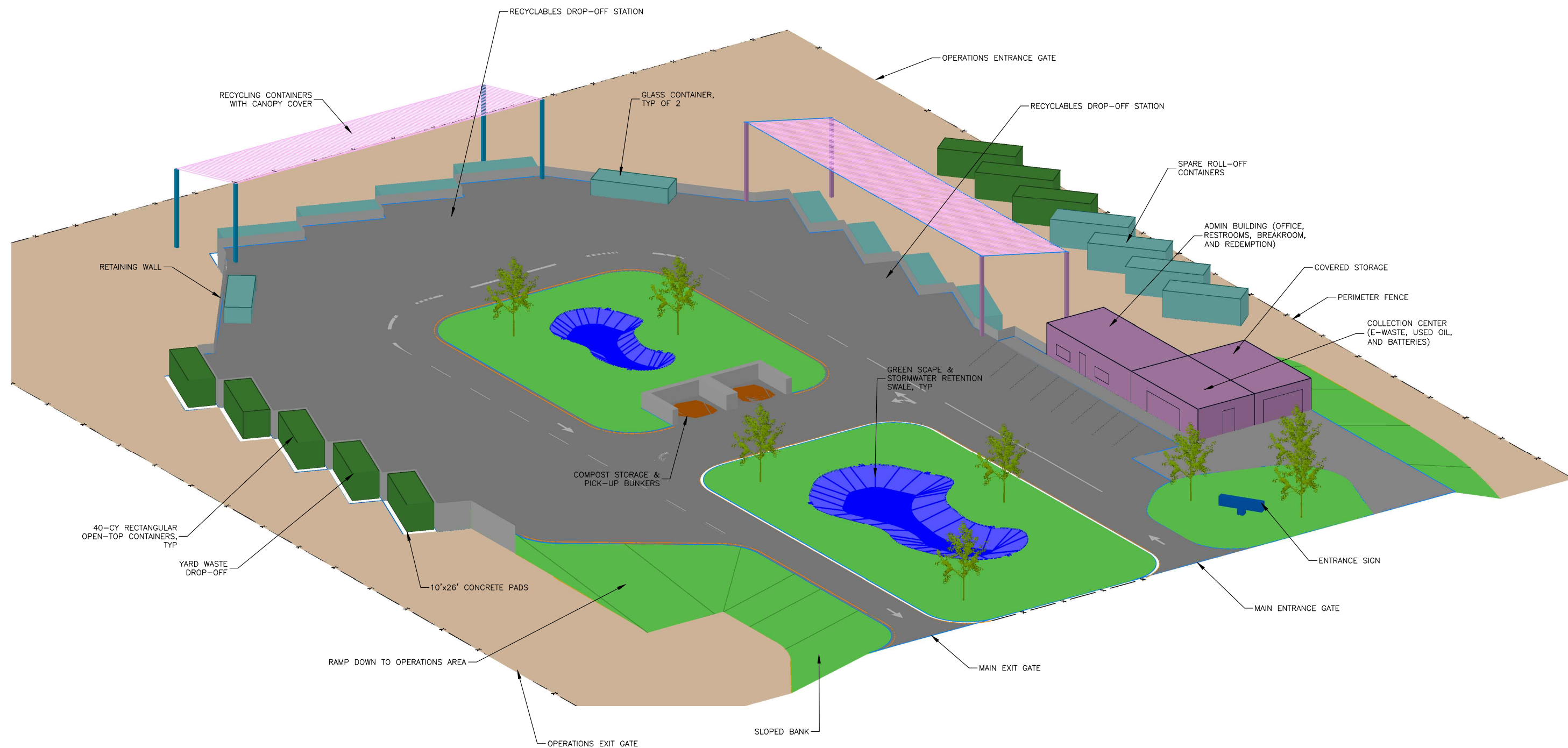


FIGURE 2 (SMALLER SITE)
2.5 ACRE RECYCLING CENTER
PROTOTYPICAL LAYOUT CONCEPT

CITY OF MOSCOW
COMPREHENSIVE SANITATION SYSTEM MASTER PLAN

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ISOMETRIC NEW RECYCLING CENTER PROTOTYPICAL LAYOUT CONCEPT

CITY OF MOSCOW
COMPREHENSIVE SANITATION SYSTEM MASTER PLAN

Appendix A

**Existing Recycling Center Review and Assessment
Technical Memorandum (Great West, July 2018)**



City of Moscow

Existing Recycling Center Review and Assessment

PREPARED FOR: City of Moscow

PREPARED BY: Travis Pyle, PE/Great West

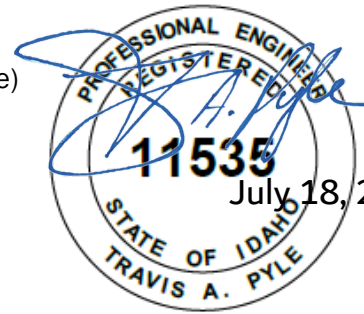
REVIEWED BY: Bob Church, PE/Great West (Principal In-Charge)
Chris Bell/Bell & Associates

DATE: July 18, 2018

PROJECT NUMBER: 4-17150

REVISION NO.: 1

APPROVED BY: Travis Pyle, PE/Great West



1.0 Introduction

The City of Moscow retained Great West Engineering to perform an assessment of the City's Recycling Center operation and physical characteristics to improve on the services and operations when the center is replaced by a new convenience drop-off location and separate processing/baling facility. This evaluation is being conducted under Task 2 (Deliverable 2.1 – Technical Memorandum #1) of the Comprehensive Sanitation System Master Planning Services Project ("Project"), in accordance with the contract between Great West Engineering, Inc. and the City of Moscow dated February 26, 2018.

1.1 Purpose/Objectives

Conduct a review of the existing Recycling Center's operation and physical characteristics as part of a comprehensive review of the City's Sanitation system and programs to continue its mission of "... actively exploring and assessing viable new technologies and opportunities in the management of the waste stream which protects the health, safety and cleanliness of the City." The City continues to adopt a progressive waste management mission to deliver quality, affordable and fiscally-responsible services to the community.

The Moscow Recycling Center was developed to provide a convenient location for residents to drop-off pre-sorted recyclables and yard waste. The recycling program in the City has evolved over the years from to pre-sorted (source-separated) curbside collection to eventually single stream "no sort" curbside collection that was adopted in February 2016. The changes in the collection program in the City has modified the function of the center. The facility now has a joint purpose of processing comingled recyclables and bailing them as well as continuing to offer a location for residents to drop-off pre-sorted recyclables and yard waste.

The City desires to relocate the existing recycling processing/baling components of the current center to a new building at the Solid Waste Processing Facility (SWPF), located south of town at 3299 Highway 8, and repurpose the current Recycling Center property for a different City use. The intent of the recycling center changes is to decouple the processing/baling components but still provide a convenient drop-off location for recyclables and yard waste for the public. This will require development of a new piece of property somewhere in town or near town to continue to provide this convenience to its residents.

The City of Moscow is in the process of soliciting input from the community by sending out 1,200 surveys to City residents (sent out in late March 2018), conducting interviews at the Recycling Center in early to mid-April, and conducting interviews of three focus groups in late April to early May. These public outreach activities have been designed to solicit feedback from the community on the City's sanitation system performance, the recycling center functions and needs, and location of a new convenience recycling drop-off center. Furthermore, the City has assembled an Advisory Group representing various businesses and groups to also provide input on this Project.

1.2 Background

1.2.1 General Information

The City of Moscow is located in Latah County, approximately 35 miles north of Lewiston, Idaho and 8 miles east of Pullman, Washington, and is the home of the University of Idaho. Moscow has a population of approximately 25,500 full-time residents and is the largest city in Latah County. The County has approximately 39,500 full-time residents.

The Recycling Center is located at 401 N. Jackson Street in the City of Moscow. Moscow Recycling is a public/private partnership between the City of Moscow and LSI and offers recycling services for both commercial and residential customers with over 30 commodities accepted. The center sits on a parcel of land with an area of approximately 72,900 square feet (or 1.67 acres) and is situated between N. Almon Street to the west, N. Jackson Street to the east, private property to the north, and C Street to the south (refer to **Exhibit 1**).

The facility is open 24 hours a day, 7 days a week for drop-off of recyclables and yard waste. The buyback office and main office hours are Tuesday through Saturday, 9:30 am to 5:30 pm. The facility offers large volume drop-off Tuesday through Saturday from 10:00 am to 4:00 pm. Much of the property is enclosed by perimeter chain link fencing. There is a grade-break with a z-wall (retaining wall) between the yard waste drop-off area on the west side of the property along N. Almon Street and the main building.

The City of Moscow provides curbside collection of municipal solid waste (MSW) on a weekly basis. The City began the curbside recycling collection program in 1999, with collection of source-separated collection at the curb. This continued until February 2016 when the City implemented single-stream recycling collection every other week through its franchise agreement with LSI.

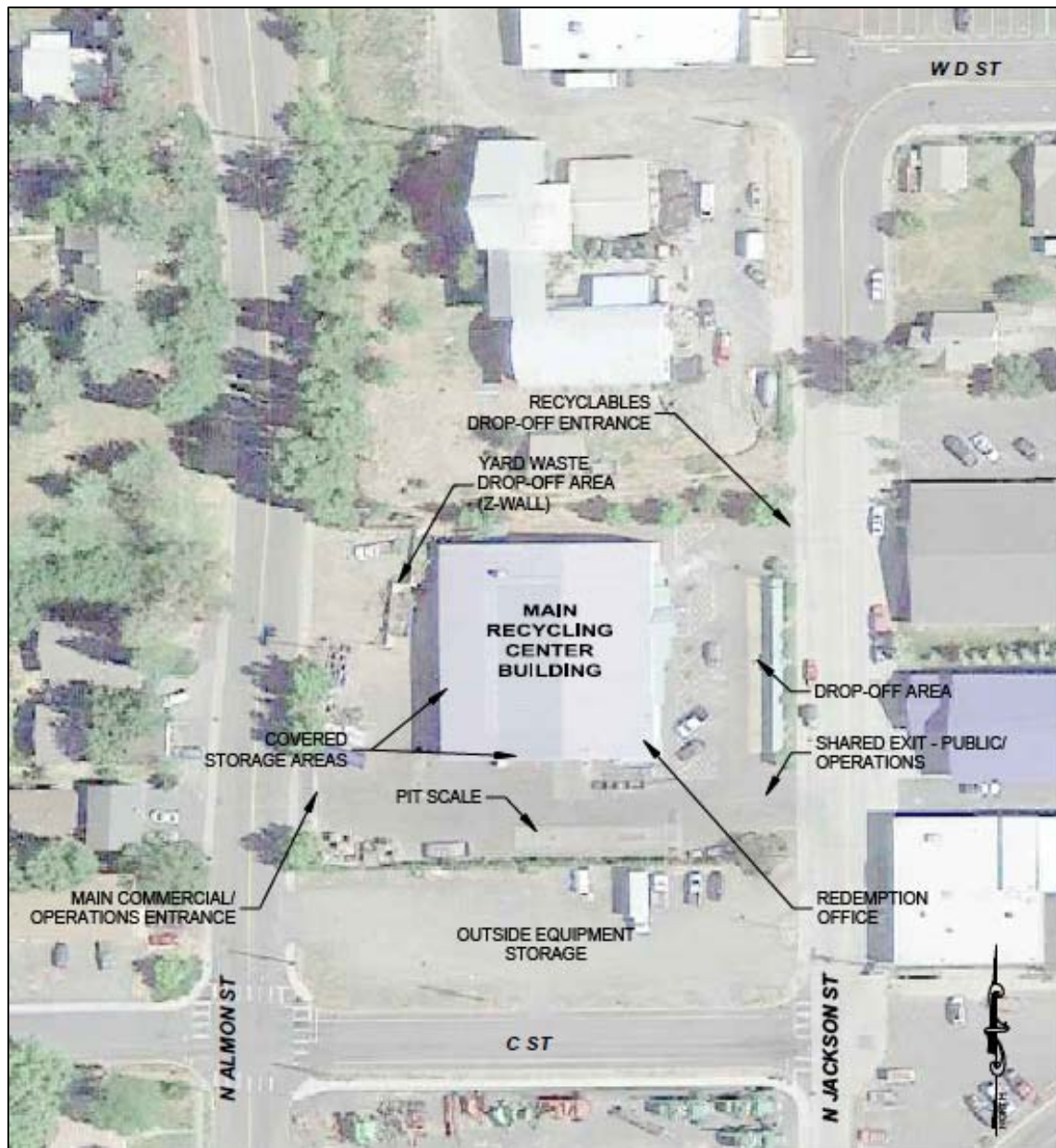


Exhibit 1. Aerial View of Recycling Center (courtesy of Google Earth)

1.2.2 Traffic Flow Patterns

Public Drop-off Areas

As shown on **Exhibit 1**, there are two public drop-off areas – one for recyclables on the east side of the facility and one for yard waste on the west side. Traffic enters the recyclables drop-off area from of N. Jackson Street and cycles counterclockwise as shown in **Exhibit 2A**. The exit is shared with commercial recyclables collection trucks, operations equipment, and large long-haul semi-trucks. Traffic backs in off of N. Almon Street to access the yard waste drop-off area also shown on **Exhibit 2A**.

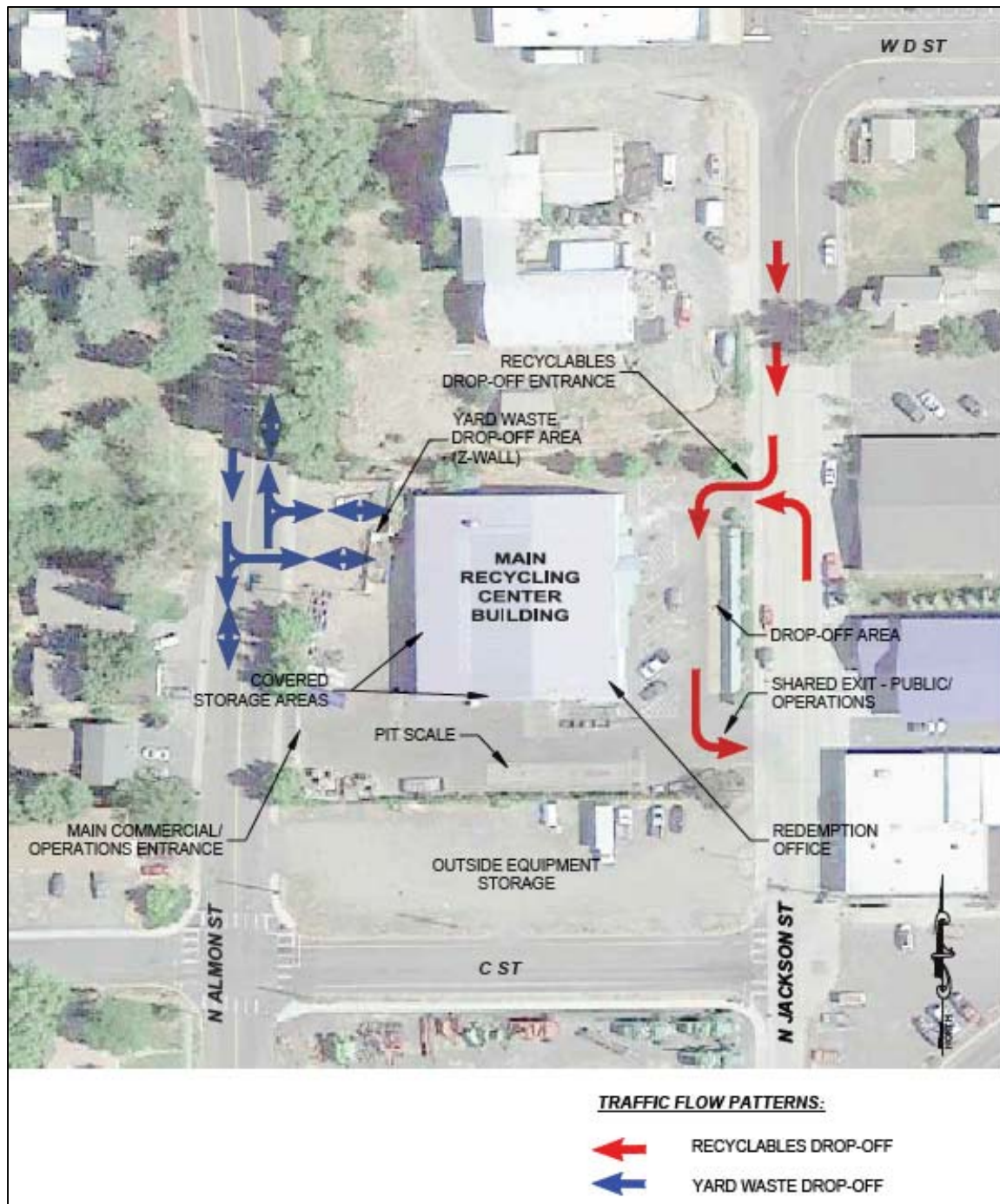


Exhibit 2A. Traffic Flow Patterns for Public Drop-Off (Recyclables and Yard Waste Areas)

Commercial Recyclables Drop-off/Yard Waste Operations

Exhibit 2B shows the traffic flow pattern for both commercial recyclables collection trucks and operation equipment for hauling yard waste roll-off containers.

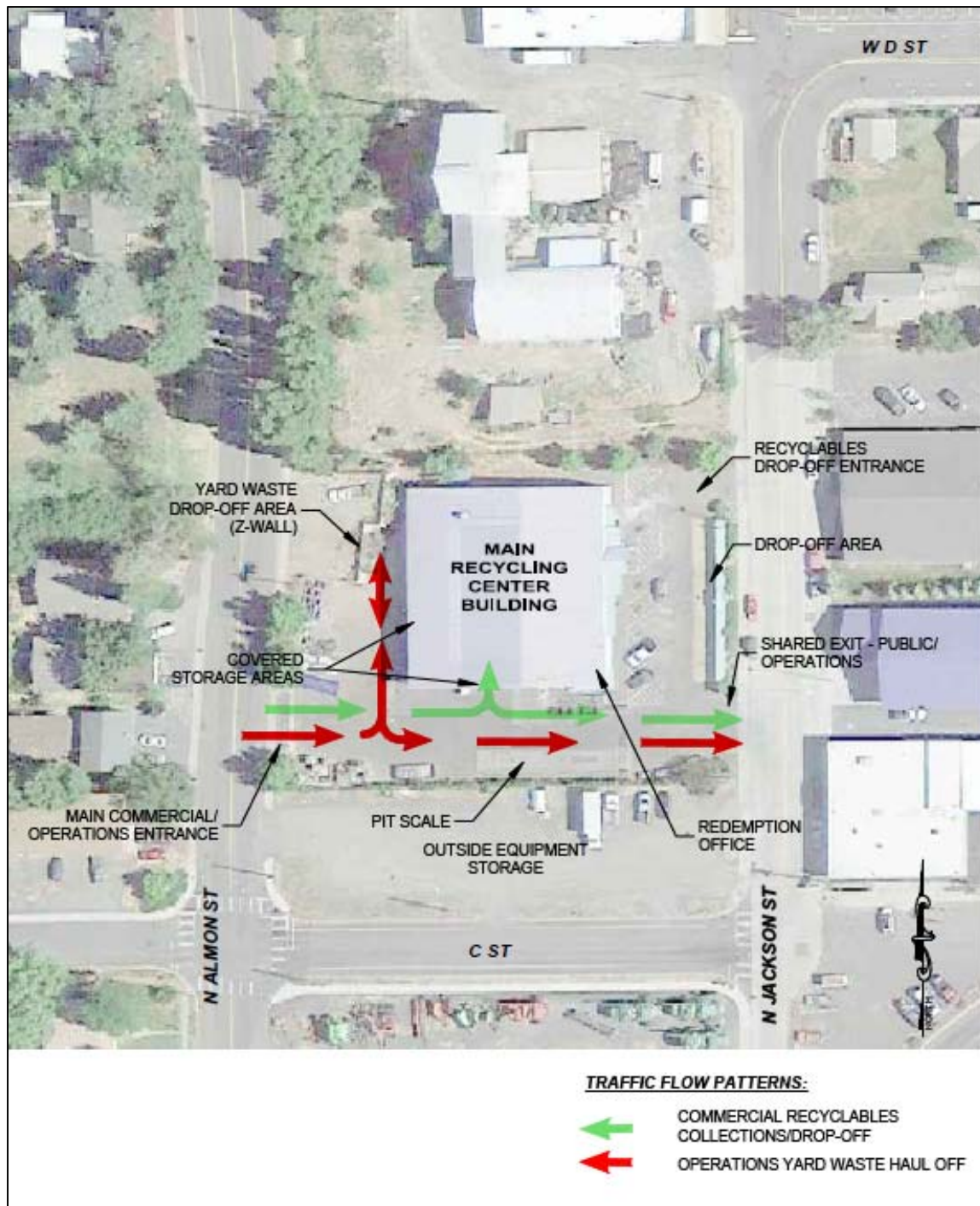


Exhibit 2B. Traffic Flow Patterns for Commercial Recyclables/ Yard Waste Haul-Off Ops

Long-Haul Semi-Truck Recyclables Haul-Off

Exhibit 2C shows the traffic pattern for the long-haul semi-trucks and trailers that arrive at the site to haul-off recyclables – both baled, single-stream recyclables and source-separated commodities. The semi-truck and trailers enter the facility from of N. Almon Street through the west gate and swing south to pass over the in-ground platform scale to be weighed and tared. After scaling in, the driver pulls the truck and trailer forward (east) and then “jockeys”

the rig into place next to the building (south side of building aligned east-west) for loading. Once the trailer is loaded, the driver pulls the rig forward through the east gate and doubles-back through the west gate, passing over the scale to weigh out, and then leaves the facility.



Exhibit 2C. Traffic Flow Pattern for Long-Haul Semi-Trucks and Trailers

1.2.3 Franchise Agreement

In 2015, the City granted a franchise agreement extension with LSI for an additional 20-year term for: (1) solid waste and recyclable collection within the City; and (2) operation of the transfer station, recycling center, and associated solid waste facilities. LSI owns, operates

and is responsible for all capital assets and equipment utilized in the solid waste and recycling collection and transfer station operations, except for the Recycling Center. The Recycling Center is owned by the City of Moscow. It is anticipated that the City will continue to receive solid waste collection services under the current franchise agreement with LSI until the end of the agreement term. Additionally, the City currently contracts with Waste Connections for solid waste transport and disposal at their Finley Buttes Landfill in Boardman, Oregon. The City is currently conducting Request for Proposals (RFP) for transport and disposal services in the effort to seek the most cost effective services. It is anticipated that the RFP, respondent selection and contract execution will be completed by May 31, 2018.

1.2.4 Historical Recycling Center Capacity Issues

The City has been contemplating expansion and improvements to the Recycling Center for almost 17 years. In June 2001, the City hired Castellaw Kom Architects (CKA) to prepare concepts for adding covered storage to the east side of the main building and relocating the recyclables drop-off area to the south along with constructing a separate redemption building. The cost estimate in 2001 by CKA was \$691,000. The estimate was later updated by CH2M HILL in May 2011 to \$1,031,000 as part of a rate study for the City. At that time, the City was considering purchasing property to the north in order to make enough space for operations. The land owner did not want to sell and the improvements were never made.

In 2013, the City reported that there was insufficient expansion capacity at the Recycling Center. Recycling had grown from 2,424 tons annually in 1995 to 3,644 tons in 2013, over a 50% increase since the center was opened. Operating with the original 1993 design, it was reported that warehouse/dry storage at the Recycling Center was becoming inadequate and there were safety concerns with vehicles/equipment interfacing with people. It went on to report that these issues would continue to become problematic with continued population growth and more volume of recyclables.

The long-term goals reported by the City in 2013 were to:

- Increase the overall capacity and capability of the City's recycling program and facilities,
- Reduce the number of risk factors involving public interaction with forklift/skid steer equipment at the Recycling Center, and
- Decrease the number and length of wait times at the Recycling Center.

The City continues to be mindful of these goals in relocating and improving recycling collection at a new convenience center.

1.2.5 Population Growth Estimates

The population of the Moscow is expected to grow on average 1.15% per year while Latah County without the City is anticipated to grow 0.56% per year (per the City's Finance Department). The County including the City of Moscow is expected to grow 0.92% per year. **Exhibit 3** provides a bar chart showing the growth of Moscow relative to Latah County (without Moscow).

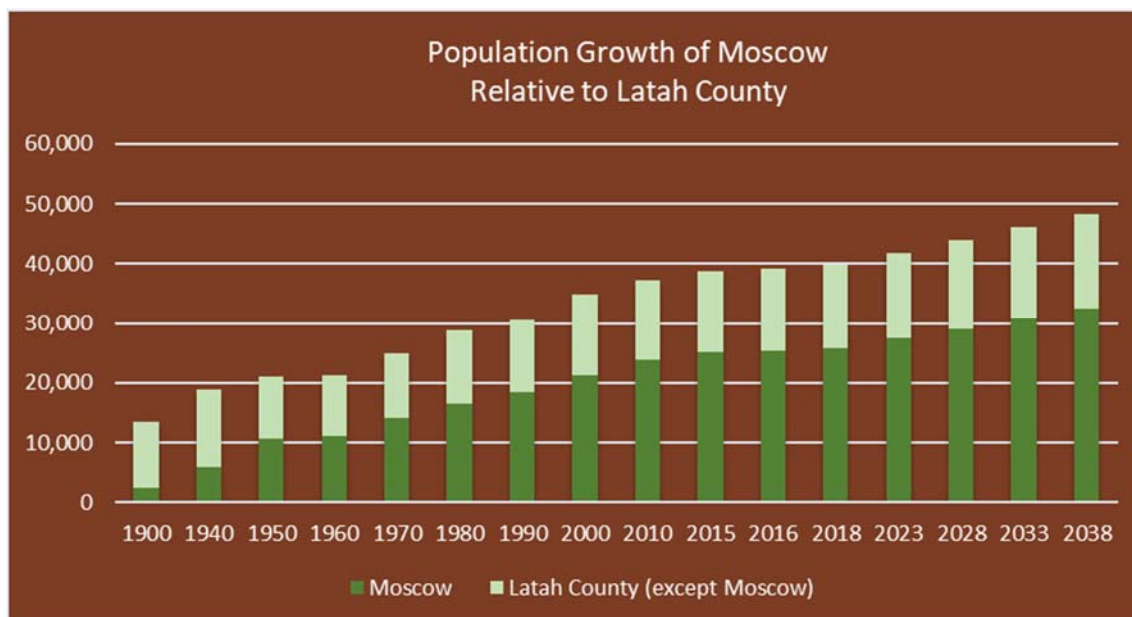


Exhibit 3. Population Growth of Moscow Relative to Latah County (Courtesy of Moscow)

1.2.6 Recyclable Tonnages

With the implementation of the single-stream recycling program in February 2016, the annual amount of recyclables collected at the curb increased by over 130%¹. The total amount that the Recycling Center is processing, however, has remained relatively steady over the last 6 years (2012 – 2017) (refer to **Exhibit 4**). Values in **Exhibit 4** include glass prior to single-stream implementation when glass is no longer accepted. The average amount of material processed at the center over this same period is approximately 3,500 tons per year². The single most tonnage of any one recyclable is corrugated cardboard, which makes up on average 1,300 tons per year (or 30% of the total tonnage). Of the 1,300 tons, about 300 tons are collected from direct drop-off at the center by residents and the remaining approximate 1,000 tons are collected from area businesses.

The direct drop off program at the Recycling Center accepts on average 49% of the total recyclables that are processed by the center, excluding the amount of cardboard that is collected from businesses. When business-collected cardboard is factored in, the amount then increases to 83%. The remaining 17% of tonnage is collected from the curbside program in Moscow.

Even with the mandatory curbside single-stream collection program in the City, people continue to choose to drop-off their pre-sorted recyclables at the center. Findings from a

¹ Previous to roll-out of the single-stream program, the City also collected glass curbside as part of the pre-sorted curbside collection program. Glass collection was not included in the single-stream collection program. Subtracting the amount of glass collected previously and comparing the two one-year periods of February-January 2015 (281 tons) and February – January 2016 (651 tons), curbside recycling increased by over 130% in accordance with the City's estimates.

² This total tonnage includes on average approximately 50 tons of "out of county" recyclables, which are collected from a bordering Nez Perce County site that LSI operates.

2016 intercept interviews at the center indicated that only 48% of the users are city residents and the remaining 52% are from Latah County and out of county users.

Based on the population estimates (and excluding the amount of cardboard collected from businesses), the City and Latah County residents together recycle approximately 0.06 tons per year per person. This per capita figure has also remained relatively steady over the same period (2012 – 2017).

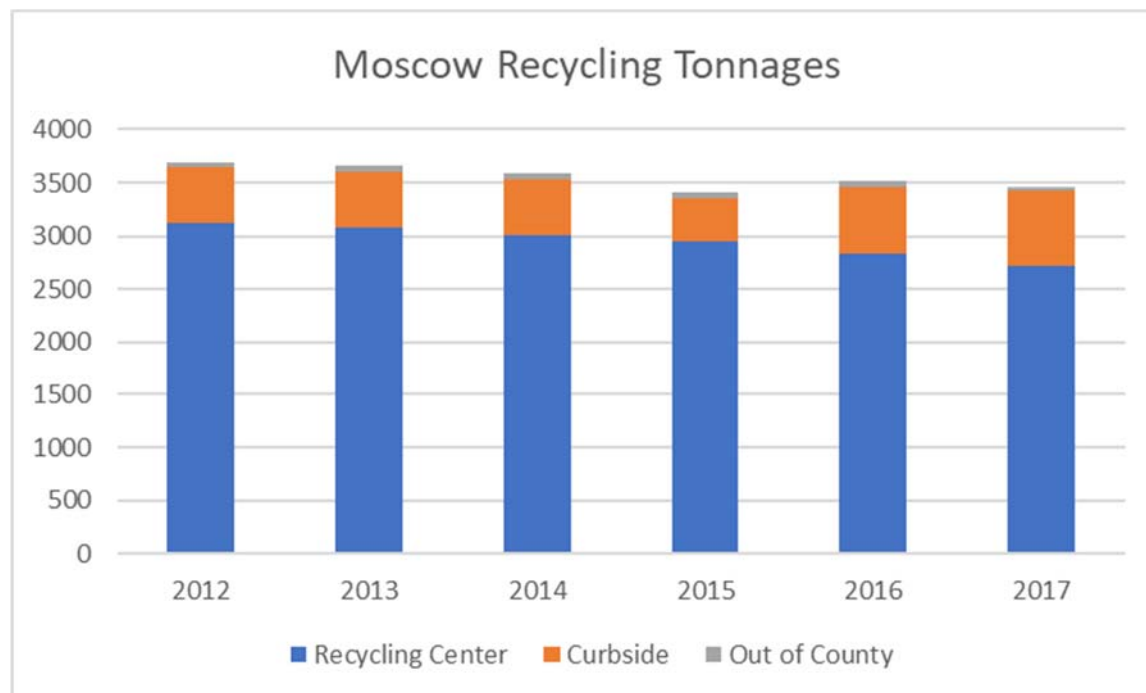


Exhibit 4. Moscow Recycling Tonnages (2012-2017)

1.3 Project Approach and Methodology

The function of the Recycling Center has changed in recent years, especially with the adoption of the single-stream curbside collection program in February 2016. This curbside collection program and the City’s need to repurpose the site for other City services is driving the reassessment of the Recycling Center’s need and purpose in the City.

On February 28, 2018, Travis Pyle, PE/Project Manager and Lead Solid Waste Engineer conducted field observations and toured the Recycling Center and the SWPF with the Sanitation System Manager, Tim Davis. Interviews were conducted with LSI staff who operate the Recycling Center to supplement observations and learn more what the staff like and do not like about the operations, infrastructure and functions of the facilities.

As part of this Project under a separate task, a material reuse and sorting facility feasibility study will be conducted to determine the viability of the City providing these types of services in-house and possibly expanding the service area to the quad-city market (Lewiston, Idaho and Clarkston and Pullman, Washington). The outcome of this assessment will directly influence the outlook for the recycling facility processing/baling function that will be located at the SWPF.

2.0 Analysis of Recycling Center

The Moscow Recycling Center consists of the following major facilities/features:

- Recyclables Drop-Off Area
- Main Building and Redemption Office
- Yard Waste Drop-Off Area
- Site Storage Areas

2.1 Recyclables Drop-off Area

2.1.1 General Description

The recyclables drop-off area is located immediately east of the main building from N. Jackson Street. Customers enter the facility through the main public entrance driveway, park at one of six parking spaces, walk across the driveway, and then unload their recyclables into pre-sorted recycling bins (refer to **Exhibit 2A**). There are ongoing safety concerns with people mixing with public vehicles and operational equipment such as forklifts in this area.

There are covered spaces for 14 bins at the recyclables drop-off area (refer to **Exhibit 5**). The 3-cubic yard (cy) bins provide collection for the following recyclables:

- Glass Bottles and Jars (all colors)
- Newspapers
- #2 Cloudy Plastics
- #1, and #3-#7 Plastics
- Tin/Steel Cans
- Aluminum Cans
- Magazines
- Mixed Paper
- Cardboard and Brown Grocery Bags

The facility also collects lead acid batteries and used motor oil at a spill containment station located on the northeast side of the building (refer to **Exhibit 6**). Scrap metals (brass, copper tubing, cast and sheet aluminum, and vehicle radiators) are also accepted. Rechargeable batteries are accepted at the Redemption Office during office hours. The center also offers a drop-off/book exchange program and shredding paper service.



Exhibit 5. View of the Recycling Drop-Off Containers Looking Southeast



Exhibit 6. View of the Used Oil/Lead Acid Battery Drop-Off Station Looking West

2.1.2 Notable Issues/Deficiencies

The recyclables drop-off area is approximately 300 square feet (sf), which is small for the traffic and customers that use the facility. With angled parking slots provided on the west side of the driveway, cars travel between the drop-off bins and the parking lot. This results in congestion and safety issues with users walking in between the parked cars and the bins and especially when cars are backing out of the parking stalls to exit the facility. Mixing people with passenger vehicles and operational equipment is an ongoing safety concern.

Additional container space should be considered to provide room for more covered bins, such as cardboard. Uncovered cardboard overflow containers are situated on the south side of the driveway between the chain link fence and N. Jackson Street, which adds to the congestion and safety concerns during busy periods. The number of parking spaces also is limiting resulting in cars stacking on N. Jackson Street or parking in front of the bins between them and the parking spaces. Unloading of full bins and replacing with empties by LSI adds to the congestion and safety issues with front access only.

2.1.3 General Recommendations for Improvement

For the new convenience recycling center, the arrangement of the bins and the parking area should be modified to allow customers to pull in front of the bins and park with cars facing toward the bins. Cars would then leave the drop-off area by backing out of the parking spaces away from the bins and exit the site in a consistent clockwise or counterclockwise pattern depending on the configuration of the new site. The space between the bins and the cars should be for pedestrians only. No cars or operational vehicles should be allowed in this space for safety.

The bins should also be arranged to allow operations to access them from the rear for removing full bins and replacing with empties. Additionally, the type of bins that will be used in the future should be assessed for efficiency especially when the center is converted to more of a convenience operation and may or may not have the capability of processing recyclables onsite. Filled containers may need to be hauled directly to the proposed, new facility for processing that will be located at the SWPF. Roll-off container style recyclable containers may be more effective for this type of operation rather than using individual 3-yd containers.

2.2 Main Building and Redemption Office

2.2.1 General Description

The main building was built in 1993 and is approximately 13,285 sf. It includes a large, unheated processing floor for sorting and baling recyclables, an outside covered storage area, office space, and a redemption (buy-back) office. **Exhibit 7** provides a view of the southeast side of the building showing the redemption office walk-up window and main south side opening to the building floor. **Exhibit 8** shows the inside of the main building.

The building was originally planned for processing/baling pre-sorted recyclables but has since been utilized to also bale single-stream recyclables collected by LSI's commercial collection trucks. The traffic flow patterns for commercial collection trucks dropping off single-stream recyclables and operations picking up roll-off yard waste containers and hauling off are shown in **Exhibit 2B**.

The added traffic and volume from the single-stream collection program is overwhelming the facility. The covered storage area is inadequate to contain and store materials in a dry environment while they wait to be sold. **Exhibit 9** shows the outside covered storage area.



Exhibit 7. View of Recycling Center and Redemption Office Looking Northwest



Exhibit 8. View of the Inside of the Main Building Looking North Through the South Door

2.2.2 Notable Issues/Deficiencies

With the change in the recycling collection program shifting to single-stream curbside collection, the facility's overall function has changed. This change requires more room to sort and bale single-stream recyclables as well as continuing to process source-separated recyclables. Traffic flow is congested with shared entrance and exits for the operations, commercial collection trucks, and the long-haul semi-trucks picking up baled material. The facility also is in need of more covered storage. The yard pit scale is also problematic (refer to Section 2.4).



Exhibit 9. View of the Covered/Dry Storage Area Looking North (West Side of Main Building)

2.2.3 General Recommendations for Improvement

Ultimately, the size and layout of a new processing building to be located at the SWPF will depend on the decision of adding a sorting system component to high-grade recyclable materials. This study is underway and will be incorporated into future decisions.

Aside from providing or not providing sorting operations at the convenience recycling center in the future, several improvements can be made to a new building by providing more floor space for baling and processing, more covered storage space, better and more streamlined access for commercial collection trucks for unloading, separate access for semi-trucks and trailers, and better scale positioning that is in-line and more efficient to use without having to double-back (or triple-back) for loading and weighing out.

The new convenience drop-off center may only have a small building associated with it for office space, a redemption center, and an area for some minor material processing and baling. The bulk of the processing will occur at the new processing/baling center to be located at the SWPF. The outlook of the new convenience recycling center will depend on public input, functionality, cost, and available property.

2.3 Yard Waste Drop-Off Area

2.3.1 General Description

The Yard Waste Drop-off Area consists of a concrete block retaining wall (z-wall) with two slots to park 30-yd roll-off containers in the lower level slots (refer to **Exhibit 10**). The upper level (unloading pad) is paved and is relatively narrow between the edge of the z-wall and N. Almon Street (refer to **Exhibit 11**). There is space on the unloading pad for two vehicles typically at one time. Users are required to back into the tipping area from N. Almon Street maneuvering into and out of traffic that is either driving by or waiting to unload yard waste themselves. The traffic flow pattern for dropping off yard waste is shown in **Exhibit 2A**. An approximate 3-ft high concrete wall extends above the unloading pad to reduce the risk of people falling into the drop boxes. There is also a railing attached to the top of the concrete wall where there is no container positioned below to discourage users from missing the containers.

Customers are instructed to throw their yard waste over the 3-ft-high wall into the containers parked below (unless the bins are full). If the bins are full, the customers are allowed to pile their yard waste on the deck until they are changed out and then LSI will clear the deck.



Exhibit 10. Yard Waste Drop-Off Area (Z-Wall) Looking North at Lower Level

The yard waste drop-off is marked for Latah County residential use only. However, it was mentioned by LSI that commercial customers have been known to illicitly dump yard waste at this site instead of hauling to the SWPF.



Exhibit 11. Yard Waste Drop-Off Area Looking Northeast from N. Almon Street

2.3.2 Notable Issues/Deficiencies

There is a short queuing distance between the unloading pad and N. Almon Street. This results in significant congestion in the roadway, especially during the weekends when multiple customers are maneuvering and backing-up to the wall to unload. This short queuing distance coupled with only two unloading spaces limits the number of users and causes safety concerns. Also, the location of the yard waste drop-off area is in the back of the facility and is open 24-hrs, 7 days a week. The lack of oversight results in illicit dumping by non-County residents as well as commercial business (such as, landscaping business).

Stormwater management is not contained or collected that comes into contact with the yard debris and the containers are not covered.

2.3.3 General Recommendations for Improvement

Several improvements can be made to the Yard Waste Drop-Off Area for the new convenience recycling center. The drop-off should be located in a more visible location on the site that allows monitoring of the users. Furthermore, the drop-off should be enclosed by a fence and only open during normal business hours to allow further control of illicit users and possible contamination. The containers lids should also be closed or the containers placed under a canopy cover to reduce the amount of contact water that is generated as best practice.

2.4 Site Storage Areas

2.4.1 General Description

Dry (covered) storage is limited at the facility. The main building has a covered storage area on the south side next to the main opening of the building (refer to **Exhibit 12**) and a west side storage bay (refer to **Exhibit 9**). The south parcel of the site is unfenced, uncovered and is used for general equipment storage.



Exhibit 12. Operations Access at West Gate Looking East

2.4.2 Notable Issues/Deficiencies

The new convenience center and processing/baling facilities will need to consider storage needs depending on the materials handled and processed at each location.

The traffic flow pattern at the Moscow Recycling Center is congested and unsafe. Walking customers are crossing paths with residential vehicle traffic and facility operations at the Recyclables Drop-off Area. Commercial collection trucks dropping off single stream recyclables on the floor of the main building intermingle with operations traffic, large haul trucks, and roll-off container trucks. The platform scale is offset (south) of the west gate entrance and requires the long-haul trucks to turn off N. Almon Street through the main west entrance and onto the scale to first weigh in, back in and out to position (“jockey”) the truck next to the building for loading, and then pull back around a final time to weigh out and leave the facility.

2.4.3 General Recommendations for Improvement

Multiple improvements can be made to the covered storage and traffic flow for the new convenience recycling center. Additional building(s) and/or covered shed structures can be provided. The traffic flow pattern for the new convenience and processing/baling facilities will need to be purposefully designed with awareness of traffic types to provide an efficient and safe operating facility. The traffic patterns will be ultimately dependent on the parcel of land for the new facilities. Being mindful of the layout with respect to traffic flow is a

fundamental in the design of these types of facilities (such as, not mixing operations and commercial traffic with public traffic).

3.0 Recycling Program Service Levels and Performance

The City is currently underway with a survey of 1,200 residents asking them about the service level and performance of the City's recycling program. The survey will be augmented with interviews of customers dropping off materials at the Recycling Center as well as input from the Focus Group and Advisory Group. The results of the survey will be tabulated and reported to the stakeholders. This information will provide the City with additional input to assist with future changes to the recycling program.

The City is providing a high-level of recycling collection service for its residents and the surrounding communities, including Latah County and out of county residents. The City has continued to offer drop-off at the Recycling Center even with the successful implementation of the single-stream curbside collection program in February 2016. Yard waste drop-off is also offered at the Recycling Center and the SWPF. Future analysis will include improving the program for curbside yard waste collection possibly on a seasonal basis.

4.0 Next Steps

The next steps for evaluation and planning of the City's recycling program and facilities is to prepare a matrix table that summarizes the key components of the City's current system with recommendations for alternatives and changes to consider in accordance with Task 2.2 of the project. This summary table will be followed by preparation of Technical Memorandum #2 that will summarize the work of this memo and the summary matrix and build on the input from the stakeholders to set the plan for recycling moving forward. Technical Memorandum #2 will also include a conceptual layout of a prototypical drop-off center for the City to utilize in conducting future site suitability assessments.

Appendix B

Recycling Facility & Program Matrix Summary Table (Great West, May 2018)

Recycling Facility & Program Matrix Summary Table
City of Moscow
Comprehensive Sanitation System Master Plan



Date: May 22, 2018

Prepared By: Travis Pyle, PE / Great West

Checked by: Chris Bell / Bell & Associates

Component/System	Current Issues/Deficiencies	Suggestions for Improvements / Considerations
Recycling Center		
Public Drop-Off Area	Crowding/Traffic Co-Mingling/Safety Issues: -Small queue-in area -Pedestrians crossing pull-through traffic zones -Operations/forklifts working in pedestrian drop-off zone -Redemption Center -Co-mingling of operations, haul trucks, and collection trucks at exit area	(as it pertains to a new convenience drop-off site and relocating the processing/baling at the SWPF) Enlarge area for more traffic staging access and drop-off space; provide an adequate number of containers and space to reduce congestion and wait times; possibly 5-6 total roll-off containers in a z-wall arrangement - 2 for cardboard, 2 for single stream and 1 for glass. Design parking area next to the bins/containers with the traffic lane outside so pedestrians and vehicles do not cross Design area with front access for public and rear access for operations to load and unload bins; consider replacing the small bin setup with z-wall type drop-off and roll-off containers; consider a carboard compactor at the new convenience center; move small (repurpose) bins out to the new processing center? Is a permanent redemption center necessary? Considering hosting a couple redemption events per year using existing buildings/infrastructure. Design public access so that it is separate from operations; collection trucks are not anticipated at the new site - they would direct haul to the new processing center at the SWPF.
Processing Building/ Site Storage	Inadequate Size/Lack of Covered Storage/Arrangement for Traffic Flow -Processing floor space may need to be increased especially if the new facility has a sorting component -Loading ramp is cumbersome and safety issue -Drop-off area(s) / containers for new processing facility. -Lack of dry storage awaiting loadout and haul-off for commodity sales -Collection trucks and operations co-mingle in the front of the building causing congestion and safety concerns Single location for recyclables drop-off within the city/near-city limits -Redemption Center is located in a crowded area next to operations	Current floor space is crowded and will only become more congested with increased recycling processing / baling needs. Increase the floor space (building area) as required to handle future needs. Consider adding a loading dock to the new processing building for semi-truck trailer back-in and loading off the staging/storage floor level. Consider repurposing the Moscow Recycling Center's containers for use at the new processing facility - see recommendations above for access and drive-through compatability. Enlarge the covered storage areas both inside of the building for load-out and/or an provide a large exterior covered storage shed Access to the unloading for collection drop-off should be on the front side of the building with operations and truck load-out on the rear to keep the traffic separated. -Consider adding recycling drop-off stations at the new processing facility in addition to yard waste drop-off at the SWPF. If a new redemption center is decided to be needed at the convenience drop-off facility, it needs to be located in the area where the public is dropping off recyclables and does not required pedestrians to co-mingle with vehicles and operations.
Yard Waste Drop-off Area	Inadequate Size/Lack of Queuing Space/Stacking of Traffic on Surface Street/Lack of Direct Sight for Monitoring -Lack of drop-off space for vehicles unloading -No finished compost pick-up area -Lack of space for vehicle maneuvering, and queuing causing back-up onto Almon St.	Consider adding another one or two z-wall container spaces for yard waste at the new convenience center. Consider adding a finished compost load-out area at the new convenience site. Design a pull-in area where vehicles with trailers can manuever without interacting with traffic; design the maneuvering space on the property and outside of access lanes.
Traffic Flow / Site Arrangement	General Site Traffic Flow/Scale Location(s) -Main processing building and site arrangement and site traffic flow requires co-mingling of operations, collection trucks and load-out haul trucks -Scale location for load-out haul trucks requires double-back (or triple-back) for inbound and outbound scaling -No scale for commercial collection trucks	Design the new site with the recommendations noted above for the main processing building and provide adequate space for the collection trucks to access separate of the public. Locate the scale along the separate operations access so that it is accessible and safe for both inbound and outbound load-out haul trucks. Consider adding a designated commercial scale at the new processing center such as an automated scale for the commercial collection trucks to weigh inbound with tared truck weights (no outbound scaling).
Recycling Program		
Curbside Collection Program for Yard Waste	-No curbside yard and/or food waste collection	Consider implementation of a seasonal yard waste collection program.
Continue to Increase Diversion Rate and Participation	-Diversion rate is approximately 16% for general crubside-type recyclables in the City without accounting for recycling of biosolids, non-municipal solid waste, and yard waste. With these included, diversion is historically around 50%.	Evaluate more opportunities to increase the diversion rate of general curbside-type recyclables and increase participation by community outreach programs. Possibiliy a yield-related campaign such as "just 2 more lbs per household each year," should be considered.

Appendix C

City of Moscow – Sanitation and Recycling Survey (2018)



Sanitation & Recycling Services Surveys

In support of the 2018 Sanitation Master Planning Process; a report of a three-pronged survey approach designed to collect community feedback on sanitation and recycling services in Moscow.

***Developed by: Shakie Doe-Williams, MPA Intern
July 31, 2018***

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Executive Summary

In early 2018, the City of Moscow began development of a Sanitation Master Plan. The Plan is intended to address the garbage and recycling needs, services, facilities and more for Moscow for many years to come. Additionally, as needs have been identified for facility relocation in the community, specifically the Moscow Recycling Center, citizen engagement in this planning process was deemed of the highest priority.

To that end, a series of community outreach and surveys were designed to gather the feedback from system users in order to better inform planning for the future. A three-pronged survey approach was adopted including a mailed written survey, designed to be statistically valid and representatives of all citizens of Moscow. Following the written survey, three opportunities were provided for citizens' engagement through focus groups. These groups provided an opportunity for additional information gathering and for citizens to share thoughts, ideas, and concerns that hadn't been captured in the written survey process. Finally, an intercept survey was conducted at the Moscow Recycling Center, a community-loved facility that for a variety of technical reasons including safety and operational capacity is scheduling to be relocated in the near future. This research into how the facility is actually used by patrons provided an update to similar information gathered in 2016.

The results from these three survey approaches are reported herein. This information will act as a resource for the Sanitation Master Planning Steering Committee, City Staff, and Great West Engineering, throughout the planning process and as a touchstone for sanitation and recycling opinions as documented in 2018.

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Written Survey Results

In 2018, the City of Moscow conducted a Sanitation and Recycling Service survey. The City of Moscow is currently undergoing a Sanitation Master Plan project to include review of our garbage and recycling services and facilities. The results from this survey will assist the City of Moscow as it collects input on current and future needs of the public in regards to recycling. The Sanitation and Recycling Survey follows a similar procedure as previously conducted City of Moscow Surveys, which gauges citizens' responses. The aggregate result of each survey question will be analyzed and evaluated as a resource to assist in the planning efforts of the Sanitation Master Plan as well as determining the most viable solution to the sanitation and recycling needs of the City of Moscow.

Methodology

The Sanitation and Recycling Services survey was sent out to 1,200 randomly selected local residents to participate, including dormitories and apartments. The City of Moscow is interested in the community opinions and feedbacks about the City's sanitation and recycling services. By asking 1,200 residents of Moscow to participate, the City will be able to determine how these survey results may apply to the entire community within a certain range. Residents' thoughtful responses will help guide decision-making and planning in regard to sanitation and recycling services in the community.

To determine the random sample of 1,200, an address list is obtained that includes all residential addresses within the City of Moscow, specifically those addresses that include the 83843-zip code. All addresses not within the Moscow City limits are then excluded. This allows for a more accurate account of Moscow residents when the results come in. Once there is a list of only Moscow residents, the random number is then assigned to the remaining addresses which are ultimately sorted by randomly assigned values. The first 1,200 are then selected for the sample. The survey includes only residential addresses and excludes those of businesses. This sample size of 1,200 provides the City of Moscow with the tools needed to capture the typical response of the overall population of the City, which is approximately 25,000 residents.

Each household was first mailed a postcard explaining that they would receive a Sanitation and Recycling Services Survey in the following week. The survey packet included a cover letter from Mayor Bill Lambert, the survey instrument, and a self-addressed-stamped envelope to return the completed survey.

Response Rate

The Sanitation and Recycling Services Written Survey response rate is 24% and account for 35 non-deliverable returned surveys. This survey is intended as a one-time survey to gauge the community's preferences for planning purposes. Since this is the first Sanitation and Recycling Services Survey of its kind there is no threshold to compare to. Of the 1,200 eligible households, 274 had returned the survey before this report was written, 35 non-deliverable/returned surveys were excluded, for a response rate of 24%. The 24% response rate for the 2018 Sanitation and Recycling Services survey provides a sufficiently large sample to result in a 95% confidence interval for most questions.

Some survey questions have some percentage of "don't know" responses and non-response rating. The statistics included in this report are given without including such non-response, as these are either questions that were simply not answered, or were not answered properly.

Understanding the Results

The questions in this survey are largely calculated to measure results on the 5-point Likert scale in a percentage format. This allows for easier and more meaningful measurement in survey questionnaires. For instance, a commonly used 5-point Likert scale format to measure satisfaction is: "Very Satisfied," "Satisfied," "Neutral," "Dissatisfied," and "Very Dissatisfied." The Likert scale allows a respondent to evaluate a specific item based upon their level of agreement or disagreement with that item. Survey questions 1,4,5,12,18, and 22-24, are based on this scale because its standardization and the ability to compare and provide a visual graph of the data. The remaining question in the survey are a mixture of open ended, yes/no questions, and multiple choice questions.

Open-Ended Comments

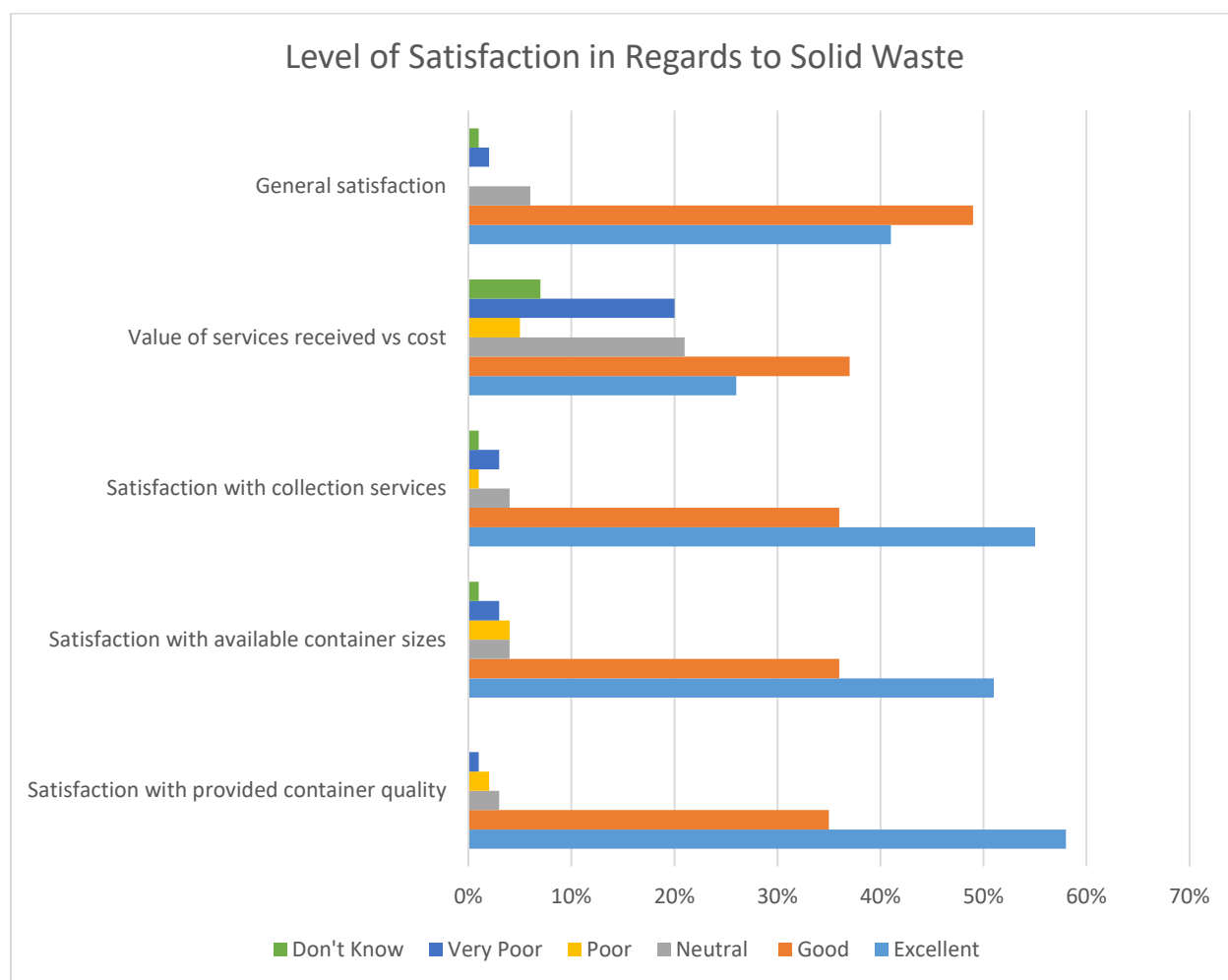
Several questions in the Sanitation and Recycling Services Written Survey were included to allow respondents to offer comments. These comments have been categorized for ease of comprehension. Respondents were asked to provide more information to better determine their preference or choice.

Solid Waste Services (Household Garbage) Collection Results

Level of Satisfaction (Q1)

The City of Moscow delivers an integrated solid waste management system consisting of diverse operations including waste collection. The City's solid waste management system provides for safe and reliable solid waste services at competitive prices for residential and commercial customers. Curbside Solid Waste services collection services are contracted through Latah Sanitation, Inc.

Using a Likert scale ranging from "Excellent" to "Very Poor", respondents were asked to rate their level of satisfaction in regards to solid waste services in Moscow. Using five sub categories; general satisfaction, value of services received vs cost, satisfaction with collection services, satisfaction with available container sizes, and satisfaction with provided container quality. The survey results show that about 90% of residents rated their satisfaction in regarding to solid waste services at "Good" or "Excellent". The table below shows the full results:



Any other comments regarding Solid Waste Service (Household Garbage) Collection (Q2)

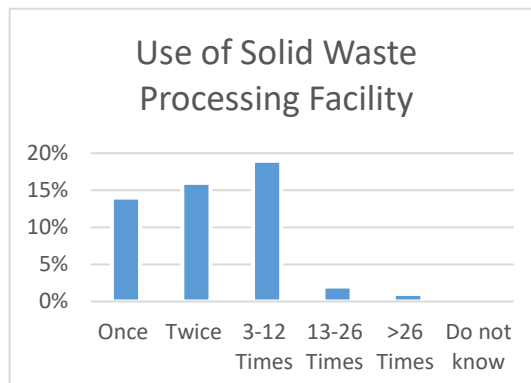
Listed below are the comments shared regarding Solid Waste Service in alphabetical order:

- 20 gallon garbage
- Clarification of recycling schedule
- Collection day in Spring
- Containers could be locked to prevent others from using them
- Cost is too high
- Discourage flagrant intrusions into alley right-of-ways
- Don't use service fee isn't fair
- Extra trash bags
- Fee is high
- Garbage bins fill up. Half of us recycle. Only my apartment composts.
- Garbage paid for by rental company
- Getting too expensive
- good minimum cost plan
- great customer service
- Home recycle
- I rent and garbage is included
- I rent at the Grove -- waste goes into dumpster there
- Insufficient container size
- Larger containers
- Live in apartment
- Live in apartment
- Miss closer glass collection site
- Need battery recycling service
- Not satisfied with any cost increase
- Pick up is always on time and containers are returned appropriately
- Prices are high
- Service good when collected
- Single Stream didn't lead to any savings
- Small container doesn't match the price
- Smaller roll chart should be reduced in price
- Surveys are a waste of paper
- System works great
- The drivers are very cautious and polite and very patient
- The fact that there is not curbside/house hold recycling
- Theft of service is a major problem. Being charged for overage because someone put trash in my container
- Very pleasant workers
- We sometimes get missed
- weekly recycling would be nice and green pick up
- When you pick up the trash pick it all up
- Why are on demand cans smaller than others?
- Wind has blown the container over and driver didn't pick up
- Wish there was recycling in apartment complex
- Working well
- Would love curbside glass recycling

Solid Waste Processing Facility (Transfer Station) Results

Utilization of Solid Waste Processing Facility (Q3)

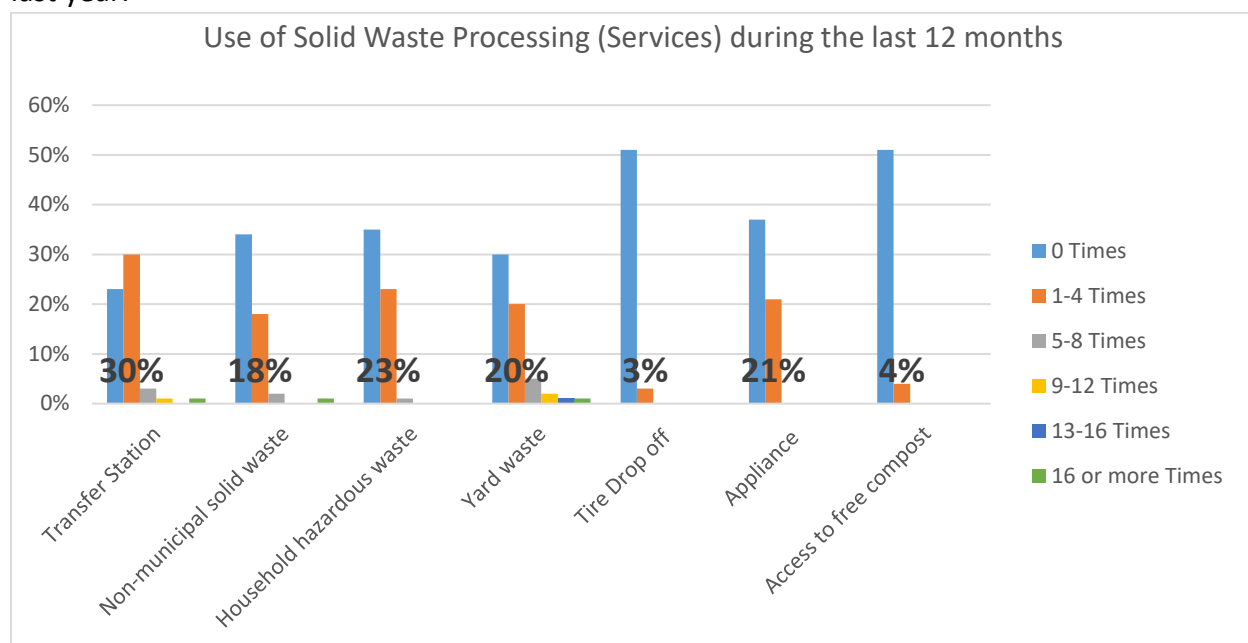
In this question respondents are asked to indicate how many times they have utilized the Solid Waste Processing Facility located on Highway 8 in the past twelve months. The results show that 51% of respondents used the Transfer Station within the last twelve months and that the majority of those residents also indicated that they used the facility at least 3-12 times.



Utilization of Solid Waste Processing Facility Services (Q4)

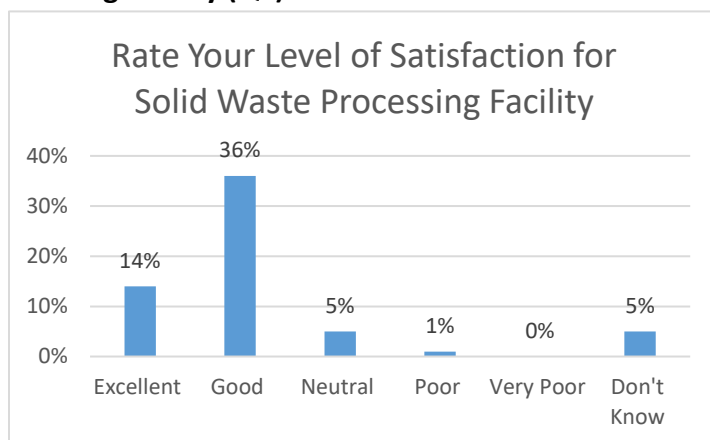
When asked to rate the frequency of which residents used the following services at the Solid Processing Facility within a 12-month period, respondents were given five options ranging from "Once" to ">26 times" and "Don't Know." Services in question include the Transfer Station, non-municipal solid waste (garbage) drop off, household hazardous waste drop off, yard-waste, tire drop off, appliance/scrap metal drop off, and access to free compost.

These results are varied and the question is more understandable by looking at percentages of respondents for each category. The chart below shows the percentage of usage as reported by respondents. The majority of the respondents noted they used the non-municipal solid waste, household hazardous waste, yard-waste, tire drop off, appliance, and used access to free compost "0 Times". The majority of respondents noted they used the facility "1-4 Times" in the last year.



Level of Satisfaction with Solid Waste Processing Facility (Q5)

Overall, level of satisfaction in regards to the Solid Waste Processing facility in Moscow was rated by respondents from “Excellent” to “Very Poor” and “Don’t Know”. Majority of respondents rated their level of satisfaction as either “Excellent” or “Good”. Only 6% of respondents rated their satisfaction as “Poor” or “Don’t Know”.



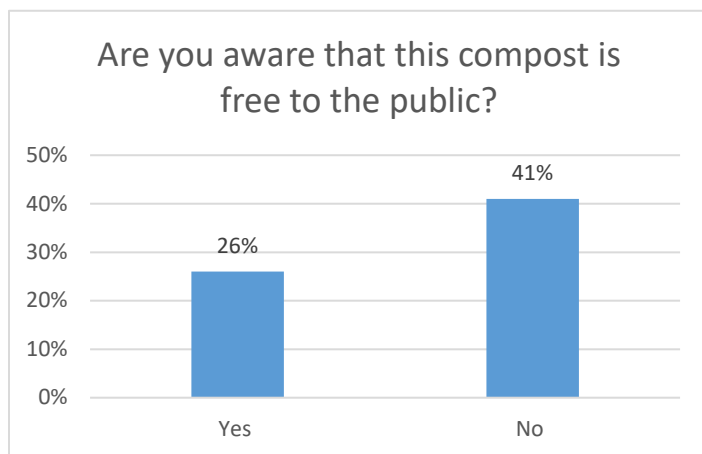
Awareness of Service (Q6)

Respondents were asked to indicate whether they are aware of the yard-waste hauling process in which yard-waste is hauled to the Solid Waste Processing Facility and then processed through a grinder, then mixed with biosolids produced at the City of Moscow Water Reclamation Facility and then composted.

The results in the chart shown here indicates that 40% of the respondents are not aware of this process while only 28% indicated that they knew about the service.

Free Compost Service (Q7)

Consistent with the previous question, respondents were asked if they knew that the compost at the Solid Waste Processing Facility is free to the public. The chart to the right shows that again respondents were unaware that compost is free with the majority 41% indicating “No” and 26% indicating “Yes”.



Value of Compost Service (Q8)

As a follow up question for those who answer the previous two question about composting, respondents were asked if they would use the City’s free composting service if they were aware of it, 51% of respondent indicated that they would use the service, while 15% of said they would not.

Any other comment regarding the Solid Waste Processing Facility (Q9)

Listed below are the comments shared regarding Solid Waste Service in alphabetical order:

- \$10 min fee is a little steep
- Basic garbage drop off is expensive
- Bio solids
- Compost delivery
- Concerned about herbicides
- Cost
- Don't have access to get the compost (no truck)
- free of contaminants
- I will now pick up compost
- Is the free compost chemical free
- Not charging locals for drop off
- Open hours at the end of the weekend would help
- Publish the rules and send with bill
- Used more often before \$10 fee
- Vacuum wouldn't fit container
- Very well kept place and friendly, helpful personnel
- We would be very interested in a curb-side compost pick-up service
- Worry about getting flat tire at solid waste processing center

Curbside Recycling Collection Results

Participate in Single-Stream Recycling (Q10)

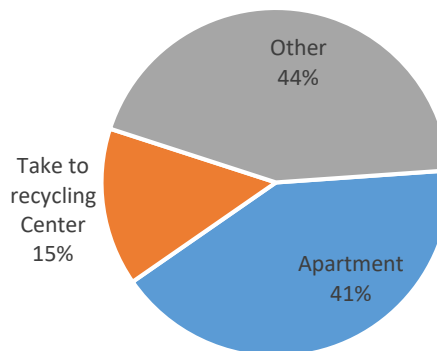
Per the survey it was noted that 74% of respondents participate in the single-stream recycling program.

Curbside Participation (Q11)

This questions asked those who did not participate in single-stream recycling what their reason was in an open-ended format. Of the 41 respondents who completed the question, 41% noted they did not recycle due to living in an apartment, 15% noted they deliver or haul their recycling in for drop off, and the remaining 44% noted the remaining issues:

- Because I live on Uldaho campus
- Bin never got delivered
- Container not delivered
- Cost prohibitive
- Didn't know about it
- Didn't know about it
- Don't have container
- Dumpster in back
- Live outside of town

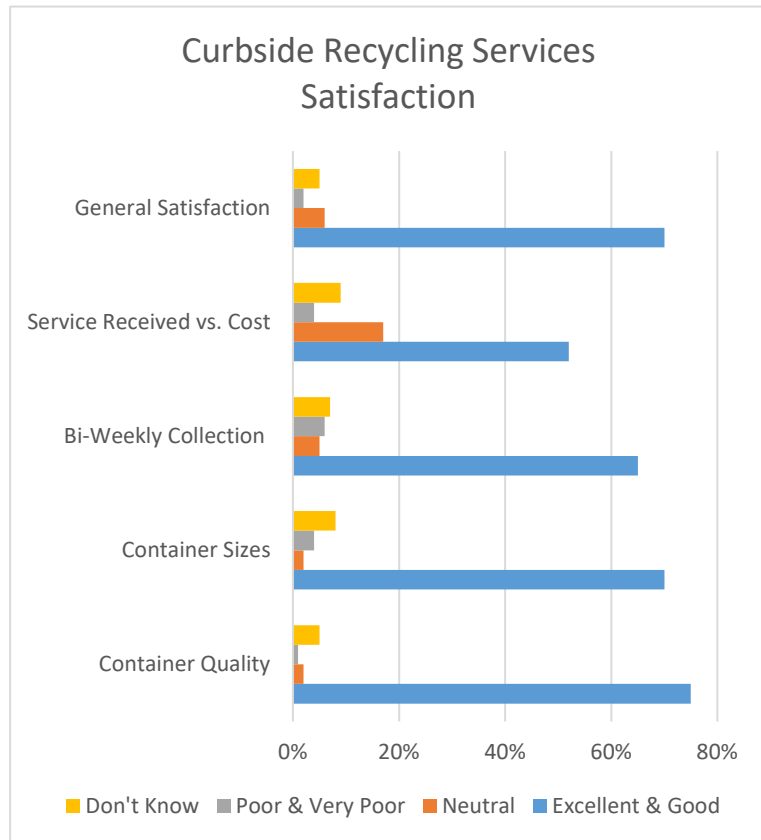
Reasons for Not Using Single-Stream Service



- Not everything gets collected
- Not offered on Moscow Mountain
- Not sure what this is
- Produce limited amount trash
- Recycling bin full at apartment complex
- Rural account
- Small amount of waste
- Waste of resources

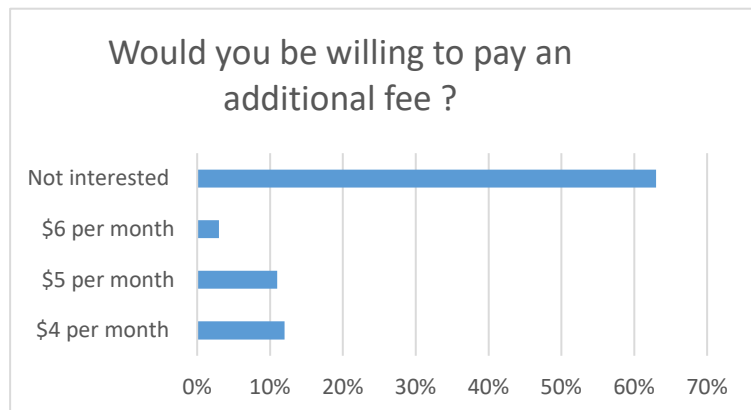
Level of Satisfaction with Curb-Side Recycling (Q12)

Survey participants were asked to rate their level of satisfaction in regards to curbside recycling collection in Moscow. Respondents were given five options ranging from “Excellent” to “Don’t Know.” Items surveyed included container quality, container sizes, bi-weekly collection, service received vs cost, and general satisfaction. The following chart shows the percentages of satisfaction as reported by respondents. The majority of respondents indicated their level of satisfaction with container quality, container sizes, bi-weekly collection, service received vs. cost, and general satisfaction as “Excellent” or “Good.”



Optional Seasonal Curbside Yard waste (Q13)

This question was asked to gauge respondents' level of interest of an additional curbside service for yard-waste collection. Respondents were given 4 selections to choose, “\$4 per months”, “\$5 per month”, “\$6 per month”, and “not interested”. A majority, 63% of respondents indicated “not interested”.



Other comments regarding Curbside Recycling Services (Q14)

Listed below are the comments shared regarding Curbside Recycling Service categorized by topic:

Glass pickup	11	Have enough roll carts	1
High cost for limited service	7	More room for roll cart	1
Need a larger container	6	Offer service outside of Moscow	1
More weekly collection	5	Haul yard-waste to the site by Rosauers	1
More seasonal fees/Pay-per-use	5	Drop off waste at Recycling center	1
Happy to take yard-waste to the yard-waste drop off	4	Move to single-stream	1
Offer at apartment complex	4	HOA provides	1
More marketing/transparency of service	3	Recycling bin frequently blows over	1
Make service free	2	Provide Magnetic calendars	1
Make available for Moscow Mountain	1	Love the one container collection	1

Moscow Recycling Center Results

Utilization of Moscow Recycling Center (Q15)

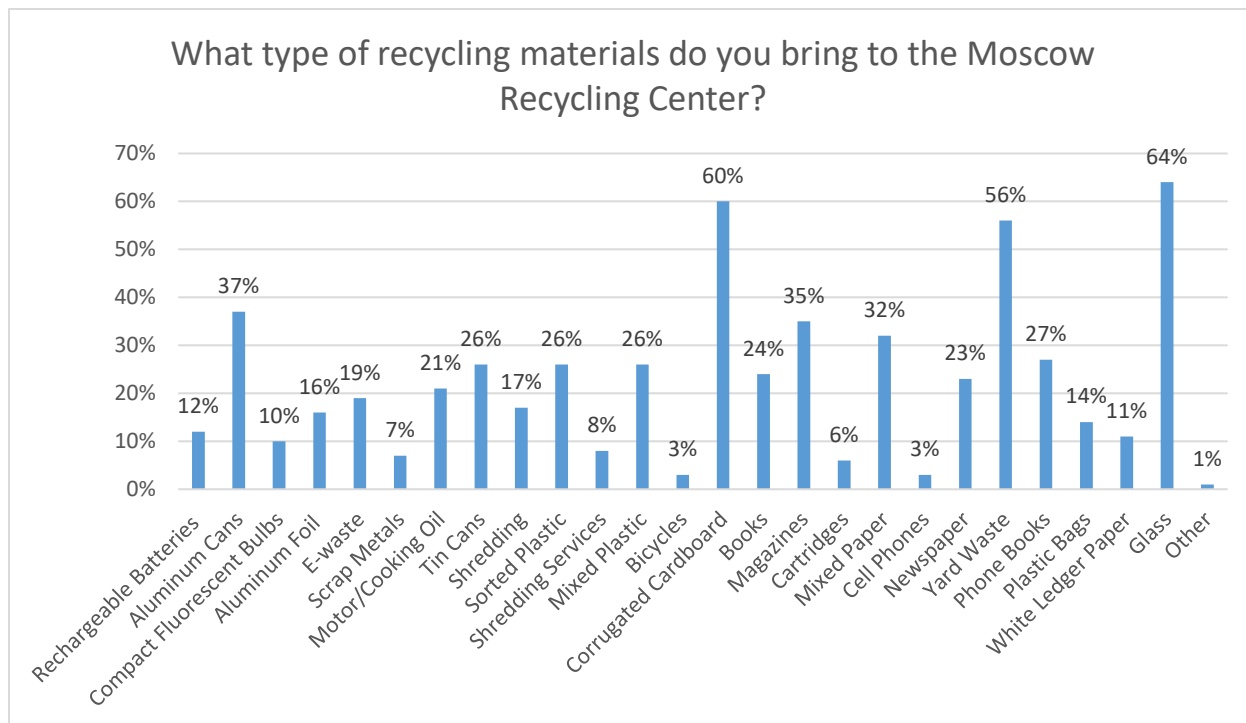
When asked if they have utilized the Moscow Recycling Center in the past twelve months. 86% of respondents noted “Yes”, while 10% indicated “No.”

Frequency of Visit (Q16)

Question 16 is a follow-up from question 15, which asked if respondents to indicate how often they use the center during a month and during the year. On average respondents visit once per month and just over 5 times per year.

Types of Recycling Material (Q17)

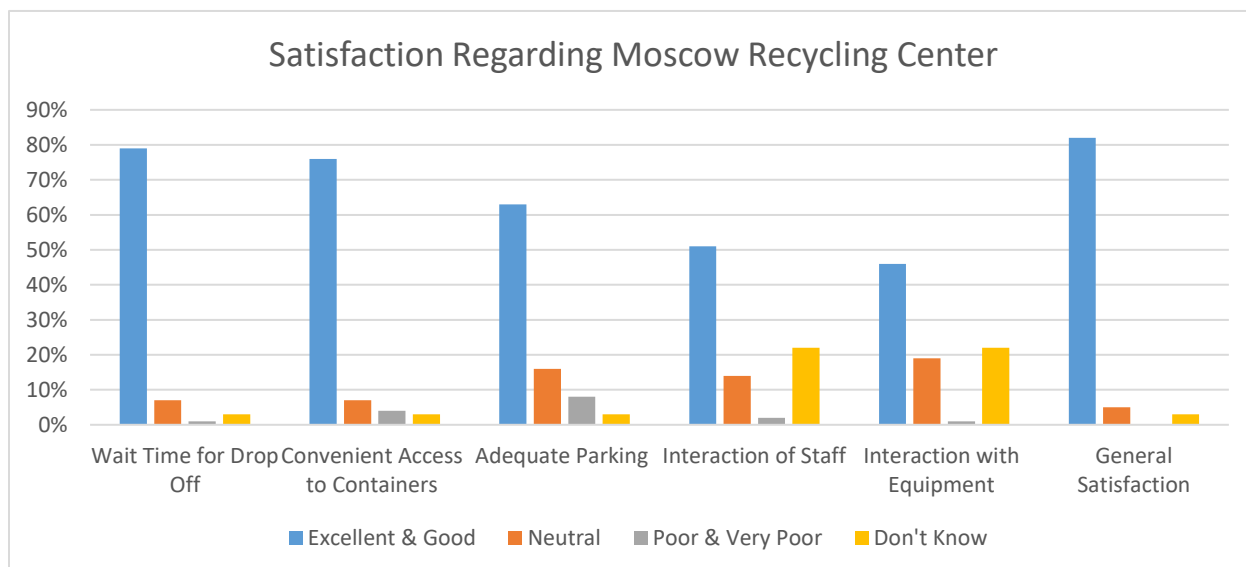
This question was asked to gauge the type of materials respondents bring to the Moscow Recycling Center. Respondents were given more than 26 different items to select from and were asked to check all that apply. Yard waste and corrugated cardboard were indicted as the two materials that were brought to the Recycling Center the most. The following chart lists all percentages for each item. Please note, percentages for each recyclable listed below notes the percentage of respondents who drop off that particular item amongst many other items.



Quality of Experience (Q18)

Survey participants were asked to rate virtually all aspect of services provided at the Recycling Center in Moscow. Services components surveyed included wait time for drop off, convenient access to containers, adequate parking, interaction of staff, interaction with equipment, and general satisfaction.

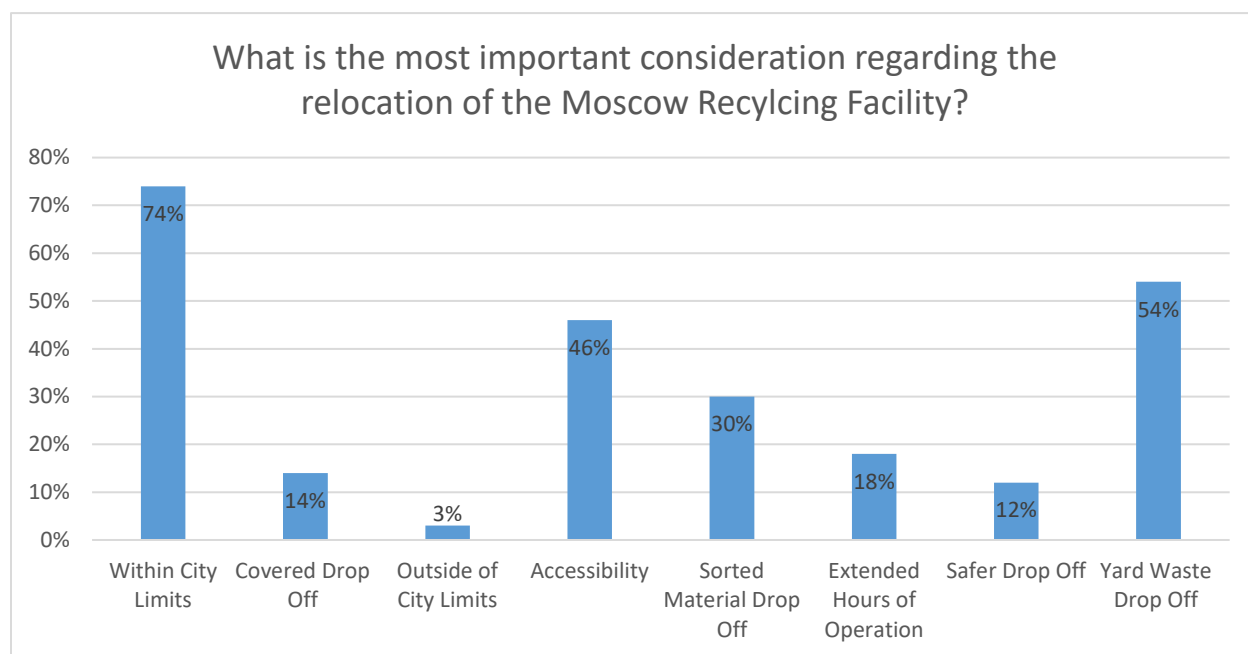
The following chart shows the percentages of respondents who noted their rate of experience in regard to satisfaction level. Of note, all services were rated very highly as “Excellent” or “Good.”



Relocation Preference (Q19)

Respondents were asked about what the most important consideration to them is regarding the relocation of the Moscow Recycling Facility. Participants were given the choices of preferred within City limits, covered drop off, preferred outside of the City limits, accessibility, sorted material drop off, extended hours of operation, safer drop off, and yard-waste drop off. Respondents were asked to check all that apply.

Shown in the following chart are the percentage of respondents who noted what their most important consideration is regarding the relocation of the facility. In short, most respondents would preferred the recycling facility to be relocated within City limits. Similarly, 54% of respondents feel it is important that the new facility has a yard-waste drop off.



As shown above, the top three most highly rated preferences for respondents is a facility that is in town that include yard-waste drop off and is accessible.

Other Improvement Suggestions to the to-be Relocated Recycling Center (Q20)

Listed below are the comments shared regarding preferences for a to-be relocated recycling center:

- Accept full length fluorescent bulbs
- Allow students to know this exist
- Battery recycling
- Battery recycling
- Better lighting and more parking
- Better lighting for night time

- Better management of weekly overflow of yard-waste especially during spring cleanup & fall
- Better Parking
- Better plastic bag recycling
- Better yard-waste area away from the street
- Better yard-waste disposal
- Bins shouldn't require sorting
- Close to city limits
- Don't move
- Don't move it
- Don't move it
- Drive through
- East side maybe by Mountain View Park
- Good to have this available
- I don't want it to move
- I like where it is now
- Improve smell
- Improve traffic flow
- Improved traffic flow for yard-waste drop off
- Incorporate glass recycling
- It works good
- Just not too far from the city limits
- Keep in city limits
- Keep it convenient and close
- Larger area & better access to yard-waste
- Larger parking area
- Larger yard-waste drop off area
- Like it close to my house
- Lots of parking and good traffic flow
- Make \$per pound price for aluminum can more reasonable
- Make it safe and easy for people to do the right thing.
- More cover
- More parking
- More parking
- More parking
- More parking
- More Parking
- More parking spaces
- More parking spaces for unloading
- More parking, large containers
- More traffic movement
- Must still be close to downtown and accessible 24hrs
- Need to be centrally located
- Needs more parking
- No need to back up vehicle
- Not far from downtown
- Open 24/7
- Other items like Styrofoam
- Parking
- Parking
- Parking
- Parking that flows better
- Pick up the parking lot - open containers allow for items to fall out and litter the parking lot
- Pleased with the current recycling center
- Recommend within city limits
- Shouldn't have to walk to the bins
- The experience is good
- The yard-waste area is right off the street
- Traffic flow
- Traffic Flow
- Unsafe parking lot
- Why move it?
- Why relocate? The location is great.
- Within city limits
- Yard waste and all other recyclables in one location
- Yard waste drop off in town
- Yard waste drop off unsafe

Other Comments Regarding the Moscow Recycling Center and/or its Location (Q21)

Given the importance of the recycling facility to the community an additional opportunity was given to share any additional feedback for consideration. Comments are listed alphabetically.

- Accept more types of material
- Accessibility
- Add glass to single stream if facility moves
- Back in parking
- Better communication about what can be recycled
- Better access
- Compost in town would be nice
- Convenient and easy to use
- Do it quickly and seamlessly please
- Easier way to recycle batteries?
- Educate public
- Empty lot next to Moscow building supply or old city shop
- Have a glass drop off on east side of town
- I like it where it is
- I think it's fine as is
- If not close, I'll stop recycling
- If out of city limits - not too far
- If yard-waste drop off leaves town, my yard-waste will end up in the trash can
- Improve access
- In city limits
- In town is more important than it being crowded
- Keep in city limits
- Keep in city limits
- Keep in city limits
- Keep it in town
- Keep it in town
- Keep prices low
- Keeping it in city limits
- Larger dump station
- Let u all vote online if possible
- Like it like it is
- Love the recycling center
- Make it easy to get to
- Make use of plastic bags
- More education about where recycled materials go
- More parking
- More staff interaction/better signage
- Prefer easy access from main road
- Rather city not move recycling center
- Recycle to save the planet
- Room for vehicles
- Should be located within city and "user" friendly
- Stay in city limits
- Yard waste disposal should remain free

Recycling Services – Yard Waste Drop Off Results

12-Month Use of Yard Waste Drop Off (Q22)

There was a typo in the question that asked respondents to rate the frequency of which they used the Moscow Recycling Center Yard Waste Drop off. The scale should have read, "Once,"

“Twice,” “3 to 12 Times,” “13 to 27 Times,” “>26 Times,” and Never. Instead the scale read “Once,” “Twice,” “Times,” “3 to 27 Times,” “>26 Times,” and “Never.” Respondents did note they used the yard-waste drop off “3 to 27 Times” per year.

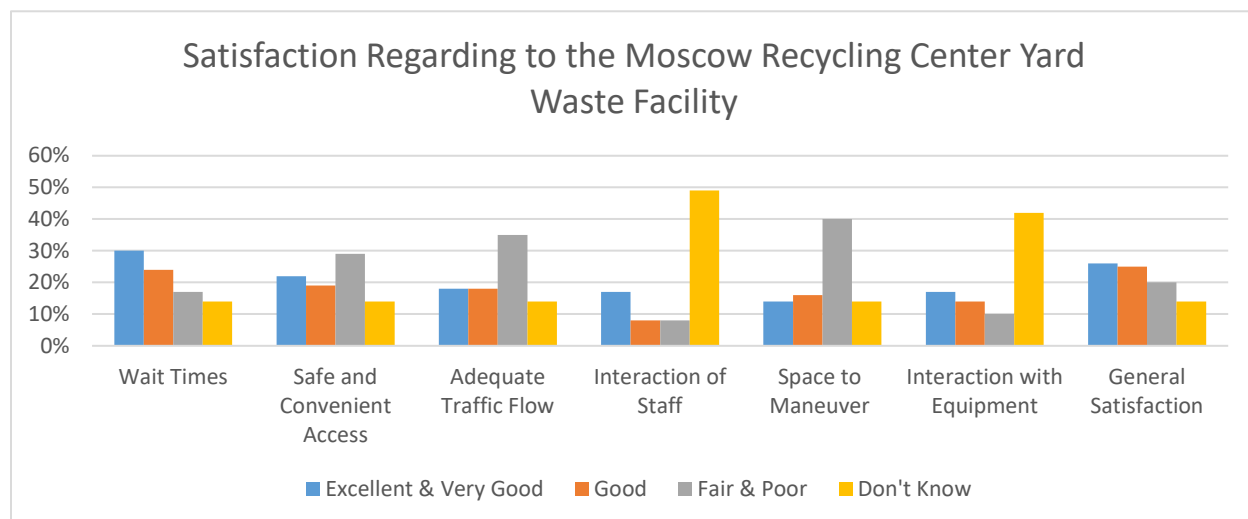
Seasonal Use of the Yard Waste Drop Off Facility (Q23)

The same error of scale was noted in questions 23 which read, “If you have visited the Moscow Recycling Yard Waste Drop Off area, how often do you visit?” The majority of respondents indicated they visited the yard-waste drop in the spring, summer, and fall “3-27 Times.” Most respondents also noted that they “Never” visit the Recycling Center Yard Waste in the winter. Unfortunately due to this error, this information is not as enlightening as it could have been, but with other data collected shows the yard-waste drop off is regularly and somewhat heavily used, especially in the warmer months.

Level of Satisfaction in Regarding to the Moscow Recycling Center Yard Waste Facility (Q24)

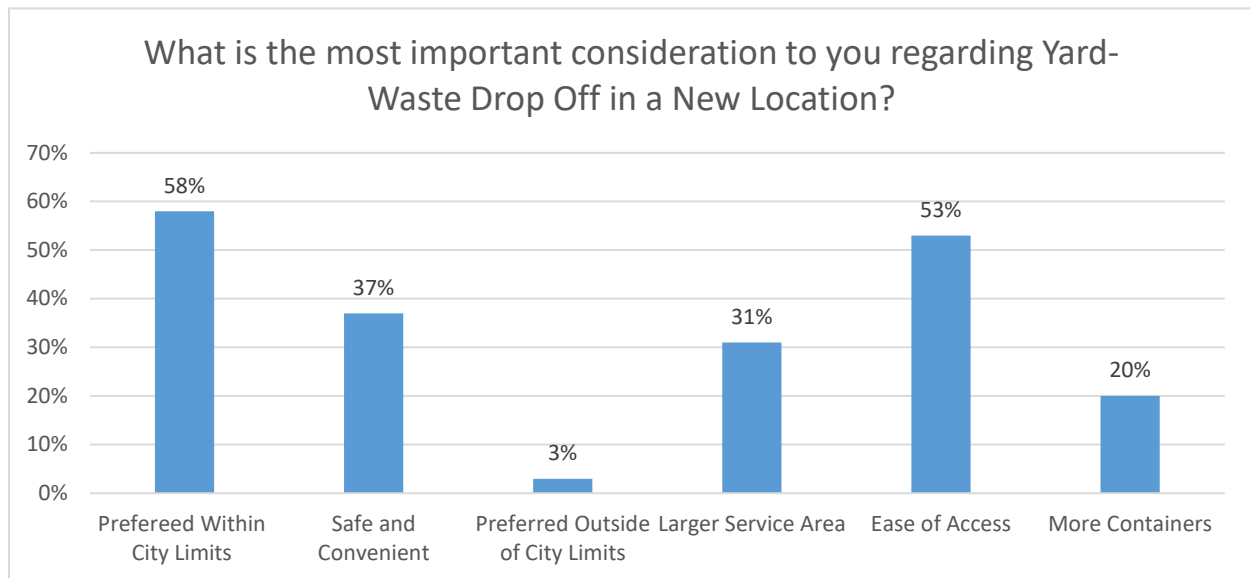
Survey participants were asked to rate their level of satisfaction in regards to the Moscow Recycling Center and Yard-Waste Facility in Moscow. Respondents were given five options ranging from “Excellent” to “Poor” and “Don’t Know”. Items surveyed included wait times for drop off, safe and convenient access, adequate traffic flow, interaction of staff, adequate space to maneuver vehicles, interaction with equipment, and general satisfaction.

The chart below shows the percentages of respondent’s satisfaction levels with each item. As shown, the majority of survey participants noted their level of satisfaction with wait time for drop off, safe and convenient access and general satisfaction as “Good” or better, with adequate traffic flow and space to maneuver rated more negatively in the “Fair” and “Poor” range. Of particular note are the “Don’t Know” responses for interaction of staff and equipment highlighting that many facility visitors do not interact with staff or equipment.



New Location Yard Waste Preferences (Q25)

The following chart shows what respondents indicated as the most important considerations in regards to a relocated yard-waste drop off facility. The majority of survey participants noted that they “preferred within City limits” followed by 53% who stated “ease of access,” followed by “safe and convenient” to be the most important considerations regarding yard-waste in the new location.



Other Improvement Suggestions to the to-be Yard-Waste Drop off Area (Q26)

Listed below are the comments shared regarding preferences for a to-be relocated recycling center:

- Accept longer than 2" branches
- Accommodate more vehicles
- Better accessibility that is safe
- Better Traffic Flow
- Circular lane to reduce need to back up
- Clearly marked or coned parking
- Congestion is the problem
- Drive through
- Ease of access
- Easy in/out
- Enlarge/elongate the space to make it easier to back several vehicles at a time into the drop area
- Free
- In town
- Keep it free
- Keep the one on Almon St
- Make it convenient
- Make people clean up after themselves
- More for waiting
- More space for vehicles
- Open 24 hours

- Pedestrian access
- Place for people to leave old trash bags
- Recycling within city limits
- Relocating yard waste and expanding recycling center
- Sections for types of yard waste (e.g. Grass, leaves, branches)
- Trees/limbs aren't cut down to requirements
- Turnaround area for utility trailer
- What to do with rock?

Other Comments Regarding the Yard Waste Drop Off Area (Q27)

Given the importance of the yard-waste drop off area to the community an additional opportunity was given to share any additional feedback for consideration. Comments are listed alphabetically.

- A space for donating/recycling usable
- Better signs/monitoring - some people make a mess!
- Crowded
- Ease of access
- Hard for old people like me to lift tubs over to dump
- Hard to lift container
- Keep in city
- Larger area for vehicles
- We appreciate the service

Household Question Results

This survey uses several demographic questions to get a clearer understanding and representation of the City of Moscow residents. The survey asked questions on residents dwelling type, solid waste collection services type as well as recycling collection services type.

Housing Type (Q28)

Respondents were asked to indicate the type of building they live in. of the survey participants, 65% noted they live in a one family house detached from any other house, 10% noted living in a duplex or townhouse, 18% noted living in an apartment or condominiums, 2% noted living in a mobile home.

Household Members (Q29)

Respondents were also asked to indicate how many people live within their household, with 23% nothing they lived alone, 40% noting two people, 12% noting three people, 8% nothing four people, 8% noting five people, and 3% noting more than five people.

Solid Waste Collection (Q30)

When asked to indicate their solid waste collection service type, 78% of respondents noted using a roll cart, 14% used dumpster, and 1% used other.

Recycling Collection Service Type (Q31)

When asked to indicate their recycling collection service type, 72% of respondents noted they use a roll cart, 5% used shared roll cart, and 8 used other.

Additional Comments (Q32)

Question 32 asked respondents to make comments and suggestions that they would like the City of Moscow to consider in regards to sanitation and recycling services. All responses are categorized below.

- Add more recycling options downtown
- Better advise citizens of peaks like free compost
- Consider a yard waste pick-up service
- Curbside pick-up of yard waste twice a year
- Food compost
- How to get magnet with recycling info
- I love the curb-recycling
- Keep cost down
- Locate on a street
- Love the curbside recycling
- Make curbside available to people living outside city limits
- Pay per use system
- Please bring recycling bins to apartment complexes
- Rentals need adequate roll carts for the number of people living in the unit(s)
- Solid waste roll cart size and fee
- We see lots of trash left on the streets when trash day
- Would like to see pricing based on amount of waste disposed of

Following is the original survey tool with percentages noted for each question as appropriate.

Written Survey Tool with Percentages Responses

City of Moscow Sanitation & Recycling Services Survey



Please complete this questionnaire if you are the adult (age 18 or older) in the household who most recently had a birthday. The adult's year of birth does not matter. Your responses are anonymous and will be reported in group form only.

Solid Waste Services (Household Garbage) Collection

1. How would you rate your level of satisfaction in regards to Solid Waste Services (Household Garbage) Collection?

	Excellent	Good	Neutral	Poor	Very Poor	Don't Know
a. Satisfaction with provided container quality	58%	35%	3%	2%	0%	0%
b. Satisfaction with available container sizes	51%	36%	4%	4%	1%	1%
c. Satisfaction with collection services	55%	36%	4%	1%	1%	5%
d. Value of services received vs cost	26%	37%	21%	5%	0%	7%
e. General satisfaction	41%	49%	6%	0%	0%	1%

2. Any other comments regarding Solid Waste Service (Household Garbage) Collection:

Solid Waste Processing Facility (Transfer Station)

3. a. Have you utilized the Solid Waste Processing Facility located on Highway 8 in the past twelve months?
If no, skip to question 10...

51%	Yes	44%	No
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- b. If yes, please indicate how many times:

Once	Twice	3-12 Times	13-26 Times	>26 Times	Do not know
14%	16%	19%	2%	1%	0%

4. How often have you used the following services at the Solid Waste Processing Facility during the last 12 months?

	0	1 – 4	5 – 8	9 – 12	13 – 16	16+
a. Transfer station – trash drop off	23%	30%	3%	1%	0%	1%
b. Non-municipal solid waste (garbage) drop off	34%	18%	2%	0%	0%	1%
c. Household hazardous waste drop off	35%	23%	1%	0%	0%	0%

4. continued... How often have you used the following services at the Solid Waste Processing Facility during the last 12 months?

	0	1 – 4	5 – 8	9 – 12	13 – 16	16+
d. Yard waste/clean wood waste drop off	30%	20%	5%	2%	1%	1%
e. Tire drop off	51%	3%	0%	0%	0%	0%
f. Appliance/scrap metal drop off	37%	21%	0%	0%	0%	0%
g. Access to free compost	51%	4%	0%	0%	0%	0%

Other: _____

5. How would you rate your level of satisfaction in regards to the Solid Waste Processing Facility?

Excellent	Good	Neutral	Poor	Very Poor	Don't Know
14%	36%	5%	1%	0%	5%

6. Are you aware that yard waste is hauled to the Solid Waste Processing Facility processed through a grinder, then mixed with biosolids produced at the City of Moscow Water Reclamation Facility and composted?

28% Yes 40% No

7. Are you aware that this compost is free to the public?

26% Yes 41% No

8. If this free compost is available at a facility like the Moscow Recycling Center, would you be more likely to use/access this material?

51% Yes 15% No

9. Any other comments regarding the Solid Waste Processing Facility:

Curbside Recycling Collection

10. Do you participate in the single-stream curbside recycling program?

74% Yes 22% No

11. If no, why not? _____ Skip to question 13...

12. How would you rate your level of satisfaction in regards to Curbside Recycling Collection?

	Excellent	Good	Neutral	Poor	Very Poor	Don't Know
a. Provided container quality	48%	27%	2%	1%	0%	5%
b. Available container sizes	44%	26%	2%	3%	1%	8%

12. continued... How would you rate your level of satisfaction in regards to Curbside Recycling Collection?

	Excellent	Good	Neutral	Poor	Very Poor	Don't Know
c. Adequacy of bi-weekly collection schedule	36%	29%	5%	4%	2%	7%
d. Value of services received versus cost	25%	27%	17%	4%	0%	9%
e. General satisfaction	32%	38%	6%	1%	1%	5%

13. If an optional, seasonal curbside yard waste collection service using roll carts was offered, would you be willing to pay an additional fee for this type of service?

12%	\$4 per month	11%	\$5 per month
3%	\$6 per month	63%	Not Interested

14. Any other comments regarding Curbside Recycling Service:

Moscow Recycling Center

15. Have you utilized the Moscow Recycling Center in the past twelve months?

86% Yes 10% No

16. If you have visited the Moscow Recycling Center, how often do you visit the facility?

_____ Times per month _____ Times per year

17. What types of recycling materials do you bring to the Moscow Recycling Center? (check all that apply)

Rechargeable batteries	12%	Aluminum cans	37%
Compact fluorescent bulbs	10%	Aluminum foil	16%
E-waste	19%	Scrap metals	7%
Motor/cooking oil	21%	Tin (steel) cans	26%
Shredding	17%	Sorted plastic	26%
Shredding services	8%	Mixed plastic	26%
Bicycles	3%	Corrugated cardboard	60%
Books	24%	Magazines	35%
Cartridges (inkjet & toner)	6%	Mixed paper	32%
Cell phones	3%	Newspaper	23%
Yard waste	56%	Phone books	27%
Plastic bags	14%	White ledger	11%
Glass	64%	Other:	1%

18. How would you rate your recent experiences at the Moscow Recycling Center in regard to the following?

	Excellent	Good	Neutral	Poor	Very Poor	Don't Know
a. Wait times for drop off	43%	36%	7%	1%	0%	3%
b. Safe and convenient access to containers	39%	37%	7%	4%	0%	3%
c. Adequate parking and traffic flow	29%	34%	16%	7%	1%	3%
d. Interaction of staff	25%	26%	14%	1%	1%	22%
e. Interaction with equipment	19%	27%	19%	1%	0%	22%
f. General satisfaction	35%	47%	5%	0%	0%	3%

19. The City of Moscow will be relocating the Moscow Recycling Center. What is the most important consideration to you regarding the relocation of the facility?

Preferred within city limits	74%	Covered drop off	14%
Preferred outside of city limits	3%	Accessibility	46%
Sorted material drop off	30%	Extended hours of operation	18%
Safer drop off	12%	Yard Waste drop off	54%

Other: _____

20. What other improvements or changes would you recommend for the to-be relocated Recycling Center to improve the overall experience?

21. Any other comments regarding the Moscow Recycling Center and/or it's relocation:

Recycling Services - Yard Waste Drop Off

22. In the last 12 months, about how many times have you or a member of your household used the Moscow Recycling Center Yard Waste Drop Off area?

Once	Twice	Times	3-27 Times	>26 Times	Never
5%	9%	3%	51%	4%	22%

23. If you have visited the Moscow Recycling Center Yard Waste Drop Off area, how often do you visit?

	Once	Twice	Times	3-27 Times	>26 Times	Never
Winter	15%	9%	1%	7%	0%	31%
Spring	7%	13%	9%	34%	0%	16%
Summer	8%	8%	6%	37%	0%	16%
Fall	10%	11%	7%	38%	0%	14%

24. How would you rate your level of satisfaction in regards to the Moscow Recycling Center Yard Waste Drop Off area?

	Excellent	Very Good	Good	Fair	Poor	Don't Know
a. Wait times for drop off	14%	16%	24%	13%	4%	14%
b. Safe and convenient access	11%	11%	19%	18%	11%	14%
c. Adequate traffic flow	8%	10%	18%	20%	15%	14%
d. Interaction of staff	9%	8%	8%	6%	2%	49%
e. Adequate space to maneuver vehicles	6%	8%	16%	20%	20%	14%
f. Interaction with equipment	9%	8%	14%	7%	3%	42%
g. General satisfaction	12%	14%	25%	16%	4%	14%

25. The City of Moscow will be relocating the Moscow Recycling Center including Yard Waste Drop Off area. What is the most important consideration to you regarding Yard Waste Drop Off in a new location?

Preferred within city limits	58%	Safe and convenient	37%
Preferred outside of city limits	3%	Larger service area	31%
Ease of access	53%	More containers	20%

Other: _____

26. What other improvements or changes would you recommend for the to-be relocated Moscow Recycling Center Yard Waste Drop Off area to improve the overall experience?

27. Any other comments regarding the Moscow Recycling Center Yard Waste Drop Off area:

Household Questions

28. Which best describes the building you live in?

65%	One family house detached from any other houses
10%	One family house attached to one or more houses e.g. duplex or townhouse
18%	Building with two or more apartments or condominiums
2%	Mobile home
	Other:

29. How many people live in your household?

23%	1	12%	3	8%	5
40%	2	8%	4	3%	>5

30. Solid waste collection service type:

78%	Roll Cart	14%	Dumpster	1%	Other
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31. Recycling collection service type:

72%	Roll Cart	5%	Shared Roll Cart	8%	Other
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Additional Comments:

32. Please use the following space (attach additional pages if necessary) to make comments and suggestions you would like the City of Moscow to consider in regards to sanitation and recycling services.

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Focus Group Survey Results

Following the Written Survey process, the City organized community focus groups for Moscow residents. A focus group process was designed to consist of six to ten individuals brought together to discuss issues raised by a facilitator. The purpose of the focus group was to gain further information in regards to Written Survey results that could benefit from further research. On May 31, 2018, the City of Moscow conducted three focus groups to gather additional information on the recycling and sanitation preferences of citizens.

Initially, the City of Moscow invited 100 randomly selected Moscow utility rate payers to partake in the focus group. Few response to attend were received from those invitees, and as a result, the City turned to its social media platform to request residents' participation. Interested participants were asked to come to Moscow City Hall where over the course of one day, three focus groups were conducted. Three hour-long focus groups were held on May 31, at 7 a.m. 12 p.m. and 5:30 p.m. All sessions had at least one participant, with three participants at 5:30 p.m. Each participant was given a copy of the draft Sanitation and Recycling Center Survey results. Assistant City Supervisor Jen Pfiffner was the lead facilitator of the group with assistance from M.P.A. Interns Shakie Doe-Williams and Trevor Memmott. Topics discussed included accessibility, Seasonal Curbside Yard-Waste Collection, Moscow Recycling Facility Use, and Redemption Center.

Focus Groups Comments

The City kicked-off each focus group session with a brief intro of the Moscow Sanitation Master Plan, detailing the City's desire to relocate the Moscow Recycling Center. From there, we dived into an engaging ice breaker activity by asking participants to express their thoughts and feelings on the subject of recycling. The ice breaker helped everyone get comfortable with each other and set the stage for a group discussions. As part of the planning process, the City prepared for the focus group by developing a focus group questionnaire, which outlined the session's flow and listed out the questions used to guide the discussion. By the end of the evening and after a good four hours of total focus group activity, the following themes were determined:

- Residents are eco-conscious and have a tendency to over utilize recycling facility through sorting materials themselves, even when they have single stream curb-side recycling.
- Safety and accessibility – Participants are concern with the size of the recycling center, specifically our focus group found that residents are concern with pedestrian safety when navigating the recycling center.

- The focus group also revealed that a primary barrier to proper recycling was a lack of knowledge and confusion as to what could not be recycled or the proper methods of recycling.
- Another major concern of the focus group participants is the cost of the recycling. Focus group participants view non-county residents using the recycling center as a “theft of service”. Focus group participants recommended several suggestions including mentoring recycling center for non-residents of Moscow and limiting access to recycling center for non-paying members.
- Focus Group participants believe that adding yard-waste and glass pick-up to curbside services is a good additional service and could help increase the use of single stream curbside.

Sanitation Master Plan Focus Group Questionnaire

Accessibility

What are the preferred hours of operation you think would work well?

- Staffed?
- Drop Off?

Parking at the current facility, what works, what doesn't work?

Disability access?

Seasonal Curbside Yard-Waste Collection

If not interested, why not?

Leaves? Lawn clippings? Christmas trees?

If interested, what fee sounds appropriate?

Experience at Yard-Waste?

Moscow Recycling Facility Use

Out of City use of the Moscow facility.

(Latah County, Pullman WA)

(Hours of operation?)

Redemption Center

Thoughts on location at Transfer Station?

Hours of operation?

Shred, batteries, etc.?

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Intercept Survey Results

In 2016, the City conducted intercept surveys at the Recycling Center with 485 users of the Moscow Recycling Center. The results of the 2016 intercept survey set the stage for the development of the most recent recycling center intercept surveys. There are several similarities between the two intercept surveys.

As a final step in the research and information gathering process for the Plan, the City of Moscow conducted intercept surveys to better understand residents' actual practices at the Moscow Recycling Center. The intercept interview survey questions were designed to collect basic demographic information about individuals and their recycling attitude, behavior and knowledge, as well as awareness and use of the single stream recycling program. A total of 98 users were surveyed. In 2016, similar intercept surveys were conducted and included 485 responses. A comparison between 2016 and 2018 data is noted where applicable below.

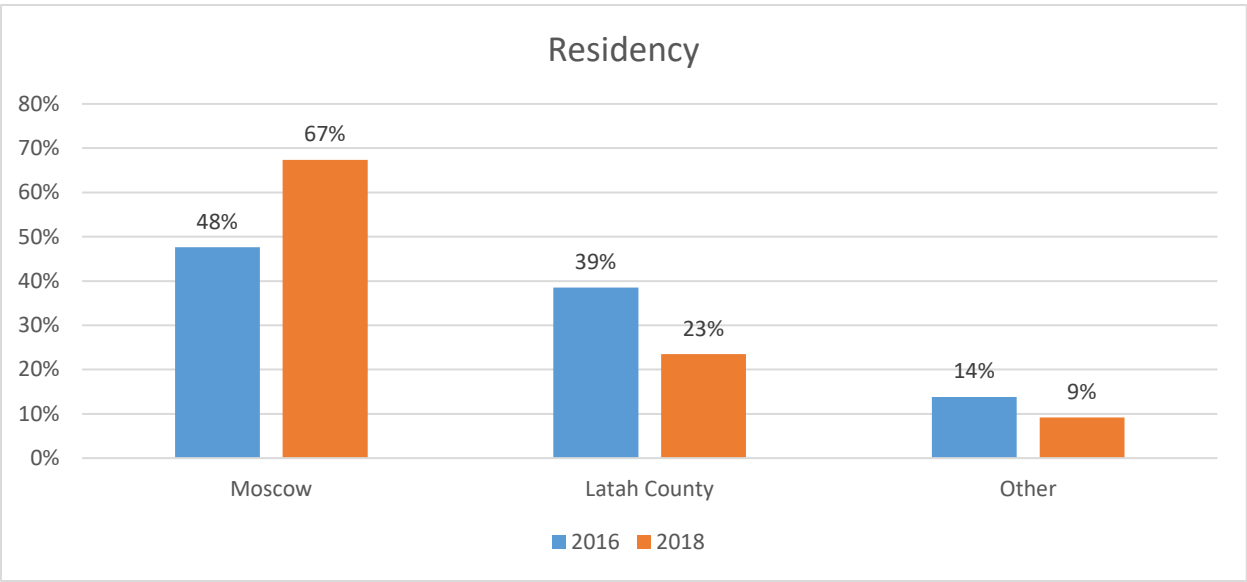
The City of Moscow conducted two intercept surveys to reach a total of 98 users of the Moscow Recycling Center. The first intercept survey was on June 22, 2018 and the second on June 30, 2018. The first intercept survey was administered on a weekday to self-haulers with sorted materials waiting in line at the facility. The second survey was conducted on a weekend which is when the facility receives increased traffic. The results were higher traffic and higher survey participation than the weekday intercept survey as generally, weekends have higher recycling rates than weekdays.

The intercept interview form inquired whether an individual subscribes to curbside recycling. To do this, the intercept survey first asked respondents, "Do you live in Moscow?", if an individual responded no, then the survey follows up with inquiries on where the respondent lives. This allows for better analysis of City of Moscow residents using the facility vs non-residents.

A majority of the questions in this survey were dedicated to gauging citizen perceptions regarding the quality of recycling services provided within the City of Moscow.

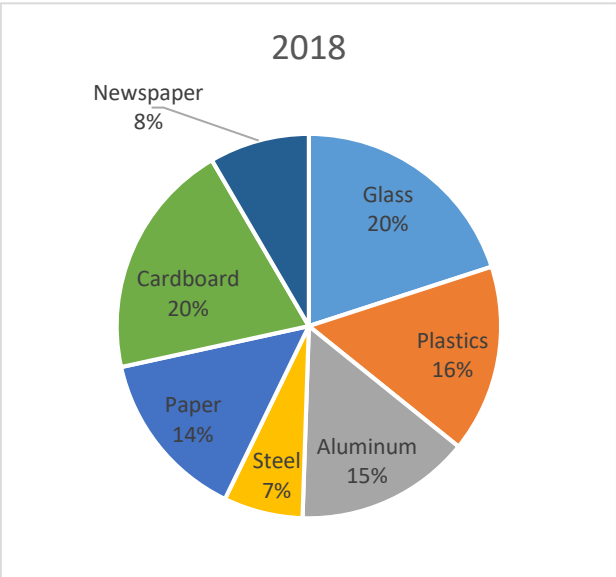
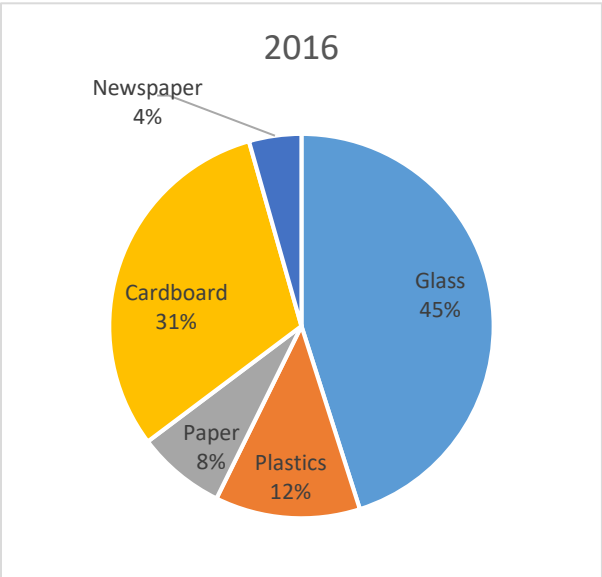
Residency (Q1)

This question was asked to determine residents of Moscow in relation to non-county residents. Of the participants who noted where they live, 67% stated they are residents of Moscow, 23% were residents in Latah County, but outside of Moscow and other residents outside of Latah County made up 9%. In the 2018 study, only 4 respondents noted they were from Pullman. When the above results are compared to the 2016 Intercept Survey Results the numbers show that only 48% of respondents noted they live in Moscow, 39% lived within Latah County and 14% of respondents indicated they live outside of Latah County.



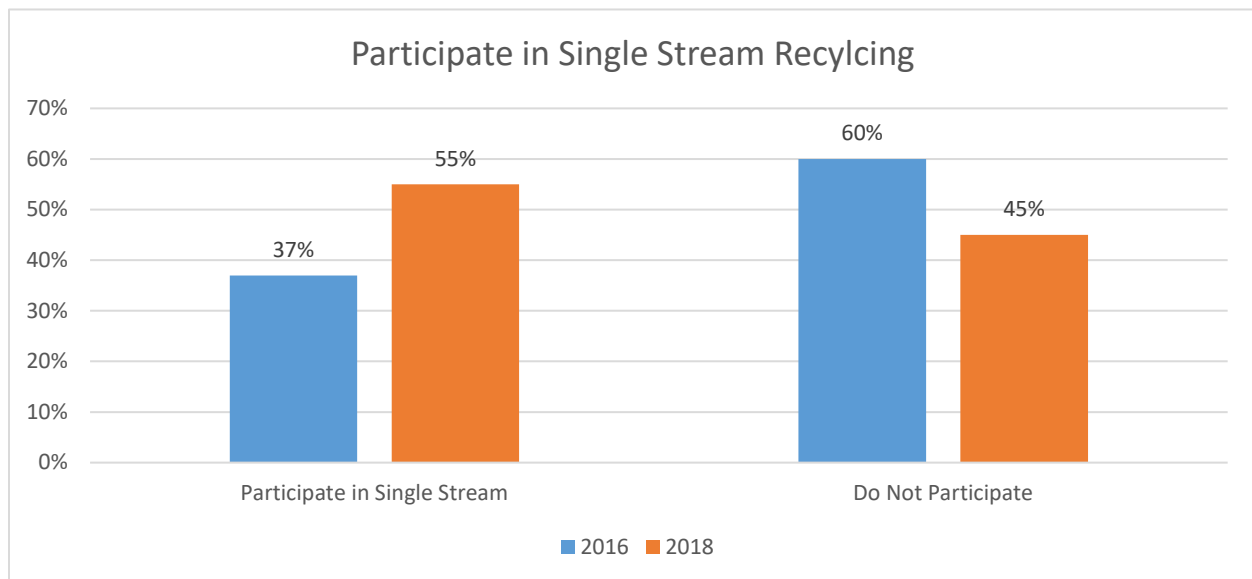
Sorted Materials (Q2)

Glass and cardboard were the two items that intercept survey respondents indicated they brought to the Recycling Center the most. In comparison to the 2016 intercept survey, respondents indicated glass and cardboard as the two materials most often brought to Moscow Recycling Center. The two pie charts on the following page show the differences in items brought to the facility. It is important to note that in 2016 the items aluminum and steel were not included in the options for respondents. While not asked, some residents noted they go to recycling center to pick up items i.e. books from the book bin.



Single Stream Curbside (Q3)

Respondents were asked to indicate if they participate in the single stream curbside recycling program. Single stream curbside program is only available to residents of City of Moscow. The survey results shown in the chart notes that 60% of respondents surveyed at the Moscow Recycling Center during this Intercept Survey do not participate in the single-stream curbside recycling program.



2018 respondents also listed the following reasons as to why they prefer to separate the materials rather than use the single stream curbside program (noted in alphabetical order):

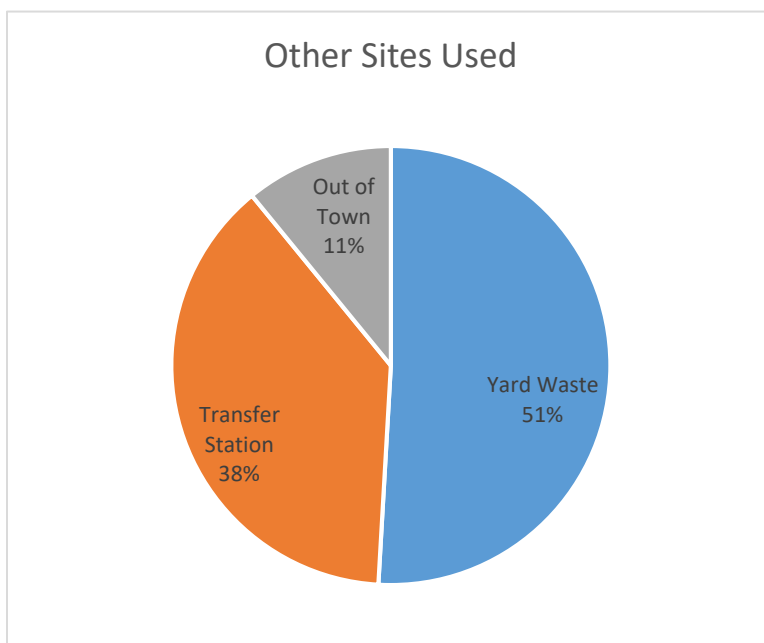
- Apartment complex
- Apartment complex
- Bring glass anyway
- County
- Curbside not available
- Like to recycle
- Likes to recycle
- Live close to recycling center
- Live in apartment
- Live in apartment
- Live in apartment
- Live in apartment
- Live in county
- Live in rental
- Live out of town
- Live out of town
- Live out of town
- Live outside city
- Lot of cardboard
- Makes a better product/lazy people make mess
- Outside city limits
- Outside city limits
- Prefer to recycle everything
- Residence
- Save the environment
- Want to recycle everything

Overall Quality (Q4)

In 2018, visitors surveyed for this intercept Survey were also asked to rate the overall quality of the Moscow Recycling Center, 94% said they would rate the quality as being “Excellent” or “Very Good.” This question was not asked in the 2016 Intercept Survey.

Other Sites (Q5)

The final questions of the Intercept Survey, also not asked in 2016, asked respondents if they use any other sites including the yard-waste drop off, Transfer Station or other out of town sites. 48% of intercept respondents indicated they do use other sites. Of the 48% who indicated the use of other facilities, 58% noted they use the Recycling Center Yard-Waste Drop Off, 44% noted they use the Latah County Transfer Station and 13% noted they use out of town sites.



Intercept Survey Tool 2018

City of Moscow

Recycling Center Intercept Survey



1. Do you live in Moscow? ☐ Yes ☐ No

B. If no, where do you live? _____

2. What type (s) of recyclable materials did you bring today? (Circle all that apply)

a)	Glass
b)	Plastics
c)	Aluminum
d)	Steel
e)	Paper
f)	Cardboard
g)	Newspaper

3. Do you participate in the single stream curbside recycling program? (Only for residents of Moscow)

a) ☐ Yes ☐ No

b) If no, please indicate why you prefer to separate the materials?

4. How would you rate the quality of recycling at the Moscow Recycling Center? (Please circle only one)

a) Excellent	b) Very Good
c) Neutral	d) Poor
e) Very poor	f) Don't know

5. Do you use any other-off sites? ☐ Yes ☐ No

b. If yes, please indicate which other site you use _____

Thank you for helping us today!

Intercept Survey Tool 2016

Recycling Center Survey September 26 - October 7, 2016

Total Customers Surveyed		485	
Do you live in Moscow?		231	48%
If not, where do you live?	Latah County	187	39%
	Other	67	14%

Latah Co. = Kendrick, Troy, Genesee, Rural County, Viola, Potlatch, Deary, Juliaetta,

Other = Garfield, Palouse, Pullman, Colton, Coeur d Alene, Rural Whitman Co, Albion, Oakesdale, Princeton, Elk River, Colfax, Worely

If from Moscow, do you participate in the SS Ry program?

YES	128
NO	103

How often do you use Moscow Recycling public sorting area?

	Daily	Weekly	Monthly	Other
Moscow SS participants	0	52	37	39
Moscow non-SS participants	3	73	16	11
Latah County customers	14	117	34	22
Other customers	0	42	17	8

What types of materials do you commonly bring to Moscow Recycling?

	Glass	OCC	Plastic	M/paper	News	All
Moscow SS participants	92	59	16	12	2	12
Moscow non-SS participants	29	24	16	5	5	64
Latah County customers	12	5	4	2	4	169
Other customers		3		3	2	63

Comments:

Love single stream

We like to come down and sort it ourselves

Love single stream

Doesn't like that people who don't use single stream have to pay for it

Nice to have a way to look through books and magazines

Would like a single stream cart (*outside city limits*)

I like to recycle myself

Appendix D

**City of Moscow Local MRF Feasibility Assessment
Technical Memorandum (Great West, July 2018)**



City of Moscow

Local Material Recovery Facility Feasibility Assessment

PREPARED FOR: City of Moscow

PREPARED BY: Travis Pyle, PE/Great West

CONTRIBUTING
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Bob Wallace, MBA/WIH Resource Group

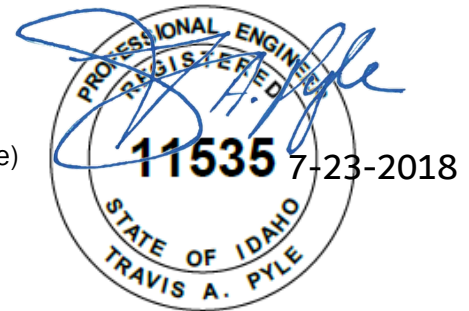
REVIEWED BY: Bob Church, PE/Great West (Principal In-Charge)

DATE: July 30, 2018

PROJECT NUMBER: 4-17150

REVISION NO.: 0

APPROVED BY: Travis Pyle, PE/Great West



1.0 Introduction

The City of Moscow retained Great West Engineering to evaluate the feasibility of the City investing in a local Material Recovery Facility (MRF). A MRF is a production plant that sorts, separates, bales, sells, and transports to market recyclable materials. Its primary function is to segregate recoverable materials for use as input materials for manufacturing and/or processing. For a MRF to be successful, an adequate and clean stream of recyclable materials must be available to process. Recycling markets must be reliable and established. The facility needs to operate near its maximum capacity, and markets for the processed materials need to be available.

This evaluation is being conducted under Task 3 (Deliverable 3.1 – Technical Memorandum #3) of the Comprehensive Sanitation System Master Planning Services Project (“Project”), in accordance with the contract between Great West Engineering, Inc. and the City of Moscow dated February 26, 2018.

1.1 Purpose/Objectives

The purpose of this task is to prepare a feasibility study in order to evaluate the viability of the City investing and/or hosting a local MRF. The MRF would be used to process single-stream recyclables from the quad-city area, which includes:

- Moscow/Latah County, Idaho
- Lewiston/Nez Perce County, Idaho
- Clarkston/Asotin County, Washington

- Pullman/Whitman County (and Washington State University), Washington

1.2 Background

1.2.1 Quad-City Recyclable Materials Collection Programs

The quad-city area recyclable materials collection programs include:

- **City of Moscow/Latah County** – The City began curbside collection of recyclables in 1999, with pick-up of source-separated materials. This program continued until February 2016 when the City adopted single-stream recycling collection every-other-week through its franchise agreement with Latah Sanitation, Inc (LSI). Comingled recyclables are also collected at drop box sites in the County. Source-separated materials are collected at the Moscow Recycling Center. The Center is also the site for baling, storing, and loading out materials for sale and transfer.
- **Lewiston/Nez Perce, Idaho** – The City of Lewiston collects recyclables at the City's solid waste transfer station and provides curbside collection for single stream recyclables. There are also two unmanned, satellite recycling drop box sites in Nez Perce County – one located in Sweetwater on US 95 and one at the junction of US 12 and Cottonwood Creek.
- **Clarkston/Asotin County, Washington** – Asotin County has a drop box site for recyclables at the front gate of the Asotin County Regional Landfill (ACRL). There are also three unmanned, satellite recycling drop box sites in the County – one at the First Presbyterian Church Parking Lot at 11th and Diagonal Street; one at the Dollar Store at the corner of 3rd Street and Fair Street; and one at Arnold Park. All of the materials that are collected are source separated. The types of recyclables that are collected depend on the current market prices.
- **Pullman/Whitman County, Washington (and WSU)** – Recyclables are collected curbside from the City of Pullman and on the WSU campus. The university manages and handles their recyclables separate from the City and Whitman County. The County offers recycling collection at the Carothers Road Solid Waste Facility (CRSWF), as well as rural drop box sites around the County.

1.2.2 Quad-City Recycling Tonnages

Table 1 presents the estimated tonnages of recyclables for Moscow and its quad-city neighbors. The 2017 figures are based on available data provided by Moscow and the other cities and counties in the quad-city area. Projected amounts are based on population growth rates provided by Moscow and published by state-available census data and the United States Census Bureau. The estimated amounts do not account for changes in the diversion rate, market trends or other variable factors.

Table 1 – Estimated Recycling Tonnages for 10 Years (Quad-City Area)

Program/Population	Recycling Tonnages									
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Moscow/Latah Co.	3,433	3,464	3,496	3,528	3,561	3,594	3,627	3,660	3,694	3,728
<i>Population (0.92%)⁽¹⁾</i>	39,440	39,803	40,169	40,539	40,913	41,290	41,670	42,054	42,441	42,832
Pullman/Whitman Co.	3,487	3,504	3,520	3,537	3,553	3,570	3,587	3,604	3,620	3,637
<i>Population (0.47%)⁽¹⁾</i>	47,250	47,472	47,695	47,919	48,145	48,371	48,598	48,827	49,056	49,287
Washington State U.	1,427	1,434	1,440	1,447	1,454	1,461	1,468	1,475	1,482	1,489
<i>Population⁽²⁾</i>	20,286	20,381	20,477	20,573	20,670	20,767	20,865	20,963	21,061	21,160
Lewiston/Nez Perce Co.	1,732	1,741	1,749	1,757	1,766	1,774	1,783	1,791	1,800	1,809
<i>Population (0.48%)⁽¹⁾</i>	33,030	33,188	33,348	33,508	33,669	33,830	33,993	34,156	34,320	34,484
Clarkston/Asotin Co.	518	521	524	527	530	534	537	540	543	547
<i>Population (0.60%)⁽¹⁾</i>	22,535	22,670	22,806	22,943	23,081	23,219	23,359	23,499	23,640	23,782
Total Recyclables (tons)	10,597	10,663	10,730	10,797	10,864	10,932	11,001	11,070	11,139	11,209
Total Population Base	162,540	163,515	164,496	165,483	166,477	167,477	168,484	169,497	170,518	171,545

Notes:

1. Annual growth rates provided by state statistical websites and the US Census Bureau.

2. Student body (and faculty) population for WSU was assumed to grow at the same rate as Pullman/Whitman Co. (0.47%).

Table 2 presents the estimated tonnages from single-stream recycling programs in the quad-city area for 2017 and the next 10 years.

Table 2 – Estimated Tonnages for Single-Stream Recyclables – 10-year Projection (Quad-City Area)

Program/Population	Single-Stream Recycling Tonnages									
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Moscow/Latah Co.	740	747	754	761	768	775	782	789	796	804
<i>Population (0.92%)⁽¹⁾</i>	39,440	39,803	40,169	40,539	40,913	41,290	41,670	42,054	42,441	42,832
Pullman/Whitman Co.	1,798	1,806	1,815	1,823	1,832	1,841	1,849	1,858	1,867	1,876
<i>Population (0.47%)⁽¹⁾</i>	47,250	47,472	47,695	47,919	48,145	48,371	48,598	48,827	49,056	49,287
Washington State U.	330	332	333	335	336	338	339	341	343	344
<i>Population⁽²⁾</i>	20,286	20,381	20,477	20,573	20,670	20,767	20,865	20,963	21,061	21,160
Lewiston/Nez Perce Co.	1,732	1,741	1,749	1,757	1,766	1,774	1,783	1,791	1,800	1,809
<i>Population (0.48%)⁽¹⁾</i>	33,030	33,188	33,348	33,508	33,669	33,830	33,993	34,156	34,320	34,484
Clarkston/Asotin Co.	0	0	0	0	0	0	0	0	0	0
<i>Population (0.60%)⁽¹⁾</i>	22,535	22,670	22,806	22,943	23,081	23,219	23,359	23,499	23,640	23,782
Total Recyclables	4,600	4,625	4,651	4,676	4,702	4,727	4,753	4,779	4,806	4,832
Total Population Base	162,540	163,515	164,496	165,483	166,477	167,477	168,484	169,497	170,518	171,545

Notes:

1. Annual growth rates provided by state statistical websites and the US Census Bureau.

2. Student body (and faculty) population for WSU was assumed to grow at the same rate as Pullman/Whitman Co. (0.47%).

Comparing **Tables 1 and 2**, less than half of the total amount of recyclables in the quad-city area are from single-stream programs that utilize a MRF to sort and process the materials. The other fraction of the materials is source-separated and is mostly cardboard collected from businesses. Future quantities are based solely on population growth with no changes to the diversion rate. The diversion rates may increase in time if there is a local MRF that can offer more cost-effective programs to these communities and if the communities are committed to helping make the local MRF viable for the host community.

1.2.3 Moscow's Single-Stream Recyclables Composition and Pricing

Table 3 presents the composition of the single-stream recycling from the City of Moscow's curbside program. Also shown in **Table 3** are the current commodity prices and commodity rates (i.e., the composition fraction of each material multiplied by the price is equal to the rate) as provided by the City.

Table 3 – Moscow's Single-Stream Recycling Composition and Current Pricing

Material	Composition Fraction ⁽¹⁾	Commodity Pricing (\$/ton) ⁽²⁾	Commodity Rate (\$/ton) ⁽³⁾
OCC	16.31%	\$55.00	\$8.97
Mixed Paper/ONP	58.72%	-\$33.00	-23.49
PET Plastic	3.70%	\$135.00	\$5.00
HDPE Plastic (Natural)	1.0% (est.)	\$340.00	\$3.40
HDPE Plastic (Color)	1.83%	-\$5.00	-\$0.09
Tin	4.07%	\$130.00	\$5.29
Glass	0.0%	-\$30.00	\$0.00
Aluminum	1.02%	\$1,460.00	\$14.89
Mixed Plastics	3.63%	-\$120.00	-\$4.36
Residue/Waste	9.70%	-\$120.00	-\$11.66
Total/Comingled Rate	100%		-\$2.07
Baling Fee			-\$38.82
Bale Breaking Fee			-\$5.00
Processing Fee			-\$89.67
Hauling Fee ⁽⁴⁾			\$30.00
Cost per Ton			-\$165.56

Notes:

1. The Composition Fraction of recyclables was provided by Moscow from Republic Services (June 2018).

2. Commodity Pricing is for baled materials as reported by Republic Services (June 2018).

3. Composition Fraction multiplied by the Commodity Pricing = Commodity Rate.

4. Hauling Fee to ship materials from Moscow to Seattle averages 26 tons per load at \$800 per load, or approximately \$30/ton.

Based on these rates, it is costing Moscow more than \$166 per ton to recycle. The processing fee is expected to climb to more than \$100 per ton in the coming months.

1.3 Recycling Markets

For a MRF to be successful, stable and reliable, recycling markets must be identified and established for the recyclable materials that are targeted. Unsold materials require temporary, dry storage and ultimately could even require landfilling if a market is not found. Storage is expensive and landfilling of the unsold or unusable material costs money and erodes profits.

The recycling market depends on the cost of recovering the raw materials and the quality of the materials generated by the MRF, as compared to virgin, raw materials. Also, there has to be a market and a means to accept and process the materials. For decades, China was accepting mixed recyclables from the United States and had significant capacity to handle and reuse the materials. However, the global recycling ban in China that was implemented earlier this year has completely changed the market. China instituted a new policy banning the import of 24 types of solid waste including unsorted paper products and low-grade plastics. They also instituted a new contamination threshold of 0.5% and suspended licenses for many recyclers in China. The Chinese government is extending this ban as of the latest reporting in the industry. Other countries have begun accepting recyclable materials from the United States. Vietnam is accepting scrap plastics and other materials but recently reported that their shipping terminals have been shut down as a result of material overload. This move is a significant development on the global recycling market since Vietnam has taken on more recyclable materials globally since China's ban. This ban and lack of other countries' capacities to process recyclables will continue to impact the recycling markets in the United States and around the world.

A primary factor moving forward will be the collection and processing of "targeted" recyclables. For the many years, single-stream curbside recycling has been the dominant trend to divert materials from the waste stream. There has been some re-thinking in the recent months on how best to implement recycling programs in the United States. Collection and processing are both very expensive, and without stable and dependable markets, some materials should not be targeted for recycling. However, there is also the political will of local government and habitual practices ("willful recycling") that are hard to change and could influence what recyclables are collected. Public education and outreach will become even more important to inform communities of what can and cannot be recycled.

1.4 Types of MRF Operation – Manual vs. Mechanical

Like most manufacturing and processing facilities, operations can be performed by labor or mechanical equipment, or a combination of the two. Older MRFs have traditionally relied on manual sorting, which is expensive and time consuming, but requires less capital investment cost. Labor is the largest cost in the operation of most MRFs. Automated processing is more cost effective than manual processing for larger facilities. Plastics are difficult to distinguish by manual sorting and require sophisticated and automated systems. Automated sorting has the advantage of reducing health and safety risks to workers who pick the recyclable materials off of conveyors.

1.5 MRF Sorting Systems

The five basic commodities that are targeted at MRFs are cardboard, also known as old corrugated cardboard (OCC), mixed paper, plastics, non-ferrous metals (aluminum), and ferrous metals (tin and steel). More advanced MRFs have the capacity to further sort out materials such as mixed paper and plastics. Basic MRFs tend to rely on third-party, specialty sorting facilities that will take mixed paper and mixed plastics and further sort them by type, as needed to supply to different manufacturers.

1.5.1 Tipping Floor

Materials are unloaded on the tipping floor of the MRF building when they are delivered. The tipping floor is typically sized for the peak number of collection trucks to unload without significant waiting time. **Exhibit 1** shows an example of a MRF tipping floor. The tipping floor provides a place to store materials. The tipping floor is engineered to withstand the weight of heavy equipment operations. Front-end loaders are used to move the materials on the floor and to in-feed conveyor system that delivers the material to the sorting line.



Exhibit 1. MRF Tipping Floor

1.5.2 Systems and Processes

The sorting of the mixed recyclables is performed through a series of systems based on the material properties of the mixed recyclables. The systems used to move and sort are as follows:

Conveyors

Conveyors are used to move materials to and from the mechanical equipment in the MRF. Typically, MRFs will have an in-feed conveyor (refer to **Exhibit 2**) where a front-end loader pushes and dumps material into the system to begin sorting and processing.



Exhibit 2. In-feed Conveyor

Sorting Stations

Flat belt conveyors deliver the recyclables to the material sorting stations (refer to **Exhibit 3**). Sorting stations remove trash, plastic bags, large/oversized materials, and other unwanted materials as well as segregate the materials by type. Personnel at the sorting stations can target certain recyclables that are not sorted by downstream equipment.



Exhibit 3. Flat Belt Conveyor Sorting Stations

Screens

Screens are used to separate materials of different sizes and densities. Disk screens separate fiber (cardboard, newsprint and other paper) from containers and other materials. They consist of a series of spaced rotating disks as shown in **Exhibit 4**. Heavy materials that are small and rigid drop between the disks and fall to another sorting system while the targeted fiber materials stay on top of the screen and discharged to a fiber pile or bin.



Exhibit 4. Disk Screen

Ferrous Metal Separators

Ferrous metals such as tin and steel cans are segregated from the material stream using overhead electromagnets (**Exhibit 5**). These units induce a magnetic field that attracts the iron contained in the objects. The collected metal objects do not contact the magnet directly – the current from the magnet pushes the objects into a storage bin.



Exhibit 5. Electromagnet Unit for Ferrous Metal Separation

Non-Ferrous Metal Separators

Eddy current separators use a powerful magnetic field to separate non-ferrous metals after all ferrous metals have been removed (**Exhibit 6**). The eddy current is applied to a conveyor belt. Non-ferrous metals are thrown forward by the force of the current into a storage bin.



Exhibit 6. Eddy Current Separator for Non-Ferrous Metals

Other Separators

Glass can be separated by a density blower and then is typically hammered into crushed glass known as cullet. Plastic separation can be done manually by workers on a conveyor sorting line or by optical sorters that identify different plastic resins and colors (**Exhibit 7**). Air classification can be used to separate certain targeted plastics such as high density polyethylene (HDPE) and polyethylene terephthalate (PET).

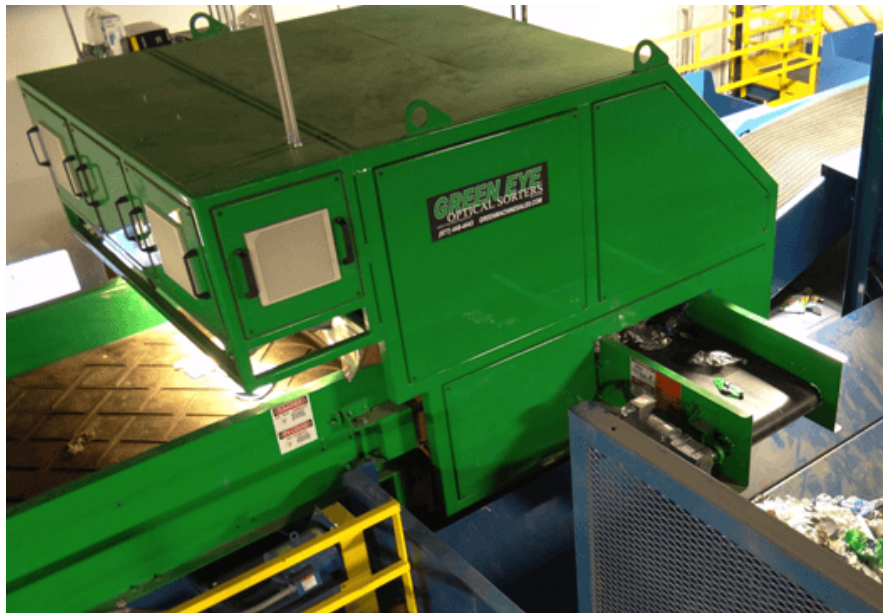


Exhibit 7. Optic Separator

Balers

The final step in processing is to bale the individual commodities. Balers compress the materials and bale by wrapping them with wire into manageable bricks for storage and transport (refer to **Exhibit 8**).



Exhibit 8. Baler

2.0 Existing or Planned Local / Nearby MRFs

2.1 Waste Management – SMaRT Center (Spokane, WA)

Waste Management, Inc. owns and operates the Spokane Materials and Recycling Technology (SMaRT) Center. The Center opened in 2012. Waste Management invested \$18 million in the 62,000 square-foot facility to process single-stream recycling for the Eastern Washington region. Situated on an 8-acre site west of Spokane and next to Spokane's Waste to Energy Plant, the facility can process up to 100,000 tons of recyclables per year. Waste Management recently quoted a price of \$109/ton on a trial basis with no rebate and final pricing dependent on material characteristics and the level of contamination.

2.2 Republic Services – Lander Facility (Seattle, WA)

In the 1980s, Rabanco (now Republic Services) converted an old U.S. Steel factory into a recycling facility. The 12-acre property is known as "3rd and Lander" for its location on 3rd and Lander Street in Seattle, Washington. This facility receives commingled recyclables from route trucks and other jurisdictions around the Northwest. The facility can process up to 200,000 tons of recyclables per year. Republic Services is charging almost \$90/ton to process recyclables with an increase to \$102/ton expected in September 2018.

2.3 Western Recycling (Boise, ID)

Western Recycling is located in Boise, Idaho and processes recyclables for the City of Boise and the rest of the Treasure Valley (Meridian, Nampa and Caldwell). It also processes recyclables from the cities of Rexburg, Idaho Falls, and Pocatello, Idaho. The sorting facility came online 4 years ago and processes approximately 40,000 – 45,000 tons per year.

The City of Boise implemented an energy bag program. Plastics that have a fuel content such as plastic film and bags and #3-7 plastics are source separated in orange bags and placed in the single stream bins collected at the curb. The orange bags are separated on the pre-sorting conveyor, baled and shipped to a facility in Utah that uses a pyrolysis to convert the plastics into synthetic diesel fuel (also called syngas). Approximately 2 barrels of diesel are generated per ton of plastic. The facility has a reported capacity of 20 tons per day, making 10 barrels of syngas.

2.4 Local Quad-City Area Processing/Baling Facilities

The following are known local recyclable material processing and/or baling facilities:

2.4.1 City of Moscow/Latah County

The City of Moscow owns the Moscow Recycling Center, and Latah Sanitation, Inc. operates it on behalf of the City. LSI also collects single stream recyclables in the City and at several drop box sites in Latah County. The Center itself also collects source separated recyclables. The mixed recyclables are baled at the facility and hauled to Republic Services' Lander facility in Seattle for processing. The source-separated materials are sold directly to the market by LSI.

2.4.2 Lewiston-Clarkston Area

Pacific Steel & Recycling is located in Lewiston and accepts the single stream recyclables from the City of Lewiston. The facility bales the materials for delivery to Waste Management's SMaRT Center in Spokane, WA for processing. Lewis and Clark Recyclers, Inc. in Lewiston accepts various types of metals, fiber products and some plastics.

2.4.3 Pullman/Whitman County, Washington

Whitman County bales mixed recyclables that are delivered to their Carothers Road Solid Waste Facility (CRSWF) from franchise haulers. The facility charges a fee of \$30 per ton to handle and bale the materials. The local regulated haulers use this baling service. The baled, mixed materials are then hauled to Republic Services' Lander facility in Seattle for processing. The costs for hauling and processing, less any commodity value, is charged to the regulated haulers.

Similar to the City of Moscow, Whitman County is also contemplating building a "mini-MRF" at the CRSWF by converting their former waste transfer building. Their assessment of the MRF feasibility is underway. Each community's decision to host a MRF will be heavily

influenced by one another. A regional partnership between the two communities to invest in a MRF together should also be considered.

3.0 MRF Siting Considerations and System Changes

3.1 Siting Considerations

A MRF is an industrial facility, similar to other manufacturing facilities, that produce noise and have truck traffic. The first issue that must be addressed when siting a MRF is zoning. In Moscow and Latah County, it is presumed that a MRF would fall under industrial zoning requirements; therefore, other zoning districts would be eliminated from further consideration unless the property goes through re-zoning or a conditional use permit.

The other important consideration is property size. At least five acres are typically necessary for an efficient and safe layout with buffer. One reason for a larger site size is to allow truck queuing and maneuverability. It is desirable to queue completely on the site and not back traffic onto public streets or highways. This should be one objective of a new MRF. Another reason is to have adequate space for storing baled materials. Ideally, all storage of recovered products would be in the facility or under covered storage to protect them from the weather.

Site utilities are also important. The MRF will need 480-volt, three-phase power to accommodate the large horsepower electric motors in conveying and baling equipment. This is standard in industrial parks serving true heavy industrial operations. The facility must have an adequate water supply for fire protection. The large quantities of paper present in a MRF could cause a large fire, and a fire pump and a fully-sprinklered building will likely be required by the local fire department.

As mentioned, route collection trucks and 18-wheel tractor-trailer trucks must have adequate ingress and egress. Tractor-trailer trucks with 53-foot-long trailers are nearly 70 feet in overall length; they require substantial turning radius for entering and leaving the public roadways. The roadway system connecting the MRF to major highways should be reviewed for their adequacy to handle the large semi-trucks and for turning radii at corners such that the semi-trucks do not jump the curbs when turning or pose a safety hazard entering and exiting the facility.

A MRF should also be enclosed by a tall screened fence at its perimeter. Although with adequate buffer, other types of screening systems and features that are aesthetically pleasing, such as a combination of a berm and plantings that could be used along road frontage, may also be considered. The perimeter fencing should be a minimum of 10 feet high. The fence, along with the recommended approach of all indoor tipping areas and no outdoor storage of bales, would mitigate blowing litter to a large degree.

3.2 Adapting to Changes/Modifications

There is uncertainty in the recycling program when it comes to the number and types of recyclables, changes in the quantity of materials, and the commodity market. A MRF needs to be designed to be flexible in changing processes and adding others to capture materials that could be marketable.

In addition to the general goal of increasing recycling, three primary factors can cause materials to be considered for future inclusion in the recovery system.

1. **Material Presence/Availability** – The materials have to be present in the waste stream in steady quantities. A material does not need to be present in large quantities. However, as a minimum, reliance on the material quantity to be included in route collection loads on a regular basis is required to justify processing equipment at the MRF.
2. **Marketable/Sellable Materials** – Economic markets must be available to justify collecting the material in the recycling system and processing it. Processing costs at the MRF, if higher than the City's waste disposal costs, can pose a conflict of interest in recovering recyclables versus disposal.
3. **Identifying Materials** – In Moscow, and in other communities in the U.S., even though materials are not on the list of "accepted materials" many people put them in the collection bins. Society has moved from questioning which recyclables can be put into the bin to assuming that all materials that look like they can be recycled are accepted and are recyclable. This philosophy of "wishful recycling" has been brought on by the single stream collection programs.

Some MRFs have the ability to add one or two materials to its existing array of materials sorted and aggregated in bunkers or large containers. When a market is identified for a material that has been part of the residue, the material can be assigned a sorting station(s) if available and trial processing and marketing can be conducted. In some cases, such materials prove to be viable for processing and marketing using these methods. In the case of HDPE and PET, the resins are acceptable, but the form of the items is not. For example, PET is used for egg cartons, food tubs and drink glasses. Water bottles use thinner plastics that tend to be challenging to separate from mixed paper and are notorious for contaminating mixed paper bales.

Certain materials meet one or more of these criteria and thus offer potential in the future:

- **Film plastics.** A significant portion of recycling program participants place paper or containers in plastic bags before placing them in the set-out containers. Thus, large numbers of plastic bags are received at the MRF. Most film plastic, primarily HDPE and including some LDPE, is typically removed in the pre-sort area in most MRFs and placed in the trash bunker or container. Film plastic not removed prior to screening will wrap around shafts of the disc screens, causing a reduction in separation efficiency and frequent maintenance to repair damage caused to the shafts. New MRF designs can include automated methods to open bags and remove film plastic.

Markets for film plastic exist, but separation systems in MRFs have not historically been used at the curb. Other programs have been employed by communities to recover film plastics such as retail drop-off centers at grocery or dry-cleaning stores. Therefore, significant quantities of film plastics continue to be received at MRFs and have typically become part of the residue. To facilitate sorting for plastic film, bag splitters and a pneumatic conveying system could be installed in the pre-sort line to deal with even greater quantities expected once this material would be named as an acceptable material. A concept for this system includes overhead intake of the bags

through a vacuum system. This system can discharge directly into a baler, reducing handling.

Another option is to provide separate collection bags to the community to collect the film and other plastics that are not sorted at the facility for fuel. As previously discussed, the City of Boise is using an energy bag program (“orange” bag) program that allows the community to collect film plastics and other plastics with a field content and send them separately to a regional syngas plant in Utah.

- **Other metals.** This category would include a wide variety of items made of ferrous metals, aluminum, brass, copper, and others. Currently, aluminum and tin/steel food and beverage containers that are relatively small and uniform in shape are processed in MRFs. Larger metal items are accepted in a number of other residential curbside programs. Examples of larger items are bicycles, auto parts, small appliances, lawn furniture, pots and pans, and other similar items. Like film plastic, larger metal items pose problems to the processing equipment, such as gouging conveyor belts and jamming disc screens. It is preferable to remove these items in the pre-sort system. The resulting mixture of large metal types is an acceptable feed stock for metal scrap processors who have the equipment to process the material further. These processors generally will pay for this mixed scrap metal.
- **Number 3 through 7 plastics.** Depending on quantity, two or more sorting points on the pre-sort conveyor may be required. Three sorting points would be ideal to enable each sorter at the pre-sort station to pick film plastic and feed it through each pneumatic hood, to pick large rigid 3 through 7 plastics, and also to remove other trash, especially materials that would cause damage to the downstream process system. Smaller plastic items could be allowed past the pre-sort to the process system. An optical sorting system would be desirable to perform automatic removal as opposed to approximately two or more sorters required if these materials were manually separated. This is labor intensive and oftentimes, in smaller, less sophisticated MRFs, the plastics are mixed together and sent to a specialty MRF for further sorting and processing.

Larger rigid plastics having these number designations include water containers greater than one-gallon capacity and other containers up to five-gallon buckets. These larger containers have dimensions that are too great to pass through some of the process system elements. As MRFs receive these rigid plastics in quantities, some have found export markets for them.

This list is not intended to be exhaustive of all materials that could be added in the future to a basic MRF processing/sorting system. However, the MRF operators that would take an interest in the City’s project should have some experience with these three types of materials, providing evidence that they might be feasible to sort out in the future. Automated systems may require some level of development to be reliable as well. In the meantime, manual sorting would serve to ensure success – success defined as sorting to produce marketable/sellable materials and avoiding problems with process equipment.

4.0 MRF Design / Construction Procurement Alternatives

There are essentially three design and construction alternatives for developing a MRF, with the third also including operating the facility. Each of these three options is discussed in further detail below.

4.1 Design-Bid-Build Method

The Design-Bid-Build (D-B-B) method is the traditional method for procuring professional services and building the facility. For this option, the City would hire an architectural and engineering (A&E) firm to prepare design documents. The A&E's product is a set of plans and specifications (also known as Contract Documents). The plans detail each feature of the project to be constructed while the specifications include the front-end administration/contract conditions as well as the technical specifications. The City then issues a Request for Proposal (RFP) that includes the Contract Documents. The bid is advertised and the bidders respond. Under this method, the Contractor has no authority to change or optimize the design. The lowest qualified bidder is typically awarded the contract. The City or its A&E firm is responsible to provide construction oversight to ensure that construction conforms to the plans and specifications. This implementation approach is common for non-process and less sophisticated facilities, including roads, bridges, office buildings, and schools.

An advantage of this procurement approach is that the City maintains control of the entire design and construction process. A disadvantage is that process design of MRFs can be quite dynamic, having to react to process modifications such as the introduction of new process technologies to enhance recovery. Thus, technology-oriented success of the MRF is dependent upon the City hiring an A&E firm that has the expertise to select an integrated process design and provide flexibility to modify the process in the future. An additional disadvantage is that, once the facility is completed, the City accepts the risk that the facility will work following successful completion of start-up and performance testing, and only has the A&E to share that risk.

4.2 Design-Build Method

For this method, the City, with its engineering consultant, develops concept-level design plans and/or performance (also known as "functional") specifications, and issues them in a RFP. An example of a performance specification is a facility that will process a minimum of 150 tons of recyclable materials in ten hours, providing on-site storage for up to five days of processed material, and is capable of sorting five materials for resale – cardboard, mixed paper, tin/steel, aluminum, and plastics. The RFP would require the selected contractor to provide the design and engineering, equipment, construction, and acceptance testing, all in one contract. Proposals would allow the City to review the technical approach proposed to fulfill the minimum functional requirements of the facility, evaluate these against the cost of each proposal, and decide which is the most cost effective and in the best interest of the City. Unlike the D-B-B method, the proposing contractors would be restricted to those that have experience in not only building but designing MRFs. Contractors may take on partners that have process system expertise, perhaps even a process equipment manufacturer.

The D-B method can be advantageous when the City wants to have a facility quickly online and operating. The City can also shift all the responsibility of design and construction of the MRF to the contractor. The contractor also has the responsibility to ensure that the facility performs at the levels and capacity that is specified in the minimum functional requirements. Offsetting these advantages is the lack of control over a facility design for which the City would have to deal with for its operational life. The designs that are proposed by the proposing contractors may be vastly different due to the need for contractors to offer competitive prices. This in and of itself can be complicated in selecting the contractor. Also, the D-B contracting market is much smaller than the traditional build and reduces the competitiveness of the bids and costs and could increase the price.

4.3 Full Service (“Turnkey”)

Full-service (also known as “turnkey”) is an extension of the D-B method but adds the operation component. For this option, the City would include in the proposal request that the contractor also operate the facility for an initial operating period, although this period could be ten years or longer. It is typically referred to as the Design-Build-Operate (DBO) method. It is becoming more and more popular in the public sector. New publically-owned advanced wastewater treatment plants, for example, have been implementing this method because of the specialized nature of the facility. MRF’s also have a special type of operation that is not typical for a local government to typically run. Proposals submitted to the City would include the capital cost of designing and constructing the facility along with the annual operating and maintenance costs offset by commodity revenues.

5.0 MRF Ownership / Operation Alternatives

5.1 Public Ownership / Operation

Under this scenario, the City takes full ownership and operation of the facility. Design and construction are implemented by either D-B-B or D-B as described in the previous section. Once the construction is completed and all start-up and performance tests are finished, the City operates the facility.

Entering into the MRF operations business means that several management systems within the City must be developed and executed to support these specialized pieces of equipment and systems, including, but not limited to, safety (regarding processing system), production, maintenance and repair, risk management (insurance), product marketing and sales. While the City has certain systems already in place that could be used, such as human resources, a management structure, general safety training, and perhaps others, the majority of systems fall into a “new” category, posing another level of complexity on the City and requirements for ongoing stand-alone resources specific to the MRF. The City would be responsible for marketing and selling materials, maintaining and repairing the equipment (with most likely added costs for third-party contractors and vendors), and, in general, operating an industrial process that is unlike any others typical to local government.

An advantage of this option is that the City would have full and complete control over the facility. This one advantage, however is outweighed by a long list of disadvantages. MRF systems consist of a number of pieces of specialty equipment that can present a complexity

not generally found in any other facility typically operated by City government. One of the more notable cost differences between publically-operated and privately-operated facilities is the cost of labor. Public MRF operations tend to have a higher labor cost than private MRF operations due to several related factors, such as redundancy of staff to cover leave obligations; increased cost related to expansive fringe benefits; and general limitations in productivity caused by inflexibility of job descriptions. This is exacerbated by possible changes to the City's management systems, needed to oversee unique MRF operations.

Another added cost is the way materials and equipment are procured by local government. Equipment and materials typically require procurement processes. Even consumables such as baling wire are compelled to be acquired through time consuming bid processes that add cost and delays of essential materials. While rigorous procurement standards protect the public from potentially fraudulent activities, they also burden the public with increased red tape that results in additional administration costs and inflexibility.

5.2 Private Ownership/Operation

A private, third-party company would own and operate the facility under a long-term service agreement with the City. The private company may choose to design and build the facility themselves through their own forces, if they have the capability, or out-source those services to an A&E firm and construction contractor. The private company may also own the property or lease the property from the City. The agreement would also take into account the cost of processing the materials and commodity pricing. There are multiple types of agreements that are used for this type of agreement. The cost to the City to process the recyclables might be on a cost per ton basis with offsets for commodity sales as an "open-book" type arrangement. This option is less risky to the contractor and can result in more favorable pricing to the City by essentially sharing the risk. Alternatively, the agreement could be more "closed" book where the private company charges the City a higher rate but also takes on more risk of the commodity market prices dropping.

An advantage of this option is that the City may only need to commit a certain amount of tonnage to the facility with the private company being responsible for all management, operations, marketing, and sales. However, there is a lack of recyclables in the quad-city area to make such an investment by a private company attractive and profitable. Moscow and the quad-city area are relatively rural and have a low population density that equates to a low tonnage generation rate. In order to make a MRF profitable, it has to have the materials to process. The entire quad city area only has approximately 10,000 tons available if all of the quad-city areas contribute. This is not attractive for large waste companies, such as Waste Management and Republic Services, that typically build and operate these types of facilities. By comparison, the capacity of Waste Management's SMaRT Center in Spokane, Washington only 80 miles away is 100,000 tons per year. That facility is also drawing on materials from the major metropolitan area of Spokane and nearby Idaho cities as well as communities in British Columbia, Canada. The City of Lewiston is also shipping their recyclables to the SMaRT Center.

Full investment in a MRF by a private contractor is a large capital commitment. The quantities of recyclables need to be there for the facility to be lucrative. Given the relatively low population density in the quad-city area, it is unlikely that a private contractor would be interested.

5.3 Public-Private Partnership

There are multiple scenarios that the City could enter into under a public-private partnership (PPP) agreement with a private company. The level of investment of the two parties is variable. The City or the private company could come up with all the capital for investing (designing and building) in the facility, or there could be some level of shared investment. The property could also be owned by either the City or the private party. These elements need to be considered in the long-term service agreement that is fair for both parties to build and operate the facility. Like the private ownership and operation scenario, the City can establish various types of contracts with the private operator. One option for this partnership is for the private operator to be required through the proposal process to provide a “best value option” where the City leaves the requirements open-ended so that proposers can provide value options to the City that enhance the recycling program. This offers “value-added” incentives to the City and processing of commodities through the procurement process.

The City currently has a favorable public-private partnership with Latah Sanitation, Inc. for operating the Moscow Recycling Center. LSI’s responsibility in addition to operating the City’s MRF is to contract with neighboring communities in the quad-city and more regionally to increase the amount of tonnage and keep the processing rate economically feasible for Moscow and other partners. These scenarios all come with a level of risk and liability that needs to be carefully considered by the City and the private contractor. This option is the most feasible in which both parties (City and private contractor) share responsibility and risk in the investment and successful operation.

An advantage of this approach is that the City would retain ownership of the site during the contract and, after the operations contract expires, would provide a degree of control over the MRF. The City would be responsible for locating a site that meets City zoning and community acceptance; such a site acquisition process can oftentimes be problematic and possibly hold up construction of the MRF beyond the needed date. Difficulties contractors face in siting a solid waste or recycling facility has been a primary reason for cities and counties to provide sites for MRFs and other related facilities.

A disadvantage of this option is the Contractor could make significant profits and charge the City exorbitant amounts of money if the contract conditions are not written fairly. The City would also have expectations of the general public to keep the facility presentable, especially if the facility is in a highly trafficked area. If the contractor has financial difficulties, the contractor could possibly allow aspects such as housekeeping to deteriorate or worst case, abandon the building, leaving equipment and material for the City to take responsibility.

5.4 Collaborative Partnerships

The City of Moscow may also consider entering into collaborative partnerships within the quad-city area or more regionally depending on need and interest. This partnership could include other communities contributing capital to build the facility and/or committing that they will send their recyclables to the facility for processing. The private company of a public-private partnership may also collaborate with these communities and secure contracts to increase tonnages, improve on profits and also help to reduce costs to Moscow. With

Whitman County also considering building a MRF, the City of Moscow should consider discussing the opportunity to partner.

5.5 Other Communities/Jurisdictions Operating MRFs

5.5.1 City of Chelan, Washington (950 tons per year)

The City of Chelan was operating a public drop-off depot until May 2018. The depot provided limited sorting and baling operations and accepted approximately 950 tons annually (including glass). The depot served the residents of Chelan and the surrounding community. The depot's annual cost of operation was approximately \$300,000 and was staffed with 3 full-time employees until the operation changed in May 2018, when the City implemented a curbside, single-stream recycling program for its residents. Currently, the facility does an initial sort at the depot building to remove contamination and then bales and transports the material to Waste Management's SMaRT Center in Spokane for processing.

5.5.2 Clark County, Washington (60,000 tons per year)

Waste Connections, under an exclusive contract with Clark County and in conjunction with the City of Vancouver, Washington, constructed a combined transfer station and MRF in Vancouver. Waste Connections operates the facility where all recycled tons from Clark County and some of the neighboring areas are processed. Under the current market conditions, the facility processes approximately 60,000 tons per year of residential and commercial commingled materials. The recycling contract provides revenue sharing with Clark County and the City of Vancouver after the cost of processing has been considered. At the end of the contract, the County has the option to purchase the land and facility for \$1 from Waste Connections.

5.5.3 City of Phoenix, Arizona (100,000+ tons per year)

In 2004, the City of Phoenix awarded their first MRF operations and maintenance contract for its 27th Avenue facility to a private contractor. In 2007, upon completion of the City's new MRF, the North Gateway Transfer Station & MRF, the City issued an RFP for and contracted the operations of the MRF and marketing of recycling commodities to Hudson Baylor, who was later acquired by ReCommunity. ReCommunity was later acquired by Republic Services.

The MRF is co-located with the City's transfer station and is a single-stream processing facility. The 60,000-square-foot North Gateway MRF (which includes a 21,000-square-foot tipping floor) processes curbside-collected, commingled material generated by residents living in the northern sector of Phoenix and in the communities of Peoria and Anthem. The plant does not handle commercially-generated material. The recycling facility operates one processing line. Recycled fiber accounts for an estimated 85 percent of the material processed at the North Gateway MRF.

In recent interviews with former and current staff that were responsible for the City's MRF RFPs, administration of contracts, and oversight of the MRF subcontractor, they shared the following information pertaining to their experience and recommendations:

- The City was very pleased with their original decision to outsource the operations of the MRF and the marketing of the recycled commodities, especially given current challenging commodities markets, citing that having Republic Services (now, after

their acquisition of ReCommunity) provides a benefit due to their ability to “drive deals” relative to commodity sales in the marketplace, since they control so much recycled volume across North America, something the City states it would not be able to do on its own.

- Commodity sales can be a great revenue source when prices are up, however floor pricing can become an issue between the City and the MRF operations subcontractor when commodity pricing is down.
- Make sure when selecting a MRF and commodities marketing subcontractor, that they are well financed and leveraged to pay any floor pricing contract penalties when commodity pricing drops.
- The City of Phoenix initially spent \$5.5 MM on its North Gateway MRF.
- The City recommends not going for the lowest cost when selecting the baler and other MRF processing equipment and recommends Bollegraaf Balers (<https://www.bollegraaf.com/technologies/balers>). Their primary reason is to avoid downtime. If the baler is down, the entire plant gets backed up and production is lost and becomes costly.
- The City recommends a longer-term operating agreement with a highly valuable, operationally proficient and commodity marketing experienced subcontractor/partner, one that has established relationships with recycled commodity buyers.
- Select a larger company to form a public/private partnership or subcontract with one that can leverage recyclables commodity pricing in the marketplace - driving larger scales of economy - related to commodity sales since they are trading in the commodities marketplace all over North America, verses just one small volume recyclables generator.
- Commodity markets for recyclables limit items a city should consider collecting at the curb. As an example, a year ago mixed paper was at \$100.00 per ton and currently around \$10.00 per ton. As such, collecting and processing it currently does not make economic sense. Design the recycling program around the commodities markets and long-term trends to maximize processing and sale of commodities for a true ROI.
- Consider surrounding communities – cities, counties and regional solid waste districts – for adding recycling commodity volumes to the MRF to create economies of scale.
- Consider a “best value option” RFP, one where the City leaves the requirements open-ended, so proposers can provide value options to the City to enhance the recycling program, offering “value added” incentives to the City and processing of commodities through the procurement process.
- If the City is too far away from the end markets (regional mills) or shipping Ports for exporting the recyclables, consider baling and shipping the recycled commodities to either a larger MRF within the region and avoid building a MRF altogether.
- Rail is typically not a viable option as the loading railcars and expecting them to get serviced, transported and delivered to either domestic mills or to the ports for export; they recommend relying on trucks.
- Shipping routes are critical to be able to get the recycled commodities to market efficiently, cost effectively and on time.

- Consider getting away from commingled to clean up the commodities, especially with China's "green fence" and associated stringent requirements.
- Produce clean curbside recyclables by educating residential and commercial customers. The key is educating the customers as to what is truly recyclable to keep the recycling commodities as clean as possible reducing contamination and downtime at the MRF from materials damaging the equipment.

5.5.4 City of Albuquerque, New Mexico (80,000 tons per year)

During the solid waste planning process in 2007, Albuquerque's Solid Waste Department (SWD) determined that it did not have the expertise to operate a MRF capable of processing the region's estimated 80,000 annual tons. At the time of the decision, SWD was operating a processing facility, but the tonnages amounts were less than 20,000 tons and the annual cost of processing was more than \$80 per ton. SWD also had difficulty marketing the processed materials. SWD issued an RFP for a company to build and operate a new MRF. Financing for the facility was a municipal bond backed by the City. The cost of the land, building and processing line was approximately \$20 million. The PPP contract between the City and contractor, Friedman Recycling, included a put-or-pay clause that guaranteed either incoming material tons or payment. After opening in 2014, it took Albuquerque four years to reach the minimum tonnage requirement. In the meantime, payments were made to Friedman because the tonnage volumes were below the contracted minimums.

5.6 Transportation & Logistical Challenges

No significant population centers exist within 50-80 miles of the City of Moscow. Given the lack of population density and the long distances to transport materials, the opportunity for the City of Moscow to attract other recyclables and process materials from other communities even in the quad-city area will be challenging. Waste Management's SMaRT Center in Spokane will undoubtedly compete with this MRF for materials. Republic's Seattle MRF, although almost 300 miles away, will also be a competitive market as they are reaching out regionally to multiple communities in order to supply enough materials to make their facility efficient and economically viable. Their cost per ton to process is significantly lower than at smaller MRFs. Large MRFs do not have to rely on brokers to sell their materials like smaller MRFs, which increases their revenues and further offsets processing costs. In the end, it comes down to the aggregate cost of processing and transportation that compete with local MRF prices.

Transportation and costs are two significant factors when considering the feasibility of recyclable materials to be delivered to a MRF in Moscow. The general movement of the recyclables, whether mixed or sorted, is toward the west coast seaports and the paper mills. Moving recyclables east to Moscow from any communities in the area, for example, is counterproductive and will add cost.

5.7 Contracting Considerations

5.7.1 Request for Proposals (RFP) Process

A well-developed and mindful RFP is required to ensure that the City obtains the desired performance over the life of the contract. Development of such performance terms often times are provided with the assistance of a specialty engineering firm that are experienced in the design and operation of these types of facilities. MRF operation services should also

be contracted on a long-term basis typically for a minimum of 7 years. The RFP should sufficiently address current needs and future contingency events.

One recommended method is for the City to seek interest from private parties, by issuing an expression of interest (EOI). This approach may be a feasible next step for the City in considering a local MRF. The critical contractual terms and conditions (T&Cs) that the City should consider are discussed below. These include T&Cs in the RFP or EOI that is released to the private sector.

5.8 Contractual Term and Conditions

A contract to provide services for processing and marketing recyclable materials for the City should be a long-term arrangement, no shorter than 7 years and ideally 10 to 20 years to allow the contractor to fully depreciate its capital investment. The stationary process equipment and mobile equipment needed to operate a MRF are capital intensive and will require several years of potentially profitable operation for a private contractor to justify making the investment. Most or all equipment will be subject to federal income tax regulations that require the owner to depreciate equipment over several years; therefore, most private contractors will require a contract for service with the City for at least 10 years as an adequate incentive for them to invest funds to construct a MRF. Periods of 15 or 20-year contracts are not unusual in this type of business.

Because the relationship between the private contractor and the City will be close and long, setting up the details of expected actions by the two parties is important. Any action or operational aspect falling short of expectations could become an ongoing issue, in some cases curable by mutual agreement between the contractor and the City. Those actions on which the City is not able to reach agreement with the contractor during the term of the contract can become a source of dissatisfaction. Equally important, the City would have to wait until the contract expires and then revise the requirement to ensure that source of dissatisfaction will be reversed to meet the City's expectations.

The preferred approach begins with development of the RFP (or an EOI). This will ensure that the City avoids undesirable aspects of MRF services and simultaneously develops a comfort level before entering into an agreement that may run 10 years or longer.

In this section, important points to include in the RFP for a full-service "turn-key" PPP arrangement are summarized to assist in satisfying the City over the contract period. Numerous details would accompany each point in the RFP; however, the details of each requirement are not presented here but would be developed during the RFP process. Details of certain items would be common to other MRF procurements in the U.S., while other items would be developed tailored to the City's situation and needs.

Beyond development of the RFP, other important steps in the selection of a MRF contractor include proposal evaluation, the process of clarification of ambiguous points in each proposal, potential interviews with proposers, contract development, and final negotiations. Important points to include in the RFP are as follows:

Design and Construction Phase

Clearly specify the parameters upon which contractor proposals will be evaluated. If a

scoring or points method is used, provide the details. In response, contractors will more consistently describe those parts of their proposals. A recommended list of parameters includes:

- City objectives, such as diversion rate.
- Proposed site feasibility and proximity to population centroids.
- Experience in operations of single-stream processing and other recyclables processing.
- Marketing plan. All materials that generators may put into the collection container should be fully marketed, that is, multiple markets should be proposed if one market will take less than 100 percent of the material.
- Materials markets and net revenue formula to City. Monthly payment by contractor to City or to the Contractor by the City.
- Proposal security, performance bond (during operational years of the MRF), payment bond.

Facility Design and Operations

The following requirements could be written into the RFP. For a new MRF sited on City-owned property, the City will want greater control over the MRF and should specify limitations or ranges on certain parameters, such as:

- Conceptual design – for example, building size and architectural style
- Site plan – to have control over location of trailer storage, limit on storage location of other vehicles, and a prohibition on making the site a waste collection vehicle or waste collection container storage lot. Site plan limitation also would specify limitation on acreage that would be provided.
- Hours of operation – to more closely correspond to other facilities at the landfill site
- Limit the quantity of processed (baled) material storage on site
- Operational approaches to prevent materials from exiting the building and becoming litter
- Placement of exterior lights and other security features

For a new MRF sited at a contractor-provided site, the contractor will typically require maintaining control over certain features of the MRF on a site the contractor selects. The contractor may want to store vehicles used by its waste or recycling collection business, as well as collection containers. The contractor also may want to process materials other than those supplied by the City curbside residential recycling program, such as other metals or other industrial materials.

For a site provided by City or Contractor - whether the MRF is sited on City property or at a site provided by the private contractor, the City could influence building design elements by specifying functionality requirements for education, such as:

- Parking for a specified number of visitor vehicles and for one bus;
- Meeting room for presentations to visitor groups and other educational activities;
- Observation areas – A mezzanine walkway at the second level will provide safe viewing of several process activities without interfering with process floor operations. This approach has been used in numerous other facilities. An additional benefit is

that the viewing areas, isolated from process operations, would allow school-age children to view the process.

Schedule

A listing of the major milestone dates that the City expects during the selection and contract development stages, construction, and commencement of commercial operations would aid in the contractors' understanding of the timing of the various resources that they must make available to the City to conclude a successful procurement process and then meet construction deadlines. For the alternative that the contractor will provide a site, the City would need to allow an adequate amount of time between RFP issuance and proposal submittal for contractors to conduct the site search activities necessary for their proposal to be responsive to the RFP. Contractors would need time to identify and conclude at least a preliminary level of commitment from the owner – for sale or for lease to the contractor.

City Responsibilities

This section should spell out the City's responsibilities during the construction of a new facility and during the term of MRF services provided by the contractor. The primary reason for this section is to let the contractor understand all of the items that the City will provide.

Acceptance/Demonstration Testing

Whether the City or the contractor provides the site, the City should expect the contractor to prove process performance demonstrations including the following:

- **Quantities** - The RFP should specify performance that matches the greatest quantity expected over the life of the contract. Annual quantities will be greatest during the last year of the contract, as quantities are expected to grow with population and increased diversion rates. The City could require the contractor to accumulate a portion of one day's receipts for a following day test, to ensure that the greater future daily quantity would be tested. Similar to the capacity provided in the conceptual design in a prior section of this report, the MRF should be required to receive and process the tested amount over a time period proposed by the Contractor. This requirement will help ensure that the contractor does not undersize the facility as a means to reduce the initial capital cost.
- **Process Efficiency** - Two aspects of process efficiency should be tested. The first is separation to achieve the grade requirements or specifications for each material in its ready-to-ship condition. Material grade requirements will be included in the marketing plan submitted by the contractor with the proposal. These requirements usually specify allowable quantities, as a percent of the total, of other materials, such as other grades of paper, and of contaminants, materials that cannot be processed by the mill receiving processed recyclables.
- **Residue Quantity and Quality**. Recycling program participants always place some small amount of non-recyclable materials into the collection system. The MRF process removes these materials and they form the process residue from daily operations. Also, some quantities of recyclable materials fail to be separated during the process, adding to residue quantities and resulting in lost revenue. Prior to development of the RFP, it would be helpful for the City to obtain a measurement of

the quantity of recyclables contained in the materials it currently collects in its waste stream. This would form a baseline value for performance.

A performance test would be witnessed by a City representative, either staff or a consultant, another common practice for such contracts. The test report with the results would require approval by the City prior to facility acceptance.

Service Agreement During Operations

To more clearly identify the performance requirements that the City would impose on the private contractor, those requirements should be written into a Draft Service Agreement. The Service Agreement would specify requirements of the contractor during construction of a new facility, if applicable, and operating requirements that would be imposed during the entire term of the service. The Draft Service Agreement would be prepared typically with input from the City's Sanitation Department, the City's Purchasing Department and City's legal counsel. The balance of items in this section would be recommended for inclusion in the draft Service Agreement, which would be made a part of the RFP document issued to potential proposing contractors.

Marketing Plan

The private contractor would be required to submit a detailed marketing plan with their proposal. Contractors would be responsible for marketing all recyclable commodities for the City. Marketing requirements should specify the materials that are to be marketed. During each operating year of the Service Agreement, the contractor would be required to update and submit to the City the Marketing Plan prior to the beginning of each year. The contractor should be required to state market development efforts expected during the coming year as a means to provide evidence of the contractor's ongoing capability to successfully market the City's materials. Also, the contractor should provide a financial risk discussion on each ongoing or potential market.

Compensation

Due to demand for recyclable paper by several paper mills constructed since 2000 in Asian countries, paper prices offered by those markets had been high. Other commodity prices had also been high. However, since 2008, prices have started to decrease.

The RFP should require a fee and revenue share such that as long as material revenue share exceeds the fee, similar to the City's current situation, the City makes no payment, thereby avoiding an annual budget line item, and the contractor pays the City according to formulas in the Service Agreement.

Should costs exceed revenue, the City would have to pay the Contractor. Effects of inflation should be allowed in the fee and proposing contractors should be required to cite the basis for annual inflation, so that fee increases can be easily calculated and reasonably projected for budget purposes. The RFP should suggest that the City would be amenable to a compensation structure that would allow the contractor to pay all costs and provide for a nominal profit even if material market conditions significantly deteriorate. Such a condition should be contingent upon the contractor providing detailed cost data and executing the Marketing Plan.

Reporting

In addition to the Marketing Plan, the RFP should require the reporting of several operating parameters, including, but not limited to, hours of operation, quantities (tonnage) processed, and revenue for each recycled commodity.

Residue Disposal

The City should specify terms by which it would provide landfill disposal capacity for MRF residue. A fee for disposal or no fee structure is feasible. An approach to provide no-fee disposal up to the maximum guaranteed residue rates would be reasonable, accompanied by a fee structure for quantities exceeding the guaranteed level. Other penalties for exceeding the maximum guarantee level would be specified elsewhere in the Service Agreement.

Capital Repairs

To ensure the long-term viability of the MRF (facility), process equipment and vehicles must be adequately maintained. Certain smaller expenses are required as they occur and manufacturer's preventive maintenance should be conducted each year. However, other larger, capitalized expenses occur at large intervals, such as three years, five years, or more, that are required to maintain the equipment's performance. A plan for capital repair schedule should be a proposal requirement. The Service Agreement should require that it be updated each year, including a report on items and their cost that were replaced during the year, as part of a year-end report.

Continuous Monitoring

The City would want rights to monitor the performance of the MRF on an ongoing basis, with rights to come on site daily, at the City's discretion.

Additional Materials

The RFP should specify the process that the City would want to use to add any new recyclable commodities/materials to the program. Additions would be a negotiated revision to the Service Agreement. Acceptance of materials from non-City sources should benefit the City in the form of higher revenue sharing. Proposals should specify how the contractor would modify the system in the future. Included in this item would be assurances that system components will be designed to accommodate certain specified types of modifications at reasonable costs.

Event of Default

The RFP should specify all of the events of default that are common with MRFs. This section provides the understanding of conditions that the contractor must "fix" in order for the contractor to continue meeting the City's expectations and continue serving the City. Examples are overnight storage of incoming materials (due to unavailability of processing capacity), failure to meet residue or other Performance Standards, failure to market materials, and others.

City-Owned and Provided Site

For a MRF constructed on a City-owned property site, the RFP should state the requirement of the City, or its representative or consultant, to have oversight and judgment regarding acceptability of work as it pertains to the use of the site. For example, input on the site plan, utilities, building, and possibly others.

5.9 MRF Capital and Operational Costs

An important element of the feasibility analysis is to identify expected capital and operations cost to develop and operate a MRF. Without knowing the contractual conditions that would be negotiated with a private contractor, the cost estimate provides a basis for general costs for designing/building and operating the facility. A basic MRF facility is assumed for this assessment as shown in **Exhibit 9**. This facility would sort and process the five basic commodities, including cardboard, mixed paper, tin/steel cans, aluminum cans, and mixed plastics.

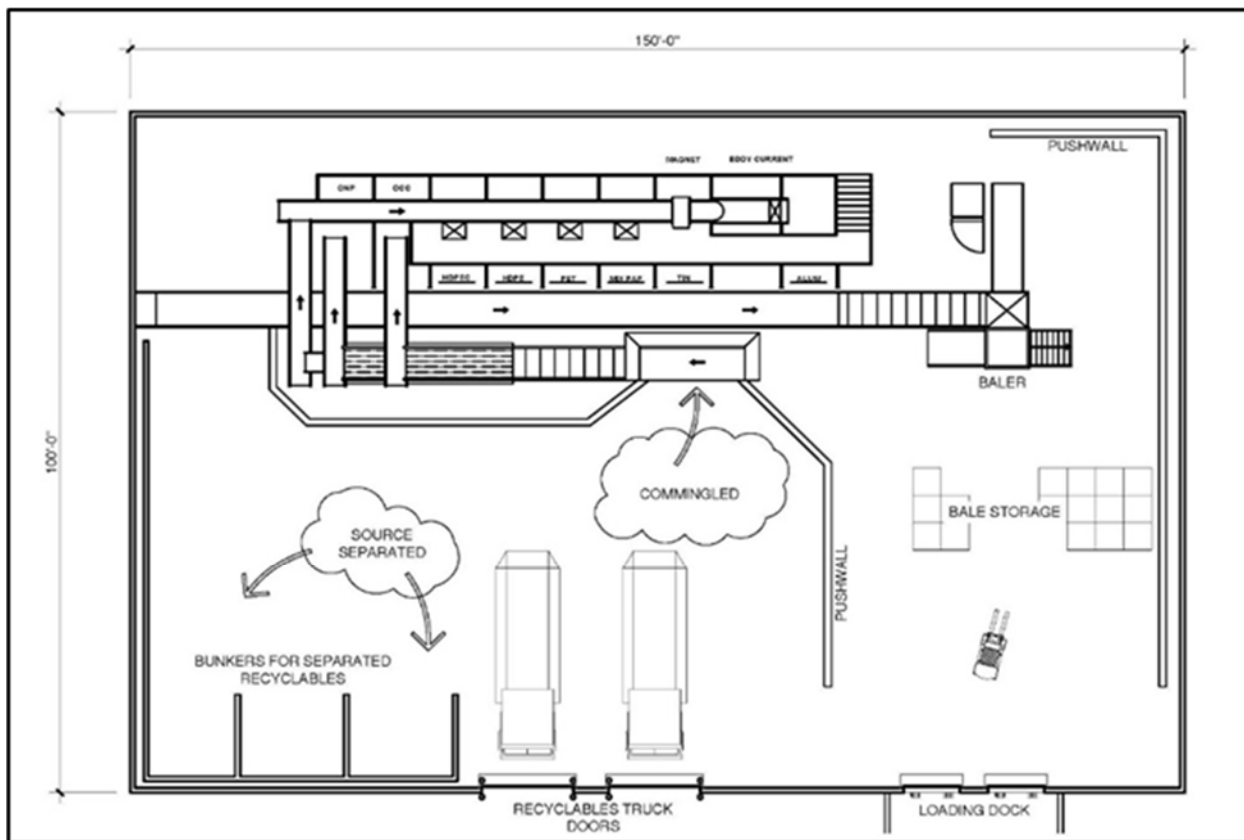


Exhibit 9. Basic MRF Building Layout Plan (courtesy of Bell & Associates)

A MRF to serve the City and its quad-city area (and possibly regional) partners would be sized to handle the maximum quantities expected for the planning horizon. Based on the quad-city area collecting approximately 10,600 tons in 2018, this quantity would be expected to grow at an aggregate rate of approximately 0.6% per year – the same as expected population growth. Assuming three years for planning and implementation, the first year of operation would be 2021. In 2021, nearly 11,000 tons per year (tpy) is forecasted for the quad-city area. This translates into approximately 900 tons per month and 42 tons per day (tpd) on a five-day week basis. Quantities projected for 20 years after startup, or in year 2040 are approximately 12,400 tons per year, or 6 tons per hour (tph) over an 8-hour work day (2080 hours per year). For this assessment, a range of tonnages was considered from 10,000 tpy to 20,000 tpy to determine the impact on cost. Thus, design capacities between approximately 5 to 10 tph were evaluated, assuming a single processing system. Above 10 tph, a second process system would be required, needing a larger building and likely doubling the existing process equipment capital costs.

As an example, a 10 tph system would be capable of 70 tons in seven hours of actual processing. With this system, operating hours could be expanded, growing to 10 hours of actual processing a day in the distant years and increasing the daily tonnage to 100 tpd. These greater hours of operation could be handled with a split shift (a second shift running less than eight hours). For the private operation alternative and likelihood that the operator would bring commercial business into the MRF, daily quantities would be even higher, improving the economics of the second shift of plant operations. Additional quantities of materials generated by increasing the types of items in the recycling program have not been included. As additional feed stock is added, the facility could move from eight-hour shifts to ten-hour shifts as required.

A facility of this capacity would require a minimum 15,000-square-foot building with approximately 1,000 square feet allocated for office space and staff locker rooms on a minimum of 5 acres (2 acres developed). Land purchase price and other acquisition costs, and demolition costs, if needed, are not included. It is assumed that the vacant land will be provided and if a siting study is needed, it will be paid for by another source. It is assumed that construction site work will include the need for all new utilities. Cost allowances for power feed lines, electrical transformers and natural gas are included. Allowances for water, sewer, and sanitary lines are also assumed.

Processing equipment is included in the building costs to recover the five basic commodities – in-feed conveyor, belt conveyor with pre-sorting stations to remove garbage and materials that could cause damage to downstream equipment, OCC and mixed paper separation using disk screens, ferrous metals (tin and steel) separation by magnet, nonferrous (aluminum) separation using an eddy current with the remainder being mixed plastics, and a compactor/baler. Allowances are also provided for steel bunkers, control panel/wiring, and steel platforms.

Cost factors are based on historical costs on comparable past projects constructed in the past three years that have been adjusted to 2018 pricing. Applicable sales tax is not included. Estimated capital cost are presented in **Table 4**. The total capital cost is then assumed to be paid through City-issued certificates of participation over a 20-year period at a 6% interest rate. This results in an annual capital cost \$801,000.

Table 4 –MRF Construction Cost Estimate ⁽¹⁾

Cost Item	Cost	Notes/Assumptions
Site Work	\$614,000	Site clearing, earthwork, surfacing, signage, fences and gates, and landscaping
Site Utilities	\$135,000	Fire suppression water service and hydrants, BFP valves, domestic water and sewer, storm drain system, electrical and site lighting
Building	\$1,913,000	Approximately \$128/sf pre-engineered metal building
Processing Equipment	\$1,966,000	In-feed conveyor, sorting belt conveyor, OCC and mixed paper screens, magnet, eddy current separator, platforms, steel bunkers, and baler
Scales/Scale House	\$148,000	200 sf stick-built structure, two 35-ft above ground scales, and electronic systems.
Subtotal Direct Costs	\$4,776,000	
General Conditions	\$1,003,000	Includes overhead and profit, mobilization, demobilization, insurance, bonds, etc.
Total Direct Costs	\$5,779,000	
Engineering/Professional Costs	\$1,300,000	Permitting, design, inspection/testing, and service during construction (construction administration and oversight)
Project Subtotal	\$7,079,000	
Contingency – 30%	\$2,121,000	For unknown costs based on the concept-level of design
Project Total	\$9,200,000	
Annual Payment	\$801,000	Assumes 20-year loan or bond at 6%

Notes:

¹ This cost opinion is based on concept design as a study of feasibility with a level of design between 1%-15%. As defined by AACE International's standard classification this is considered a Class 4 Estimate with a typical accuracy range between -30% to +50%. The cost of the project will depend ultimately on final design, market conditions, actual labor and material costs, actual site conditions, productivity, project scope and schedule, and other factors. As a result, the actual project costs will vary. Because of these factors, funding needs must be carefully reviewed by the City before making specific financial decisions or establishing final budgets.

In the past decade, significant increases in prices for process systems have been experienced. This is due to a large degree to price increases for raw materials, especially steel. Steel prices reached levels more than 40 percent higher in the last decade. Another factor is the lower U.S. dollar purchasing power when purchasing system components from manufacturers located in European and Asian countries. Additionally, are the higher costs associated with designing a system that has provisions for adding materials to the recycling program, usually resulting in longer sorting conveyors or similar effects.

Replacement funds for both fixed and mobile equipment are also required. Because mobile equipment is expected to have a life cycle of 10 years, it is assumed that money will need to be set aside annually so that at the end of the 10 years, the funds will be available to purchase replacement equipment. The same is assumed for the fixed equipment but with a life cycle of 20 years. Building replacement costs are not included. Both replacement funds account for inflation in equipment prices.

Operations and maintenance costs are estimated for a basic MRF operating five days per week. Operations and maintenance costs per ton for processing are provided in **Table 5**. The

equipment used in the cost analysis could process on average 10,000 tons per year, up to a maximum of 20,000 tons per year. For a point of comparison, the cost to operate a MRF with only 1,000 tons per year was evaluated. This is close to the estimated amount of single stream available from Moscow/Latah County of 740 tons in 2017. This tonnage is expected to climb to almost 1,000 tons with the addition of the commercial accounts in January 2018.

Table 5 – Annual MRF Operating Cost Estimate ⁽¹⁾

Operating Cost Item	1,000 tons	5,000 tons	10,000 tons	15,000 tons	20,000 tons	Notes/Assumptions
Labor Costs	\$187,000	\$224,000	\$297,000	\$334,000	\$407,000	Scaled costs for labor – 250 work days
Bond/Loan Repayment	\$801,000	\$801,000	\$801,000	\$801,000	\$801,000	20-year loan/bond at 6% interest
Operational Costs	\$97,000	\$251,000	\$446,000	\$602,000	\$821,000	Utilities, supplies, maintenance, etc.
Subtotal Operating Costs	\$1,085,000	\$1,277,000	\$1,544,000	\$1,737,000	\$2,090,000	
Total Processing Cost	\$1,118,000	\$1,315,000	\$1,590,000	\$1,789,202	\$2,090,000	With 3% operating reserve
Material Value (Revenue)	-\$3,000	-\$14,000	-\$28,000	-\$41,000	-\$55,000	Based on June 2018 commodity pricing as reported by Republic – refer to Table 3; assumes \$84/ton for disposal (LSI's rate)
Cost Less Revenues	\$1,115,000	\$1,301,000	\$1,563,000	\$1,748,000	\$2,035,000	
Cost Per Ton	\$1,115	\$260	\$156	\$117	\$102	
Cost Per Ton w/ Operating Margin/ Reserve	\$1,394	\$325	\$195	\$146	\$127	Assumes 25% margin/reserve
Monthly Customer Set-out Weight (Moscow)	12.3 lbs	12.3 lbs	12.3 lbs	12.3 lbs	12.3 lbs	Assumes set-out rate stays the same in Moscow regardless of annual tonnage contributed from the quad-city communities
Cost per Customer per Month	\$8.56	\$2.00	\$1.20	\$0.89	\$0.78	

Notes:

¹. Refer to Table 4 for general assumptions and assumed level of accuracy for this Engineer's opinion of cost.

The net cost of receiving MRF services are driven by a number of factors, such as:

- Size and design of the facility;
- Location of the facility;
- Ownership of the facility;
- Length of contractual arrangement;
- Allocation of risks and price by the service provider;
- Value of recyclable commodities in the marketplace;
- Amount and cost of residue disposal in recyclables processed; and
- Direct or implicit sharing of product revenues, net of transportation costs to get to purchaser.

Recyclable products are commodities whose value rises and falls with demand, both domestic and worldwide. It should also be recognized, that as this report is authored, there continues to be a volatile market with speculation on the market demand and pricing for recyclable materials. It will be important to track the marketplace as decisions about developing a future MRF is made.

5.10 Estimated Service Fees and Rates

The City collected approximately 700 tons of single-stream in 2017. With approximately 9,500 accounts (single-family and multi-family residences) in the City of Moscow, the 700 tons equates to 147 lbs per customer (“account”) per year, or 12.3 lbs per month. LSI, through the franchise agreement with the City, is paying approximately \$166 per ton (refer to **Table 3**) to haul and process the single-stream at Republic Services’ Lander Facility in Seattle, Washington. This equates to approximately \$1.02 per customer per month.

Exhibit 10 presents a graphical representation of the material processing costs by quantity and a cost percentage increase as compared to the baseline cost of \$1.02 per customer per month.

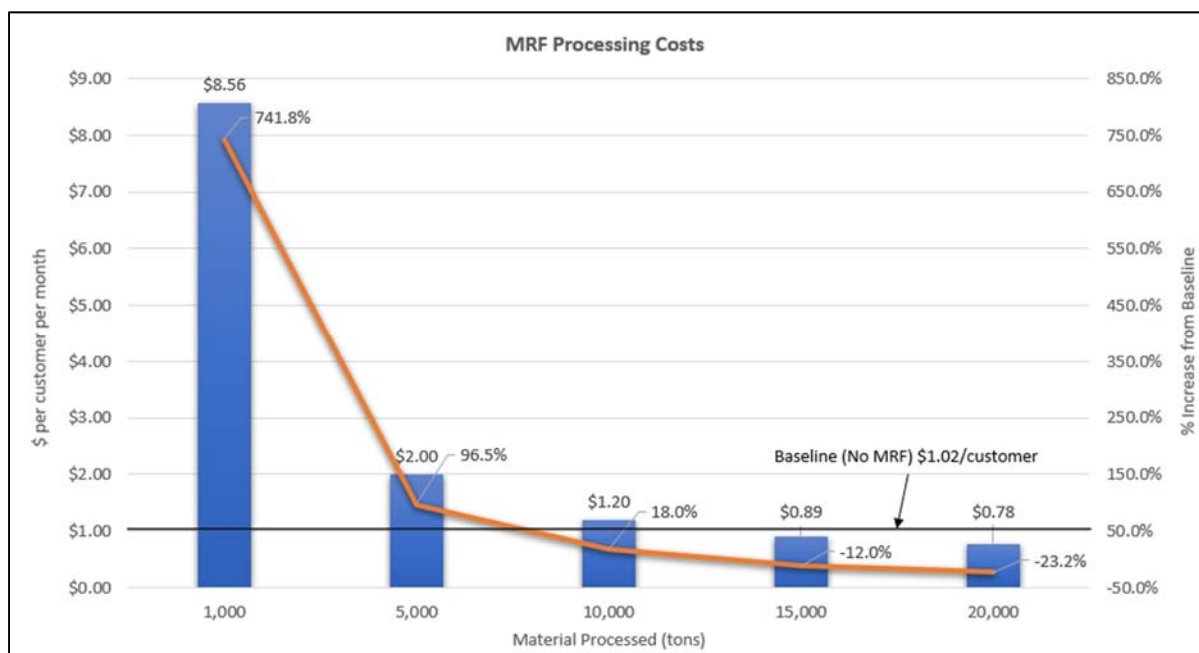


Exhibit 10. MRF Processing Costs on a Per Monthly Customer Basis

Assuming that only Moscow and Latah County would contribute recyclables to this program (and all are single stream), it would cost each Moscow customer \$8.56 per month to process minus prospective revenues, which is a fee increase of over 700%. By comparison, if Moscow can attract the projected amount of recyclables that are available today in the quad-city area of approximately 5,000 tons, the cost per customer would be \$2.00 per month or an increase of approximately 97%. With the maximum amount of 20,000 tons per year that the facility could handle, the monthly fee would go down to \$0.78 per customer – a decrease of about 23% of what each account is paying today.

With the exception of processing only 1,000 tons per year, this cost differences seem relatively low with the assumption that they could be easily absorbed in a small fee increase

for the customers. However, by percentage, these are large increases until about 10,000 tons per year are processed. Furthermore, there are other possible fees that would need to be added especially for contingencies in case the market has another sudden drop. That contingency might be on the order of an additional \$1 to \$2 per month per customer.

6.0 Summary and Recommendations

Assuming the City fully funds and operates (“hosts”) a MRF, the cost (\$ per customer per month) increase is not excessive as long as the City can attract single stream from all, or almost all, the quad-city area. If the City can also attract recyclables outside of the quad-city area, this would only help to offset the cost of operation. By itself, the City’s 1,000 tons per year of single stream would increase the rate by more than 7 times (over 700%). With contributions from the entire quad-city area, the total amount of single stream would increase to nearly 5,000 tons per year and the rate would still almost double what the customer is paying today.

It is expected that the processing costs and haul costs will continue to climb until there is a better market. The benefit of the City, or a quad-city area neighbor, to host a MRF is that it could pass along rebates it receives from the sale of commodities. These rebates are provided today by the large, regional MRFs but also the rebate pricing is offset by the companies need to generate a profit. A local government entity such as the City of Moscow would not be hosting a MRF to make a profit. It would be providing a service for their community and their quad-city area partners.

The investment could also be lowered with collaborative partnerships (that is, from quad-city neighbors) and/or entering into PPP arrangement with a private operator/investor. The investment is further complicated with the risk of owning and operating a MRF. Risk is a major consideration given the recent changes and uncertainties in the domestic and global recycling markets. The small MRFs will be the first to suffer if markets fall again as compared to the larger MRFs who have direct accounts and relationships with mills and remanufacturing plants. Small MRFs do not have the direct access, and therefore, do not have the same level of negotiation leverage in the sell price of their commodities.

Likely, the most feasible alternative for developing a local MRF by the City would be involving a private company in a PPP arrangement. This venture, however, has to be attractive to both parties. The contractor needs to fully and completely understand the local markets and how they will bring in other regional materials to make the facility sustainable. There are several advantages of involving private contractors in the process. Private contractors have developed equipment and systems specifically designed for waste materials, as well as relationships with product purchasers. Private sector companies typically operate multiple MRFs with systems already developed.

The main advantage of a private company is their ability to market broad ranges of materials. Private operators with significant market standing are able to market materials at prime dollar. Most private companies have longstanding relationships at mills. Certain materials can be very challenging for a small operation to market as most mills use exclusive supply agreements to control the flow of feedstocks. The small operator is rarely

able to break through to direct mill marketing, and therefore, must rely on brokers, who in turn retain a percentage of the market value for themselves and erode profits.

Perhaps the most important difference between private and public operations is experience. The private companies generally bring a wealth of knowledge related to the specific operation. From acquisition of appropriate equipment to the specialized maintenance requirements of these systems, the private companies have a great advantage. Public operators rarely have history managing and maintaining the complex manufacturing systems which MRF's represent. This lack of experience can lead to higher system costs with reliance on third-party companies to provide maintenance and service. The City of Albuquerque's experience with their processing facility, which stopped processing commingled materials in 2014, exemplified this challenge.

There are a lot of factors to consider should the City continue to contemplate hosting a local MRF. Risk, as previously mentioned, is a major factor. It also comes down to interest from a private contractor to establish a PPP and having enough material in the area to make it attractive. The City should consider discussing the option of investing in a local MRF with their long-time waste contractor, LSI. Another option to consider is issuing a EOI to see what level of interest there is from other private companies. This would give the City a chance to evaluate the level of interest in the marketplace. And lastly, the City should consider a collaborative partnership with Whitman County who is also assessing the viability of hosting a MRF at the Carothers Road Solid Waste Facility.

Appendix E

**City of Moscow Prototypical Recycling Center
Engineer's Opinion of Costs (Great West, August 2018)**

City of Moscow - Engineer's Opinion of Cost

Prototypical Recycling Center Concept (3-Acre Site)

Prepared For: City of Moscow

Prepared By: Duncan Breedlove, EIT

Reviewed by: Travis Pyle, PE & Michelle Langdon, PE

Date: August 30, 2018

Project No. 4-17110

Revision No. 0

Approved By: Travis Pyle, PE



Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Unit Price
Site Civil					
1	Site Clearing and Preparation	3	AC	\$ 2,500	\$ 7,500
2	Site General Cut	6,400	CY	\$ 2.00	\$ 8,600
3	General Site Fill	4,300	CY	\$ 3.00	\$ 18,900
4	Import General Fill	6,300	CY	\$ 15.00	\$ 94,500
5	Import Structural Fill	6,300	CY	\$ 28.00	\$ 176,400
6	Gravel Roads/Yard Surfacing (Lower Yard)	1,420	CY	\$ 25.00	\$ 35,490
7	Pavement Surfacing	4,525	SY	\$ 45.00	\$ 203,625
8	Site Yard Concrete Surfacing/Sidewalks	3,300	SF	\$ 15.00	\$ 49,500
9	Site Finish Grading/Drainage/Swales	3,500	SY	\$ 7.00	\$ 24,500
10	Hydroseeding	0.72	AC	\$ 5,500	\$ 3,977
11	Perimeter Fence/Gates	1,464	LF	\$ 40	\$ 58,560
12	Site Utilities (Water/Sewer/Stormwater)	1	LS	\$ 35,000	\$ 35,000
Structural/Architectural					
13	Steel Building (Office/Restrooms/Break Room)	840	SF	\$ 100.00	\$ 84,000
14	Steel Building - E-Waste and Storage Areas	1,360	SF	\$ 75.00	\$ 102,000
15	Z-Walls (Full Height) - Assume 1 cy/LF	440	CY	\$ 800.00	\$ 352,000
16	Low Retaining Walls - Assume 0.6 cy/LF	140	CY	\$ 800.00	\$ 112,000
17	Guard Rail	225	LF	\$ 50.00	\$ 11,250
18	Container Concrete Pads	3,380	SF	\$ 15.00	\$ 50,700
19	Recyclable Container Covers	7,200	SF	\$ 35.00	\$ 252,000
20	Miscellaneous Bollards/Bunker Walls/Etc.	1	LS	\$ 12,000	\$ 12,000
Site Yard Electrical					
21	Site Lighting/Yard Service	1	LS	\$ 25,000	\$ 25,000
General Conditions					
22	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout (7%)	1	LS	\$ 120,225	\$ 120,225.17
23	Construction Facilities, Temporary Controls, Survey, and Safety (5%)	1	LS	\$ 85,875	\$ 85,875
CONSTRUCTION SUBTOTAL					\$1,923,603
CONTINGENCY ⁽²⁾ 25%					\$480,901
CONSTRUCTION TOTAL (Rounded)					\$2,405,000
A/E DESIGN 8%					\$192,400
A/E CM SUPPORT SERVICES (Limited CM) 4%					\$96,200
TAXES 6.00%					\$72,150
TOTAL (Base Cost)					\$2,766,000
Low Range (-30%)					\$1,936,000
High Range (+50%)					\$4,149,000

Notes:

(1) This is cost estimate based on concept-level design. This estimate assumes a 1-15% level of design and is considered a Class 4 estimate in accordance with AACE International's classification system (Study of Feasibility) with a typical range of accuracy between -30% to +50%.

(2) Contingency is for scope changes that are presently unforeseen.

City of Moscow - Engineer's Opinion of Cost
Prototypical Recycling Center Concept (2.5-Acre Site)

Prepared For: City of Moscow

Prepared By: Duncan Breedlove, EIT

Reviewed by: Travis Pyle, PE & Michelle Langdon, PE

Date: August 30, 2018

Project No. 4-17110

Revision No. 0

Approved By: Travis Pyle, PE



Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Unit Price
Site Civil					
1	Site Clearing and Preparation	2.5	AC	\$ 2,500	\$ 6,250
2	Site General Cut	4,500	CY	\$ 2.00	\$ 6,000
3	General Site Fill	3,000	CY	\$ 3.00	\$ 19,200
4	Import General Fill	6,400	CY	\$ 15.00	\$ 96,000
5	Import Structural Fill	6,400	CY	\$ 28.00	\$ 179,200
6	Gravel Roads/Yard Surfacing (Lower Yard)	996	CY	\$ 25.00	\$ 24,888
7	Pavement Surfacing	3,400	SY	\$ 45.00	\$ 153,000
8	Site Yard Concrete Surfacing/Sidewalks	3,300	SF	\$ 15.00	\$ 49,500
9	Site Finish Grading/Drainage/Swales	4,100	SY	\$ 7.00	\$ 28,700
10	Hydroseeding	0.85	AC	\$ 5,500	\$ 4,659
11	Perimeter Fence/Gates	1,354	LF	\$ 40	\$ 54,160
12	Site Utilities (Water/Sewer/Stormwater)	1	LS	\$ 28,000	\$ 28,000
Structural/Architectural					
13	Steel Building (Office/Restrooms/Break Room)	840	SF	\$ 100.00	\$ 84,000
14	Steel Building - E-Waste and Storage Areas	1,360	SF	\$ 75.00	\$ 102,000
15	Z-Walls (Full Height) - Assume 1 cy/LF	270	CY	\$ 800.00	\$ 216,000
16	Low Retaining Walls - Assume 0.6 cy/LF	70	CY	\$ 800.00	\$ 56,000
17	Guard Rail	110	LF	\$ 50.00	\$ 5,500
18	Container Concrete Pads	2,080	SF	\$ 15.00	\$ 31,200
19	Recyclable Container Covers	3,600	SF	\$ 35.00	\$ 126,000
20	Miscellaneous Bollards/Bunker Walls/Etc.	1	LS	\$ 8,000	\$ 8,000
Site Yard Electrical					
21	Site Lighting/Yard Service	1	LS	\$ 20,000	\$ 20,000
General Conditions					
22	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout (7%)	1	LS	\$ 90,878	\$ 90,877.97
23	Construction Facilities, Temporary Controls, Survey, and Safety (5%)	1	LS	\$ 64,913	\$ 64,913
CONSTRUCTION SUBTOTAL					\$1,454,048
CONTINGENCY ⁽²⁾ 25%					\$363,512
CONSTRUCTION TOTAL (Rounded)					\$1,818,000
A/E DESIGN 8%					\$145,440
A/E CM SUPPORT SERVICES (Limited CM) 4%					\$72,720
TAXES 6.00%					\$54,540
TOTAL (Base Cost)					\$2,091,000
Low Range (-30%)					\$1,464,000
High Range (+50%)					\$3,137,000

Notes:

(1) This is cost estimate based on concept-level design. This estimate assumes a 1-15% level of design and is considered a Class 4 estimate in accordance with AACE International's classification system (Study of Feasibility) with a typical range of accuracy between -30% to +50%.

(2) Contingency is for scope changes that are presently unforeseen.



City of Moscow

Existing Recycling Center Review and Assessment

PREPARED FOR: City of Moscow

PREPARED BY: Travis Pyle, PE/Great West

REVIEWED BY: Bob Church, PE/Great West (Principal In-Charge)
Chris Bell/Bell & Associates

DATE: May 10, 2018

PROJECT NUMBER: 4-17150

REVISION NO.: 0

APPROVED BY: Travis Pyle, PE/Great West *T.P.*



1.0 Introduction

The City of Moscow retained Great West Engineering to perform an assessment of the City's Recycling Center operation and physical characteristics to improve on the services and operations when the center is replaced by a new convenience drop-off location and separate processing/baling facility. This evaluation is being conducted under Task 2 (Deliverable 2.1 – Technical Memorandum #1) of the Comprehensive Sanitation System Master Planning Services Project ("Project"), in accordance with the contract between Great West Engineering, Inc. and the City of Moscow dated February 26, 2018.

1.1 Purpose/Objectives

Conduct a review of the existing Recycling Center's operation and physical characteristics as part of a comprehensive review of the City's Sanitation system and programs to continue its mission of "... actively exploring and assessing viable new technologies and opportunities in the management of the waste stream which protects the health, safety and cleanliness of the City." The City continues to adopt a progressive waste management mission to deliver quality, affordable and fiscally-responsible services to the community.

The Moscow Recycling Center was developed to provide a convenient location for residents to drop-off pre-sorted recyclables and yard waste. The recycling program in the City has evolved over the years from to pre-sorted (source-separated) curbside collection to eventually single stream "no sort" curbside collection that was adopted in February 2016. The changes in the collection program in the City has modified the function of the center. The facility now has a joint purpose of processing comingled recyclables and bailing them as well as continuing to offer a location for residents to drop-off pre-sorted recyclables and yard waste.

The City desires to relocate the existing recycling processing/baling components of the current center to a new building at the Solid Waste Processing Facility (SWPF), located south of town at 3299 Highway 8, and repurpose the current Recycling Center property for a different City use. The intent of the recycling center changes is to decouple the processing/baling components but still provide a convenient drop-off location for recyclables and yard waste for the public. This will require development of a new piece of property somewhere in town or near town to continue to provide this convenience to its residents.

The City of Moscow is in the process of soliciting input from the community by sending out 1,200 surveys to City residents (sent out in late March 2018), conducting interviews at the Recycling Center in early to mid-April, and conducting interviews of three focus groups in late April to early May. These public outreach activities have been designed to solicit feedback from the community on the City's sanitation system performance, the recycling center functions and needs, and location of a new convenience recycling drop-off center. Furthermore, the City has assembled an Advisory Group representing various businesses and groups to also provide input on this Project.

1.2 Background

1.2.1 General Information

The City of Moscow is located in Latah County, approximately 35 miles north of Lewiston, Idaho and 8 miles east of Pullman, Washington, and is the home of the University of Idaho. Moscow has a population of approximately 25,500 full-time residents and is the largest city in Latah County. The County has approximately 39,500 full-time residents.

The Recycling Center is located at 401 N. Jackson Street in the City of Moscow. Moscow Recycling is a public/private partnership between the City of Moscow and LSI and offers recycling services for both commercial and residential customers with over 30 commodities accepted. The center sits on a parcel of land with an area of approximately 72,900 square feet (or 1.67 acres) and is situated between N. Almon Street to the west, N. Jackson Street to the east, private property to the north, and C Street to the south (refer to **Exhibit 1**).

The facility is open 24 hours a day, 7 days a week for drop-off of recyclables and yard waste. The buyback office and main office hours are Tuesday through Saturday, 9:30 am to 5:30 pm. The facility offers large volume drop-off Tuesday through Saturday from 10:00 am to 4:00 pm. Much of the property is enclosed by perimeter chain link fencing. There is a grade-break with a z-wall (retaining wall) between the yard waste drop-off area on the west side of the property along N. Almon Street and the main building.

The City of Moscow provides curbside collection of municipal solid waste (MSW) on a weekly basis. The City began the curbside recycling collection program in 1999, with collection of source-separated collection at the curb. This continued until February 2016 when the City implemented single-stream recycling collection every other week through its franchise agreement with LSI.

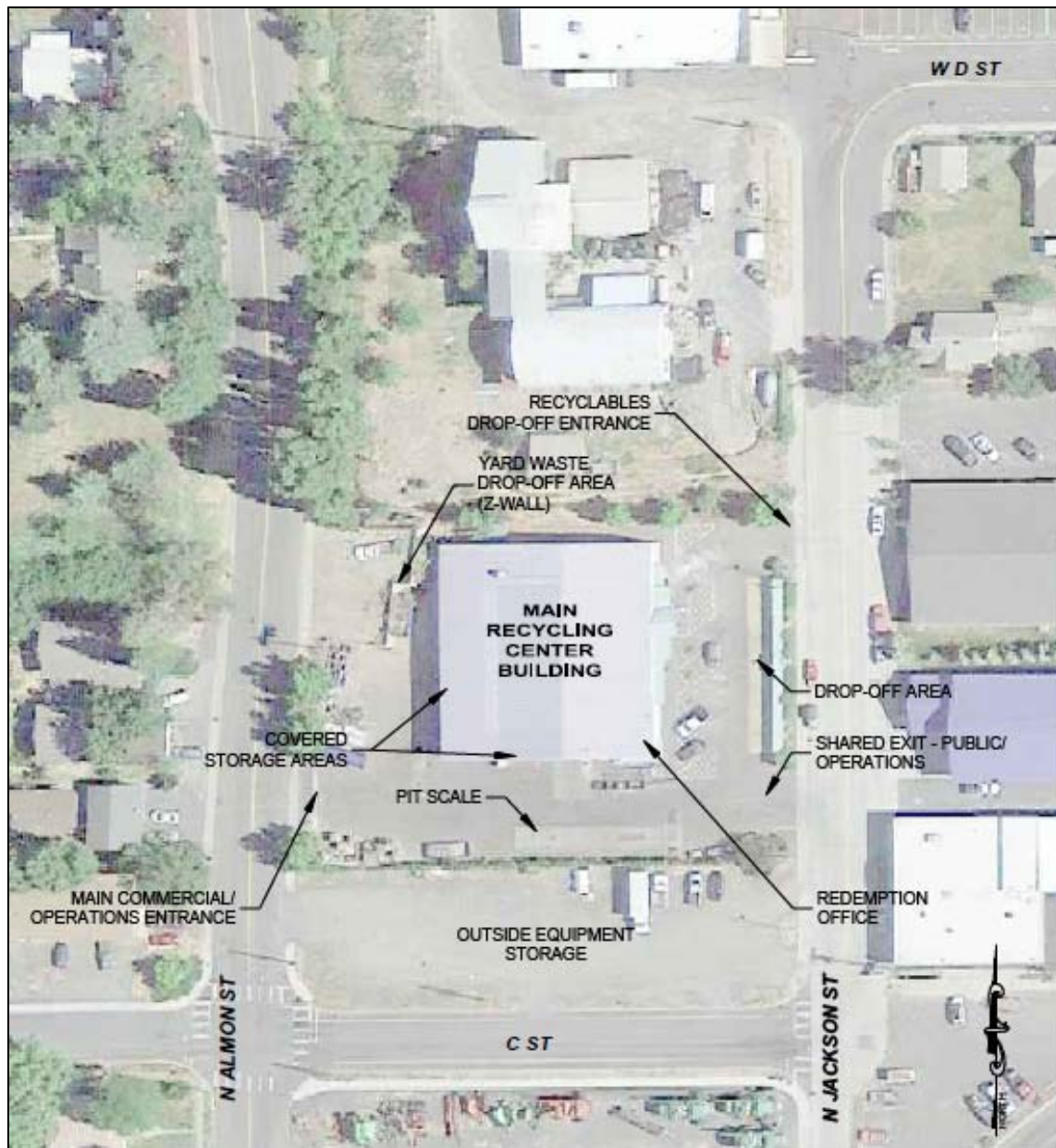


Exhibit 1. Aerial View of Recycling Center (courtesy of Google Earth)

1.2.2 Traffic Flow Patterns

Public Drop-off Areas

As shown on **Exhibit 1**, there are two public drop-off areas – one for recyclables on the east side of the facility and one for yard waste on the west side. Traffic enters the recyclables drop-off area from of N. Jackson Street and cycles counterclockwise as shown in **Exhibit 2A**. The exit is shared with commercial recyclables collection trucks, operations equipment, and large long-haul semi-trucks. Traffic backs in off of N. Almon Street to access the yard waste drop-off area also shown on **Exhibit 2A**.

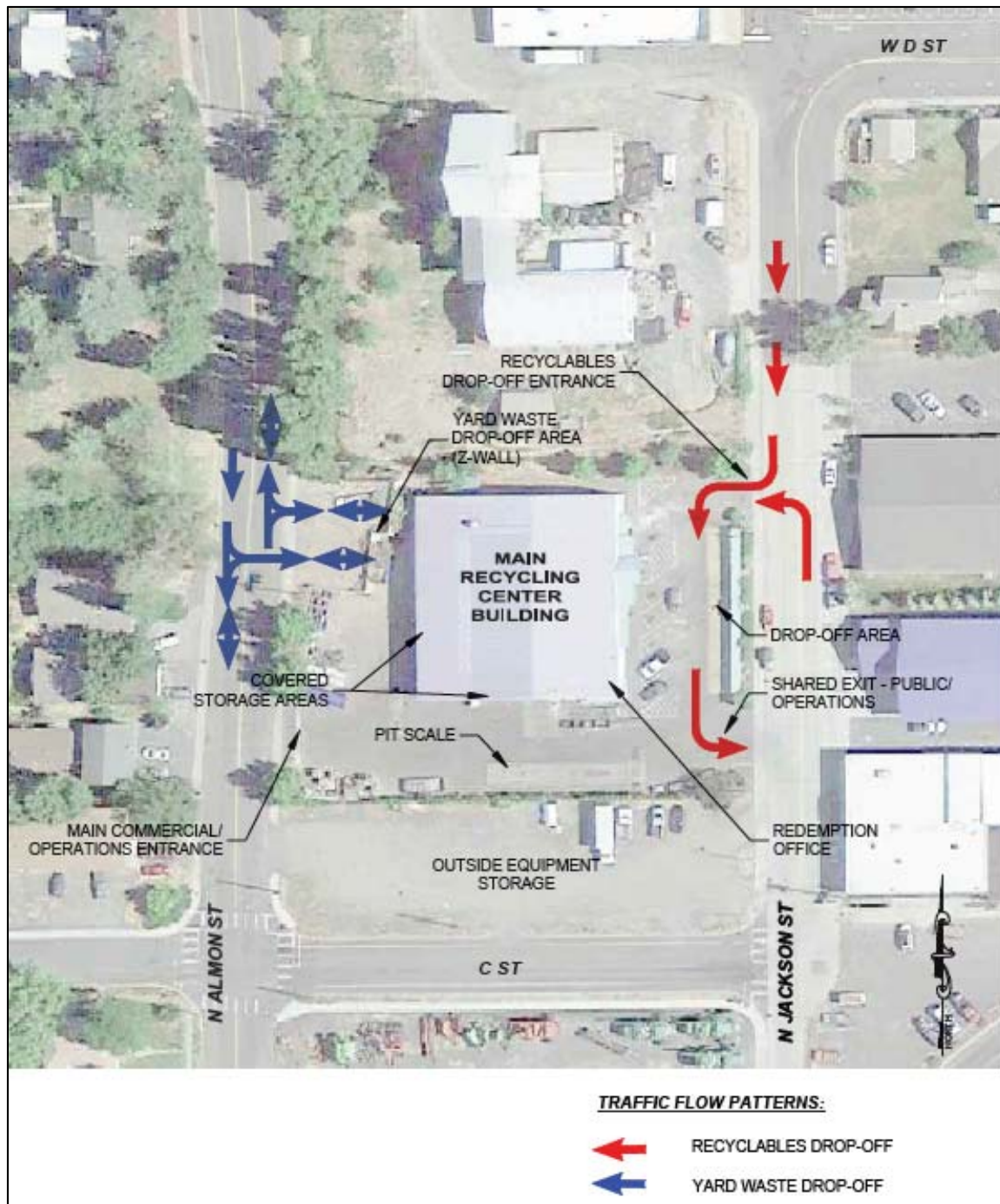


Exhibit 2A. Traffic Flow Patterns for Public Drop-Off (Recyclables and Yard Waste Areas)

Commercial Recyclables Drop-off/Yard Waste Operations

Exhibit 2B shows the traffic flow pattern for both commercial recyclables collection trucks and operation equipment for hauling yard waste roll-off containers.



Exhibit 2B. Traffic Flow Patterns for Commercial Recyclables/ Yard Waste Haul-Off Ops

Long-Haul Semi-Truck Recyclables Haul-Off

Exhibit 2C shows the traffic pattern for the long-haul semi-trucks and trailers that arrive at the site to haul-off recyclables – both baled, single-stream recyclables and source-separated commodities. The semi-truck and trailers enter the facility from of N. Almon Street through the west gate and swing south to pass over the in-ground platform scale to be weighed and tared. After scaling in, the driver pulls the truck and trailer forward (east) and then “jockeys”

the rig into place next to the building (south side of building aligned east-west) for loading. Once the trailer is loaded, the driver pulls the rig forward through the east gate and doubles-back through the west gate, passing over the scale to weigh out, and then leaves the facility.



Exhibit 2C. Traffic Flow Pattern for Long-Haul Semi-Trucks and Trailers

1.2.3 Franchise Agreement

In 2015, the City granted a franchise agreement extension with LSI for an additional 20-year term for: (1) solid waste and recyclable collection within the City; and (2) operation of the transfer station, recycling center, and associated solid waste facilities. LSI owns, operates

and is responsible for all capital assets and equipment utilized in the solid waste and recycling collection and transfer station operations, except for the Recycling Center. The Recycling Center is owned by the City of Moscow. It is anticipated that the City will continue to receive solid waste collection services under the current franchise agreement with LSI until the end of the agreement term. Additionally, the City currently contracts with Waste Connections for solid waste transport and disposal at their Finley Buttes Landfill in Boardman, Oregon. The City is currently conducting Request for Proposals (RFP) for transport and disposal services in the effort to seek the most cost effective services. It is anticipated that the RFP, respondent selection and contract execution will be completed by May 31, 2018.

1.2.4 Historical Recycling Center Capacity Issues

The City has been contemplating expansion and improvements to the Recycling Center for almost 17 years. In June 2001, the City hired Castellaw Kom Architects (CKA) to prepare concepts for adding covered storage to the east side of the main building and relocating the recyclables drop-off area to the south along with constructing a separate redemption building. The cost estimate in 2001 by CKA was \$691,000. The estimate was later updated by CH2M HILL in May 2011 to \$1,031,000 as part of a rate study for the City. At that time, the City was considering purchasing property to the north in order to make enough space for operations. The land owner did not want to sell and the improvements were never made.

In 2013, the City reported that there was insufficient expansion capacity at the Recycling Center. Recycling had grown from 2,424 tons annually in 1995 to 3,644 tons in 2013, over a 50% increase since the center was opened. Operating with the original 1993 design, it was reported that warehouse/dry storage at the Recycling Center was becoming inadequate and there were safety concerns with vehicles/equipment interfacing with people. It went on to report that these issues would continue to become problematic with continued population growth and more volume of recyclables.

The long-term goals reported by the City in 2013 were to:

- Increase the overall capacity and capability of the City's recycling program and facilities,
- Reduce the number of risk factors involving public interaction with forklift/skid steer equipment at the Recycling Center, and
- Decrease the number and length of wait times at the Recycling Center.

The City continues to be mindful of these goals in relocating and improving recycling collection at a new convenience center.

1.2.5 Population Growth Estimates

The population of the Moscow is expected to grow on average 1.15% per year while Latah County without the City is anticipated to grow 0.56% per year (per the City's Finance Department). The County including the City of Moscow is expected to grow 0.92% per year. **Exhibit 3** provides a bar chart showing the growth of Moscow relative to Latah County (without Moscow).

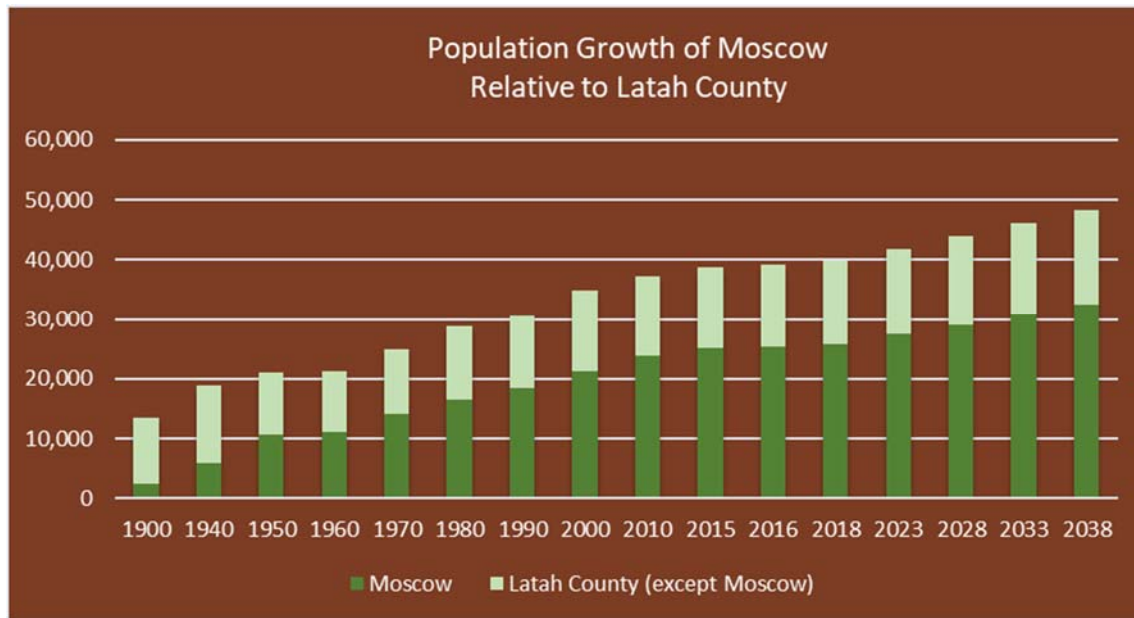


Exhibit 3. Population Growth of Moscow Relative to Latah County (Courtesy of Moscow)

1.2.6 Recyclable Tonnages

With the implementation of the single-stream recycling program in February 2016, the annual amount of recyclables collected at the curb increased by over 130%¹. The total amount that the Recycling Center is processing, however, has remained relatively steady over the last 6 years (2012 – 2017) (refer to **Exhibit 4**). Values in **Exhibit 4** include glass prior to single-stream implementation when glass is no longer accepted. The average amount of material processed at the center over this same period is approximately 3,500 tons per year². The single most tonnage of any one recyclable is corrugated cardboard, which makes up on average 1,300 tons per year (or 30% of the total tonnage). Of the 1,300 tons, about 300 tons are collected from direct drop-off at the center by residents and the remaining approximate 1,000 tons are collected from area businesses.

The direct drop off program at the Recycling Center accepts on average 49% of the total recyclables that are processed by the center, excluding the amount of cardboard that is collected from businesses. When business-collected cardboard is factored in, the amount then increases to 83%. The remaining 17% of tonnage is collected from the curbside program in Moscow.

Even with the mandatory curbside single-stream collection program in the City, people continue to choose to drop-off their pre-sorted recyclables at the center. Findings from a

¹ Previous to roll-out of the single-stream program, the City also collected glass curbside as part of the pre-sorted curbside collection program. Glass collection was not included in the single-stream collection program. Subtracting the amount of glass collected previously and comparing the two one-year periods of February-January 2015 (281 tons) and February – January 2016 (651 tons), curbside recycling increased by over 130% in accordance with the City's estimates.

² This total tonnage includes on average approximately 50 tons of "out of county" recyclables, which are collected from a bordering Nez Perce County site that LSI operates.

2016 intercept interviews at the center indicated that only 48% of the users are city residents and the remaining 52% are from Latah County and out of county users.

Based on the population estimates (and excluding the amount of cardboard collected from businesses), the City and Latah County residents together recycle approximately 0.06 tons per year per person. This per capita figure has also remained relatively steady over the same period (2012 – 2017).

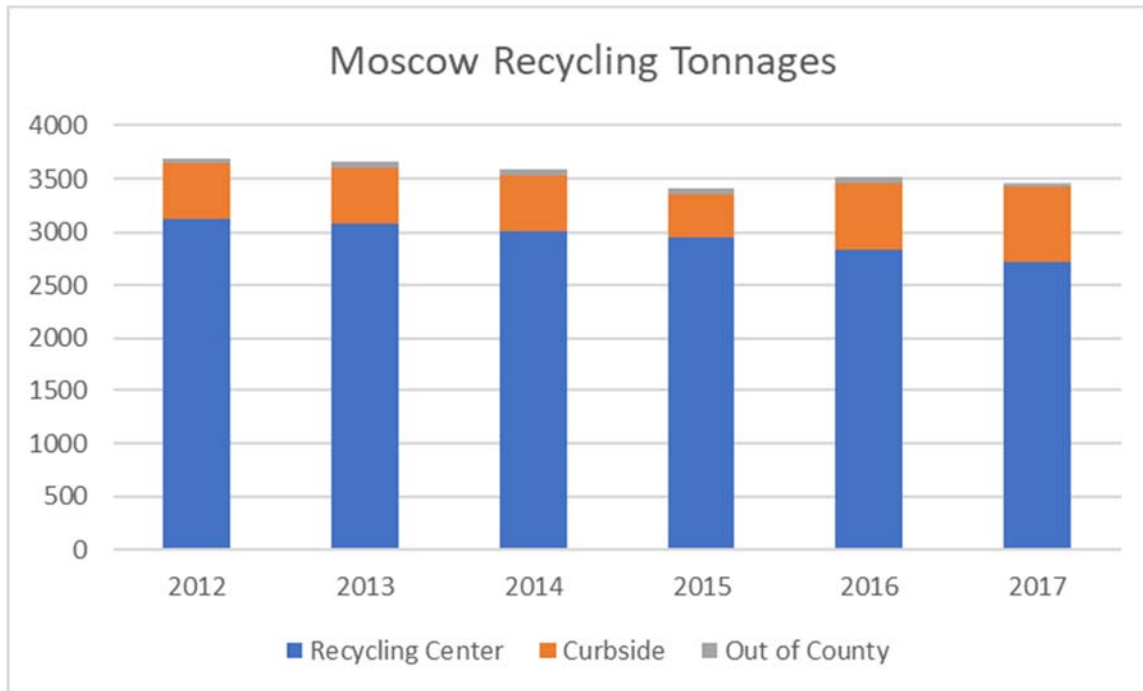


Exhibit 4. Moscow Recycling Tonnages (2012-2017)

1.3 Project Approach and Methodology

The function of the Recycling Center has changed in recent years, especially with the adoption of the single-stream curbside collection program in February 2016. This curbside collection program and the City’s need to repurpose the site for other City services is driving the reassessment of the Recycling Center’s need and purpose in the City.

On February 28, 2018, Travis Pyle, PE/Project Manager and Lead Solid Waste Engineer conducted field observations and toured the Recycling Center and the SWPF with the Sanitation System Manager, Tim Davis. Interviews were conducted with LSI staff who operate the Recycling Center to supplement observations and learn more what the staff like and do not like about the operations, infrastructure and functions of the facilities.

As part of this Project under a separate task, a material reuse and sorting facility feasibility study will be conducted to determine the viability of the City providing these types of services in-house and possibly expanding the service area to the quad-city market (Lewiston, Idaho and Clarkston and Pullman, Washington). The outcome of this assessment will directly influence the outlook for the recycling facility processing/baling function that will be located at the SWPF.

2.0 Analysis of Recycling Center

The Moscow Recycling Center consists of the following major facilities/features:

- Recyclables Drop-Off Area
- Main Building and Redemption Office
- Yard Waste Drop-Off Area
- Site Storage Areas

2.1 Recyclables Drop-off Area

2.1.1 General Description

The recyclables drop-off area is located immediately east of the main building from N. Jackson Street. Customers enter the facility through the main public entrance driveway, park at one of six parking spaces, walk across the driveway, and then unload their recyclables into pre-sorted recycling bins (refer to **Exhibit 2A**). There are ongoing safety concerns with people mixing with public vehicles and operational equipment such as forklifts in this area.

There are covered spaces for 14 bins at the recyclables drop-off area (refer to **Exhibit 5**). The 3-cubic yard (cy) bins provide collection for the following recyclables:

- Glass Bottles and Jars (all colors)
- Newspapers
- #2 Cloudy Plastics
- #1, and #3-#7 Plastics
- Tin/Steel Cans
- Aluminum Cans
- Magazines
- Mixed Paper
- Cardboard and Brown Grocery Bags

The facility also collects lead acid batteries and used motor oil at a spill containment station located on the northeast side of the building (refer to **Exhibit 6**). Scrap metals (brass, copper tubing, cast and sheet aluminum, and vehicle radiators) are also accepted. Rechargeable batteries are accepted at the Redemption Office during office hours. The center also offers a drop-off/book exchange program and shredding paper service.



Exhibit 5. View of the Recycling Drop-Off Containers Looking Southeast



Exhibit 6. View of the Used Oil/Lead Acid Battery Drop-Off Station Looking West

2.1.2 Notable Issues/Deficiencies

The recyclables drop-off area is approximately 300 square feet (sf), which is small for the traffic and customers that use the facility. With angled parking slots provided on the west side of the driveway, cars travel between the drop-off bins and the parking lot. This results in congestion and safety issues with users walking in between the parked cars and the bins and especially when cars are backing out of the parking stalls to exit the facility. Mixing people with passenger vehicles and operational equipment is an ongoing safety concern.

Additional container space should be considered to provide room for more covered bins, such as cardboard. Uncovered cardboard overflow containers are situated on the south side of the driveway between the chain link fence and N. Jackson Street, which adds to the congestion and safety concerns during busy periods. The number of parking spaces also is limiting resulting in cars stacking on N. Jackson Street or parking in front of the bins between them and the parking spaces. Unloading of full bins and replacing with empties by LSI adds to the congestion and safety issues with front access only.

2.1.3 General Recommendations for Improvement

For the new convenience recycling center, the arrangement of the bins and the parking area should be modified to allow customers to pull in front of the bins and park with cars facing toward the bins. Cars would then leave the drop-off area by backing out of the parking spaces away from the bins and exit the site in a consistent clockwise or counterclockwise pattern depending on the configuration of the new site. The space between the bins and the cars should be for pedestrians only. No cars or operational vehicles should be allowed in this space for safety.

The bins should also be arranged to allow operations to access them from the rear for removing full bins and replacing with empties. Additionally, the type of bins that will be used in the future should be assessed for efficiency especially when the center is converted to more of a convenience operation and may or may not have the capability of processing recyclables onsite. Filled containers may need to be hauled directly to the proposed, new facility for processing that will be located at the SWPF. Roll-off container style recyclable containers may be more effective for this type of operation rather than using individual 3-yd containers.

2.2 Main Building and Redemption Office

2.2.1 General Description

The main building was built in 1993 and is approximately 13,285 sf. It includes a large, unheated processing floor for sorting and baling recyclables, an outside covered storage area, office space, and a redemption (buy-back) office. **Exhibit 7** provides a view of the southeast side of the building showing the redemption office walk-up window and main south side opening to the building floor. **Exhibit 8** shows the inside of the main building.

The building was originally planned for processing/baling pre-sorted recyclables but has since been utilized to also bale single-stream recyclables collected by LSI's commercial collection trucks. The traffic flow patterns for commercial collection trucks dropping off single-stream recyclables and operations picking up roll-off yard waste containers and hauling off are shown in **Exhibit 2B**.

The added traffic and volume from the single-stream collection program is overwhelming the facility. The covered storage area is inadequate to contain and store materials in a dry environment while they wait to be sold. **Exhibit 9** shows the outside covered storage area.



Exhibit 7. View of Recycling Center and Redemption Office Looking Northwest



Exhibit 8. View of the Inside of the Main Building Looking North Through the South Door

2.2.2 Notable Issues/Deficiencies

With the change in the recycling collection program shifting to single-stream curbside collection, the facility's overall function has changed. This change requires more room to sort and bale single-stream recyclables as well as continuing to process source-separated recyclables. Traffic flow is congested with shared entrance and exits for the operations, commercial collection trucks, and the long-haul semi-trucks picking up baled material. The facility also is in need of more covered storage. The yard pit scale is also problematic (refer to Section 2.4).



Exhibit 9. View of the Covered/Dry Storage Area Looking North (West Side of Main Building)

2.2.3 General Recommendations for Improvement

Ultimately, the size and layout of a new processing building to be located at the SWPF will depend on the decision of adding a sorting system component to high-grade recyclable materials. This study is underway and will be incorporated into future decisions.

Aside from providing or not providing sorting operations at the convenience recycling center in the future, several improvements can be made to a new building by providing more floor space for baling and processing, more covered storage space, better and more streamlined access for commercial collection trucks for unloading, separate access for semi-trucks and trailers, and better scale positioning that is in-line and more efficient to use without having to double-back (or triple-back) for loading and weighing out.

The new convenience drop-off center may only have a small building associated with it for office space, a redemption center, and an area for some minor material processing and baling. The bulk of the processing will occur at the new processing/baling center to be located at the SWPF. The outlook of the new convenience recycling center will depend on public input, functionality, cost, and available property.

2.3 Yard Waste Drop-Off Area

2.3.1 General Description

The Yard Waste Drop-off Area consists of a concrete block retaining wall (z-wall) with two slots to park 30-yd roll-off containers in the lower level slots (refer to **Exhibit 10**). The upper level (unloading pad) is paved and is relatively narrow between the edge of the z-wall and N. Almon Street (refer to **Exhibit 11**). There is space on the unloading pad for two vehicles typically at one time. Users are required to back into the tipping area from N. Almon Street maneuvering into and out of traffic that is either driving by or waiting to unload yard waste themselves. The traffic flow pattern for dropping off yard waste is shown in **Exhibit 2A**. An approximate 3-ft high concrete wall extends above the unloading pad to reduce the risk of people falling into the drop boxes. There is also a railing attached to the top of the concrete wall where there is no container positioned below to discourage users from missing the containers.

Customers are instructed to throw their yard waste over the 3-ft-high wall into the containers parked below (unless the bins are full). If the bins are full, the customers are allowed to pile their yard waste on the deck until they are changed out and then LSI will clear the deck.



Exhibit 10. Yard Waste Drop-Off Area (Z-Wall) Looking North at Lower Level

The yard waste drop-off is marked for Latah County residential use only. However, it was mentioned by LSI that commercial customers have been known to illicitly dump yard waste at this site instead of hauling to the SWPF.



Exhibit 11. Yard Waste Drop-Off Area Looking Northeast from N. Almon Street

2.3.2 Notable Issues/Deficiencies

There is a short queuing distance between the unloading pad and N. Almon Street. This results in significant congestion in the roadway, especially during the weekends when multiple customers are maneuvering and backing-up to the wall to unload. This short queuing distance coupled with only two unloading spaces limits the number of users and causes safety concerns. Also, the location of the yard waste drop-off area is in the back of the facility and is open 24-hrs, 7 days a week. The lack of oversight results in illicit dumping by non-County residents as well as commercial business (such as, landscaping business).

Stormwater management is not contained or collected that comes into contact with the yard debris and the containers are not covered.

2.3.3 General Recommendations for Improvement

Several improvements can be made to the Yard Waste Drop-Off Area for the new convenience recycling center. The drop-off should be located in a more visible location on the site that allows monitoring of the users. Furthermore, the drop-off should be enclosed by a fence and only open during normal business hours to allow further control of illicit users and possible contamination. The containers lids should also be closed or the containers placed under a canopy cover to reduce the amount of contact water that is generated as best practice.

2.4 Site Storage Areas

2.4.1 General Description

Dry (covered) storage is limited at the facility. The main building has a covered storage area on the south side next to the main opening of the building (refer to **Exhibit 12**) and a west side storage bay (refer to **Exhibit 9**). The south parcel of the site is unfenced, uncovered and is used for general equipment storage.



Exhibit 12. Operations Access at West Gate Looking East

2.4.2 Notable Issues/Deficiencies

The new convenience center and processing/baling facilities will need to consider storage needs depending on the materials handled and processed at each location.

The traffic flow pattern at the Moscow Recycling Center is congested and unsafe. Walking customers are crossing paths with residential vehicle traffic and facility operations at the Recyclables Drop-off Area. Commercial collection trucks dropping off single stream recyclables on the floor of the main building intermingle with operations traffic, large haul trucks, and roll-off container trucks. The platform scale is offset (south) of the west gate entrance and requires the long-haul trucks to turn off N. Almon Street through the main west entrance and onto the scale to first weigh in, back in and out to position (“jockey”) the truck next to the building for loading, and then pull back around a final time to weigh out and leave the facility.

2.4.3 General Recommendations for Improvement

Multiple improvements can be made to the covered storage and traffic flow for the new convenience recycling center. Additional building(s) and/or covered shed structures can be provided. The traffic flow pattern for the new convenience and processing/baling facilities will need to be purposefully designed with awareness of traffic types to provide an efficient and safe operating facility. The traffic patterns will be ultimately dependent on the parcel of land for the new facilities. Being mindful of the layout with respect to traffic flow is a

fundamental in the design of these types of facilities (such as, not mixing operations and commercial traffic with public traffic).

3.0 Recycling Program Service Levels and Performance

The City is currently underway with a survey of 1,200 residents asking them about the service level and performance of the City's recycling program. The survey will be augmented with interviews of customers dropping off materials at the Recycling Center as well as input from the Focus Group and Advisory Group. The results of the survey will be tabulated and reported to the stakeholders. This information will provide the City with additional input to assist with future changes to the recycling program.

The City is providing a high-level of recycling collection service for its residents and the surrounding communities, including Latah County and out of county residents. The City has continued to offer drop-off at the Recycling Center even with the successful implementation of the single-stream curbside collection program in February 2016. Yard waste drop-off is also offered at the Recycling Center and the SWPF. Future analysis will include improving the program for curbside yard waste collection possibly on a seasonal basis.

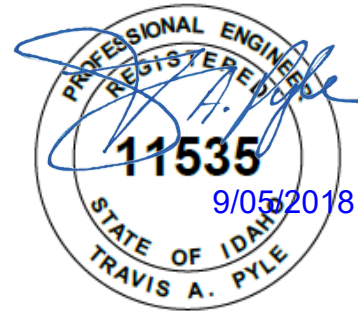
4.0 Next Steps

The next steps for evaluation and planning of the City's recycling program and facilities is to prepare a matrix table that summarizes the key components of the City's current system with recommendations for alternatives and changes to consider in accordance with Task 2.2 of the project. This summary table will be followed by preparation of Technical Memorandum #2 that will summarize the work of this memo and the summary matrix and build on the input from the stakeholders to set the plan for recycling moving forward. Technical Memorandum #2 will also include a conceptual layout of a prototypical drop-off center for the City to utilize in conducting future site suitability assessments.



City of Moscow Recycling Center Prototypical Layout

PREPARED FOR: City of Moscow
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REVIEWED BY: Michelle Langdon/Great West
DATE: September 5, 2018
PROJECT NUMBER: 4-17150
REVISION NO.: 0
APPROVED BY: Travis Pyle, PE/Great West *T.P.*



1.0 Introduction

The existing Moscow Recycling Center property is planned to be repurposed for a different City use in the near future. The City desires to move the recycling center collection services from its current location to another location in the City limits while also decoupling the processing and baling components of the center and moving those systems to a new building at the Solid Waste Processing Facility (SWPF).

The City of Moscow retained Great West Engineering to develop a prototypical layout for a new convenience center for recycling collection services. This evaluation is being conducted under Task 2 (Deliverable 2.3 – Technical Memorandum #2) of the Comprehensive Sanitation System Master Planning Services Project (“Project”), in accordance with the contract between Great West Engineering, Inc. and the City of Moscow dated February 26, 2018.

This document builds on the first two project deliverables – Technical Memorandum #1 and the Matrix Summary Table that were prepared as part of Tasks 2.1 and 2.2 of the project. Technical Memorandum #1 summarizes the current recycling center’s physical and operational characteristics, identified issues and deficiencies, and provided recommendations for improvements. The Matrix Summary Table further dissected the issues and deficiencies of the center and included additional recommendations.

1.1 Purpose/Objectives

The purpose of this task is to prepare a prototypical concept layout for the new convenience recycling center while addressing known issues and deficiencies at the existing center and improving on the level of service and safety.

1.2 Background

The City of Moscow provides curbside collection of recyclables and offers recycling drop-off services at the Moscow Recycling Center. The City started curbside recycling in 1999, when they began collecting pre-sorted materials. This continued until February 2016 when the City implemented a single-stream (“no sort”) collection program curbside with pick up every other week through its franchise agreement with Latah Sanitation Inc. (LSI).

The existing Moscow Recycling Center is located at 401 N. Jackson Street in the City of Moscow. The facility is operated by Moscow Recycling, which is a public/private partnership between the City of Moscow and LSI. The facility offers recycling services for both commercial and residential customers with over 30 commodities currently being accepted. The center sits on a parcel of land with an area of approximately 72,900 square feet (1.67 acres) and is situated between N. Almon Street to the west, N. Jackson Street to the east, private property to the north, and C Street to the south.

The facility is open 24 hours a day, 7 days a week for drop-off of recyclables and yard waste. The buyback office (redemption office) and main office hours are Tuesday through Saturday, 9:30 am to 5:30 pm. The facility offers large volume drop-off Tuesday through Saturday from 10:00 am to 4:00 pm. Much of the property is enclosed by perimeter chain link fencing. There is a grade-break with a z-wall (retaining wall) between the yard waste drop-off area on the west side of the property along N. Almon Street and the main building.

1.2.1 Historical Recycling Center Capacity Issues

The City has been contemplating expansion and improvements to the Moscow Recycling Center for almost 17 years. In June 2001, the City hired Castellaw Kom Architects (CKA) to prepare concepts for adding covered storage to the east side of the main building and relocating the recyclables drop-off area to the south along with constructing a separate redemption building. The cost estimate in 2001 by CKA was \$691,000. The estimate was later updated by CH2M HILL in May 2011 to \$1,031,000 as part of a rate study for the City. At that time, the City was considering purchasing property to the north of the site in order to increase space for operations. The land owner did not want to sell, and the improvements were never made.

In 2013, the City reported that there was insufficient expansion capacity at the Moscow Recycling Center. Recycling had grown from 2,424 tons annually in 1995 to 3,644 tons in 2013, over a 50% increase since the center was opened. Operating within the original 1993 site layout has created issues including; inadequate warehouse/dry storage and safety issues with vehicles/equipment interfacing with people. These issues will continue to become problematic with continued population growth and increased volume of recyclables.

The long-term goals reported by the City in 2013 were to:

- Increase the overall capacity and capability of the City’s recycling program and facilities,
- Reduce the number of risk factors involving public interaction with forklift/skid steer equipment at the Recycling Center, and
- Decrease the number and length of wait times at the Recycling Center.

The City continues to be mindful of these goals in relocating and improving recycling collection at a new convenience drop-off center.

2.0 Approach and Methodology

The overall project approach is to decouple the processing and baling components of the recycling center's function but still provide a convenient drop-off location for recyclables and yard waste for the public within the City limits. The new convenience drop-off center will require development of a new piece of property in town to continue to provide these services.

The prototypical layout concept for this recycling center is based on two sets of information: (1) findings and recommendations from the first phase of the project that identified issues/deficiencies at the existing station along with suggested improvements; and (2) community outreach that was administered by the City as summarized in Technical Memorandum #3 – *City of Moscow Sanitation Services Program Review*. The Solid Waste Advisory Group also provided key input and helped to prioritize the services and amenities for the new convenience center.

2.1 Notable Issues/Deficiencies and Recommendations

As part of the first phase of the project, issues and deficiencies were identified and suggestions were made to enhance the safety and service level of the center. A site tour and interviews with the Sanitation Supervisor, Tim Davis, and LSI's facility operations staff were conducted as part of the information gathering step of the project. Key areas for improvements that were noted included:

- **Public Drop-off Area for Recyclables:** This area of the facility is congested at times and co-mingling of mixed traffic types cause long waiting times and safety concerns. The overcrowding can be alleviated by providing longer vehicle queuing space off a main road and adding parking spaces for unloading. Safety issues are caused by having a drive-through lane between the building and public unloading parking spaces on one side and the containers on the other. Commercial trucks and load-out long-haul trucks add to the congestion by sharing the same exit as the public drop-off area. This arrangement causes a mixture of pedestrian, public and operational traffic. Placing the containers on the same side as public parking and servicing the containers from the behind would improve efficiency and reduce safety issues for the new facility.
- **Processing Building/Site Storage:** Moving the baling and any material sorting operations to a new building at the SWPF will eliminate the majority of the issues that are currently being caused at the Moscow Recycling Center related to the building and lack of site storage. The City is also working with LSI to provide recyclables drop-off at the new SWPF which will create an additional collection point, reducing some of the traffic at the City's convenience center. The redemption station is located in the main building next to the public parking spaces. Public traffic utilizing the redemption area added to the congestion of the operations area. Locating the redemption station away from the main unloading and operational area will improve safety.

- **Yard Waste Drop-Off:** There are multiple issues with the existing yard waste drop-off area including a lack of unloading spaces, lack of queuing space and stacking of vehicles on the road, and inadequate container spaces at the z-wall. These issues can all be alleviated by providing more room for drop-off and more spaces for containers at the new convenience center. The City would also like to provide a place at the recycling center to pick-up finished compost that is processed at the SWPF, as requested by the public in the surveys (refer to Section 3.0).
- **General Traffic Flow/Site Layout:** Many of the general traffic flow issues at the existing recycling center are created by multiple operations occurring at the site. Separating the processing/baling operations from the public drop-off at the new convenience center will improve much of the current site issues that are causing inefficiencies and safety concerns. Operations concerns related to scaling and load-out operations of the baled goods will be addressed at the new SWPF building.

3.0 Prototypical Layout Features and Priorities

Based on industry best design/layout practices for these types of intermediate handling facilities, the observed issues/deficiencies that currently exist at the Moscow Recycling Center (as noted in Section 2.1), feedback from the community outreach surveys (as summarized in Technical Memorandum #3 – *City of Moscow Sanitation Program Review*, and input from the Advisory Group (also summarized in Technical Memorandum #3), the following facility features and priorities were established and set the basis for the prototypical layout concept of the new convenience drop-off site:

- **Site Location:** Although the prototypical layout is not designed for any particular property or location, the community desires to keep the recycling center within the City limits. Improved accessibility in and out of the site is a high priority. The Sanitation Division is currently researching potential properties within the City that will satisfy the minimum acreage needed with good accessibility for the public.
- **General Services:** Site services will include drop-off stations for pre-sorted and comingled recyclables, glass, yard waste, e-waste and batteries as well as an area to pick-up finished compost material and a redemption center. The facility will continue to be staffed during normal business hours and will likely remain necessary to be open 24-hours a day, 7-days per week, as requested by the public in the surveys.
- **General Layout:** The site will feature a grade-separation with public traffic and material drop-off located at the main site grade. The lower grade will be created with retaining walls and will be located around the perimeter of the main site. Operations and drop off boxes will be located at this lower grade keeping public and operations completely separate.
- **Entrance Area/Facilities:** An Office Building will be provided near the entrance of the new facility for office space, a breakroom and restrooms. Storage for collected materials will be located in a storage area attached to the office building. Entrance

into the facility will be off a main surface street and will be one-way into and out of the facility at the main site level. The facility will be enclosed by a perimeter chain link fence with gates at the public and operations entrances and exits.

- **Traffic Flow and Support Facilities:** Traffic will be designed to flow in a one-way, counter-clockwise pattern around the site with right-hand-side pull-outs and parking at the various drop-off stations. This circular pattern will minimize interaction of pedestrians with vehicles and equipment. Only the general public will be permitted to use this facility. All commercial vehicles will be routed directly to the new, proposed recycling building at the SWPF. Operations will use a separate access for the lower yard area where the majority of the operations will take place.
- **Recyclables Drop-Off:** The drop-off area for recyclables will be positioned in such a way that the public accesses it from the front at the main site grade and operations services it from the back at a lower grade. Forty-cubic yard (cy) rectangular, open-top (roll-off) containers will be placed on the lower grade adjacent to a z-wall pattern retaining wall. The containers will be located under shed covers. Containers will be available for corrugated cardboard, mixed paper, aluminum, and co-mingled materials (“no sort”). Thirty-cy roll-off container(s) will also be provided in the public access area for glass.
- **Yard Waste Drop-Off:** Similar to the recycling drop-off area, 40-cy roll-off containers will be positioned in a z-wall configuration separate of the recycling area and with increased room for vehicle maneuverability. There will be room for multiple vehicles to back-in to spaces in front of the containers and unload at the same time without restricting pass-through traffic.

The first prototypical layout concept incorporates the full list of desired site features and priorities (**Figure 1** – attached), and includes: a combined office and redemption building with e-waste collection and covered storage near the front entrance to the facility; a circular, counter-clockwise traffic pattern with right-hand-side pull-outs; two recyclables drop-off stations to park and unload with covered z-walls, each housing four 40-cy roll-off containers (total of 8 containers); two at-grade drop-off locations for glass using 30-cy roll-off containers; one large yard waste drop-off station with five 40-cy roll-off containers and a large maneuvering area for trucks and trailers to back-in and out; a bunker for pick-up of finished compost material with a separate access; and adequate space for extra container storage and operations maneuverability in the lower yard area along with a separate set of accesses for large trucks and equipment. This site layout is 400 ft by 330 ft, or approximately 3 acres.

The second layout concept assumes a smaller property is available and incorporates the highest priority facility needs and features (**Figure 2** – attached). Similar to the first layout, this concept also features the same office and support facilities at the entrance, and counter-clockwise traffic flow pattern with right-hand-side pull-outs. A single recyclables drop-off station is provided in this concept along with one glass container, and a smaller yard waste drop-off station, with four containers instead of five. Also similar to the first concept, operations would access the lower yard to keep the traffic separate from the public users. The size for this option stays at the same width of 400 ft but decreases the length to

280 feet, reducing the overall site area needed by approximately 0.5 acre to 2.5 acres in total.

A three-dimensional isometric view of the preferred, larger layout is provided (**Figure 3** – attached).

4.0 Engineer's Opinion of Costs

Order-of-magnitude cost estimates are provided for the two prototypical layout concepts. The estimates include cost allowances and costs per square foot for certain items. The estimates do not include the cost to buy or permit the property, if it needs to go through rezoning or conditional use permit process(es). It is assumed utilities are available at the property limits to service the site and only onsite improvements will be required. Fire protection is assumed to be in the form of street hydrants. The property is also assumed to be relatively flat with suitable soils to use for cut/fill construction along with importing fill to create the topographic relief between the main service grade level and the lower operations yard.

The estimates assume the project will be complete on a competitive bid basis. Contractors will have a reasonable amount of time to complete the work given a reasonable project schedule with no liquidated damages and the project will be constructed under a single contract. The actual cost of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, schedule, final design, and other factors. As a result, the actual cost of the project will vary. Because of these factors, funding needs must be carefully reviewed by the City prior to making specific financial decisions or establishing final budgets. The cost estimates are in 2018 dollars (2018\$). Refer to **Attachment 1** for a breakdown of costs.

The following cost summary is for the 3-acre site concept:

	Low Range -30%	ESTIMATE RANGE Base	High Range +50%
Base Construction Estimate	\$1,936,000	*\$2,766,000	\$4,149,000

**Includes 25% contingency.*

The following cost summary is for the 2.5-acre site concept:

	Low Range -30%	ESTIMATE RANGE Base	High Range +50%
Base Construction Estimate	\$1,464,000	*\$2,091,000	\$3,137,000

**Includes 25% contingency.*

FIGURES

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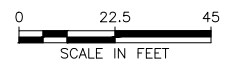
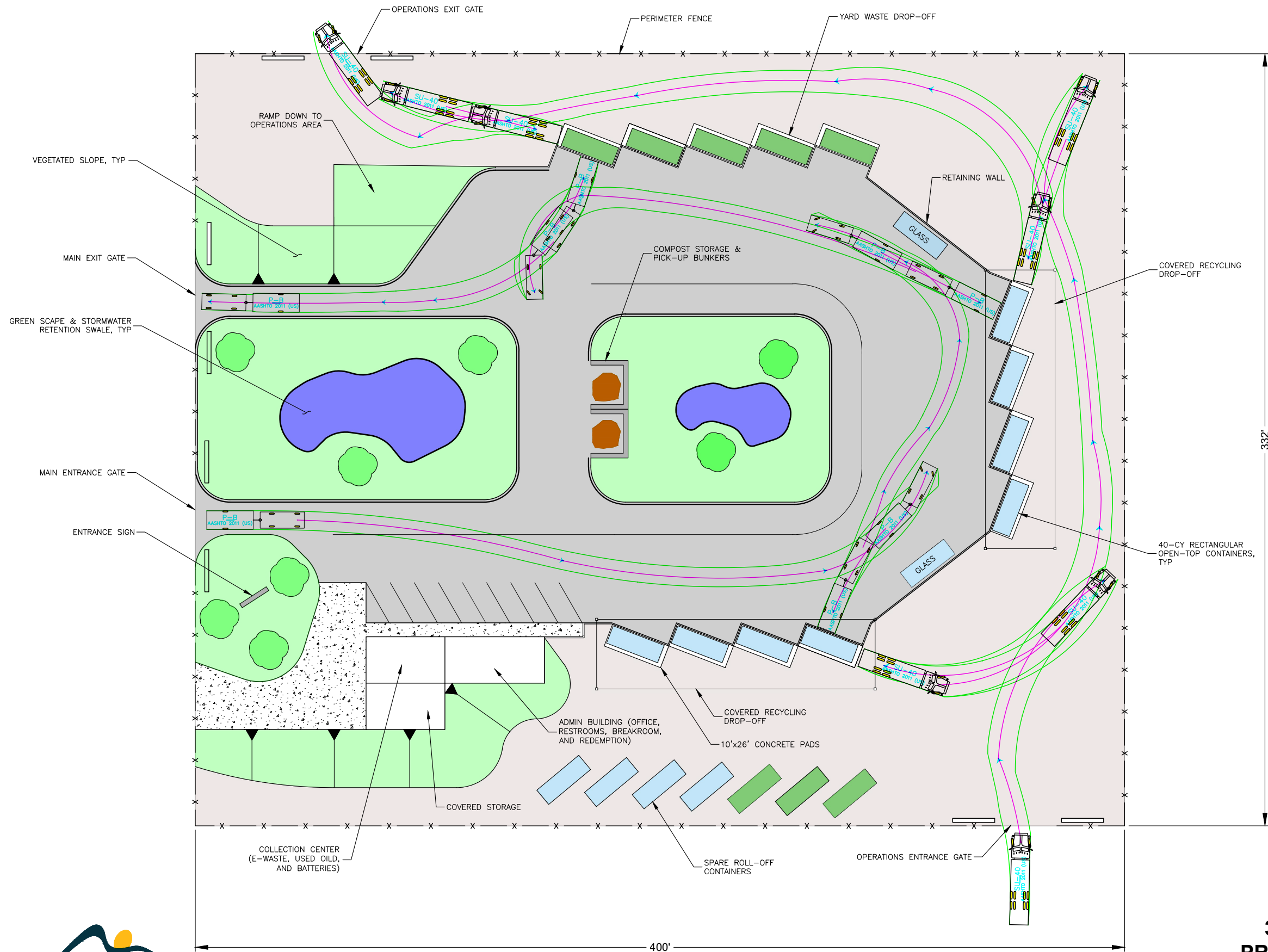
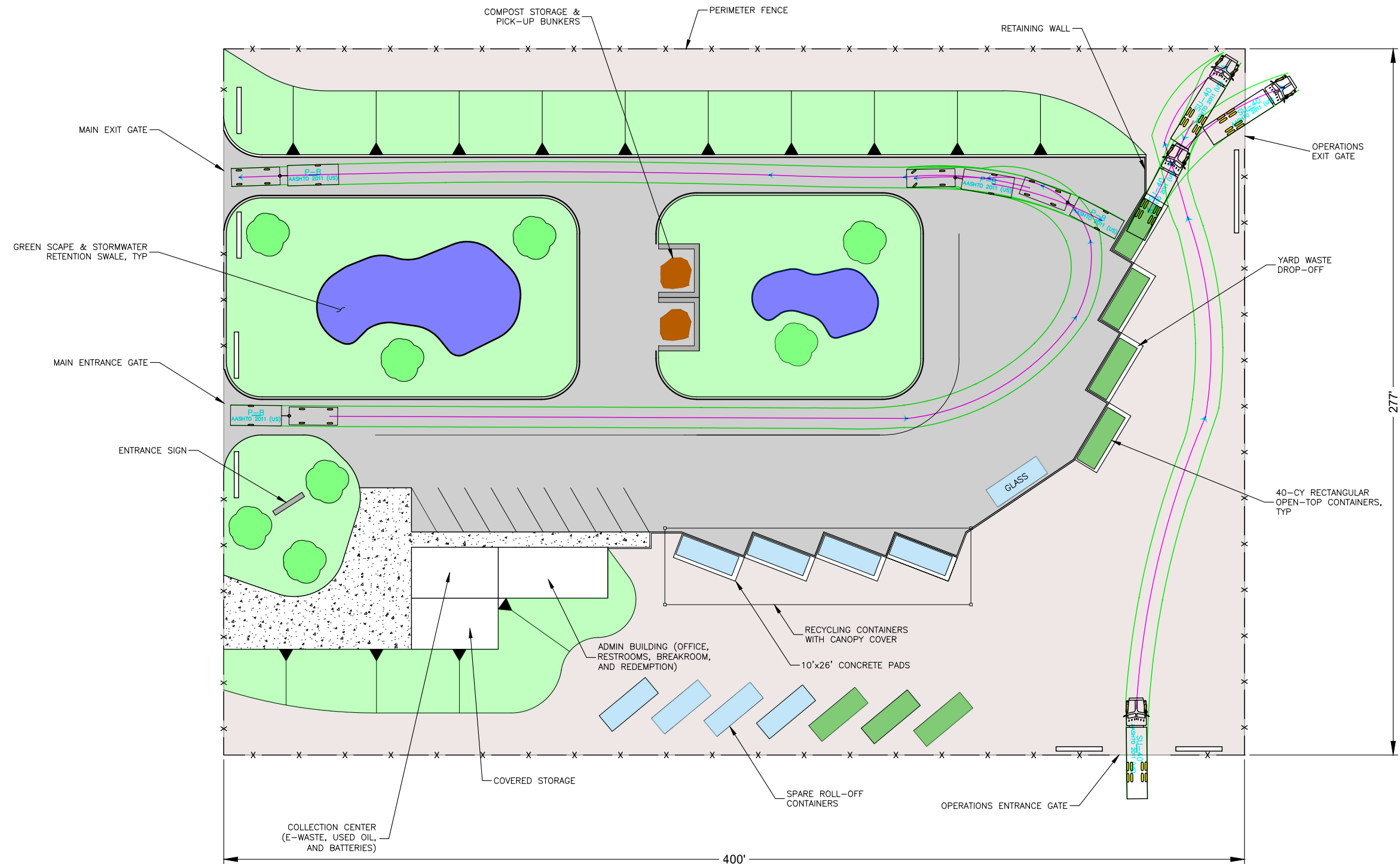


FIGURE 1
3.0 ACRE RECYCLING CENTER
PROTOTYPICAL LAYOUT CONCEPT

CITY OF MOSCOW
COMPREHENSIVE SANITATION SYSTEM MASTER PLAN



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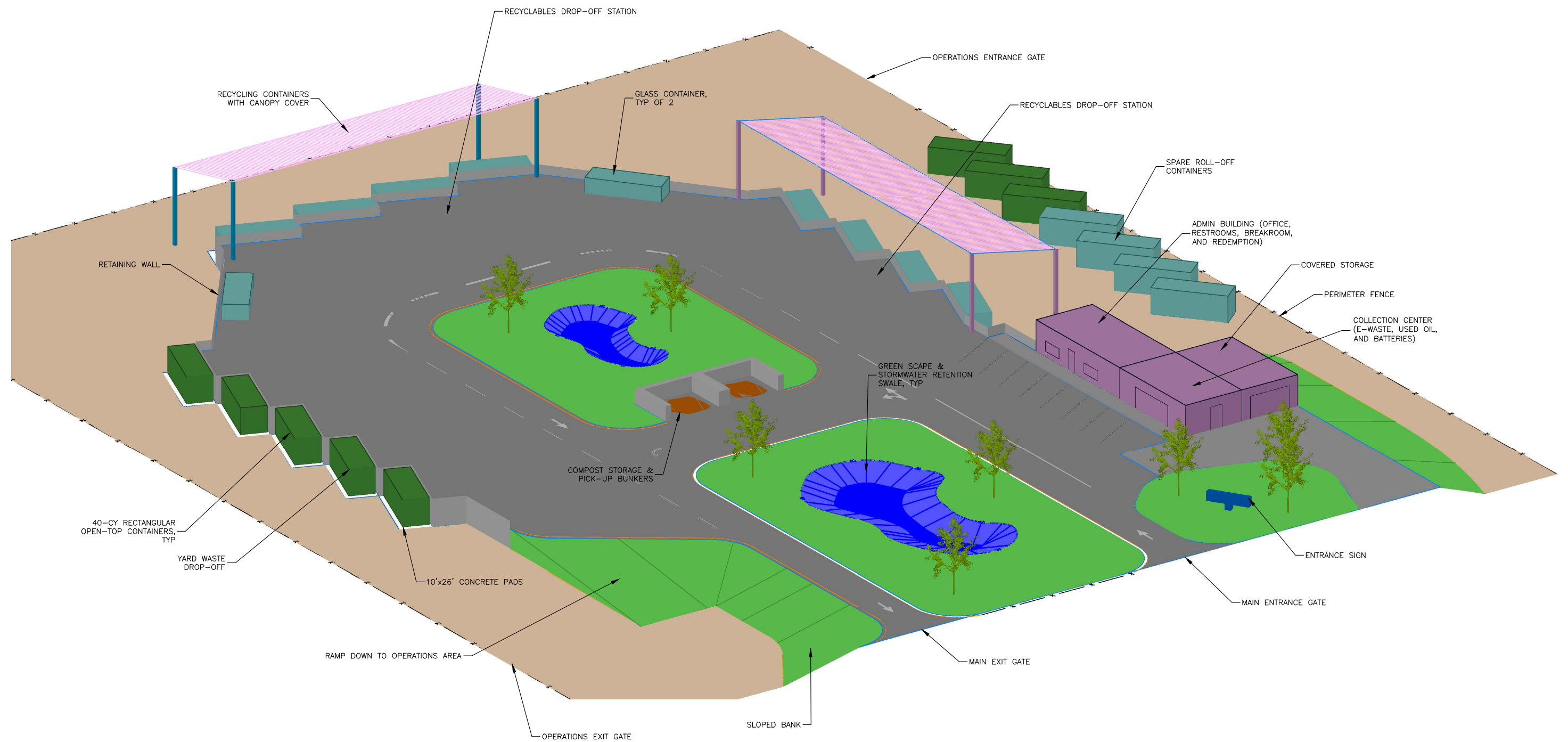
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SCALE IN FEET

**FIGURE 2 (SMALLER SITE)
2.5 ACRE RECYCLING CENTER
PROTOTYPICAL LAYOUT CONCEPT**

CITY OF MOSCOW
COMPREHENSIVE SANITATION SYSTEM MASTER PLAN



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**FIGURE 3 (ISOMETRIC)
NEW RECYCLING CENTER
PROTOTYPICAL LAYOUT CONCEPT**

CITY OF MOSCOW
COMPREHENSIVE SANITATION SYSTEM MASTER PLAN

ATTACHMENT 1

City of Moscow - Engineer's Opinion of Cost

Prototypical Recycling Center Concept (3-Acre Site)

Prepared For: City of Moscow

Prepared By: Duncan Breedlove, EIT

Reviewed by: Travis Pyle, PE & Michelle Langdon, PE

Date: August 30, 2018

Project No. 4-17110

Revision No. 0

Approved By: Travis Pyle, PE *T.P.*



Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Unit Price
Site Civil					
1	Site Clearing and Preparation	3	AC	\$ 2,500	\$ 7,500
2	Site General Cut	6,400	CY	\$ 2.00	\$ 8,600
3	General Site Fill	4,300	CY	\$ 3.00	\$ 18,900
4	Import General Fill	6,300	CY	\$ 15.00	\$ 94,500
5	Import Structural Fill	6,300	CY	\$ 28.00	\$ 176,400
6	Gravel Roads/Yard Surfacing (Lower Yard)	1,420	CY	\$ 25.00	\$ 35,490
7	Pavement Surfacing	4,525	SY	\$ 45.00	\$ 203,625
8	Site Yard Concrete Surfacing/Sidewalks	3,300	SF	\$ 15.00	\$ 49,500
9	Site Finish Grading/Drainage/Swales	3,500	SY	\$ 7.00	\$ 24,500
10	Hydroseeding	0.72	AC	\$ 5,500	\$ 3,977
11	Perimeter Fence/Gates	1,464	LF	\$ 40	\$ 58,560
12	Site Utilities (Water/Sewer/Stormwater)	1	LS	\$ 35,000	\$ 35,000
Structural/Architectural					
13	Steel Building (Office/Restrooms/Break Room)	840	SF	\$ 100.00	\$ 84,000
14	Steel Building - E-Waste and Storage Areas	1,360	SF	\$ 75.00	\$ 102,000
15	Z-Walls (Full Height) - Assume 1 cy/LF	440	CY	\$ 800.00	\$ 352,000
16	Low Retaining Walls - Assume 0.6 cy/LF	140	CY	\$ 800.00	\$ 112,000
17	Guard Rail	225	LF	\$ 50.00	\$ 11,250
18	Container Concrete Pads	3,380	SF	\$ 15.00	\$ 50,700
19	Recyclable Container Covers	7,200	SF	\$ 35.00	\$ 252,000
20	Miscellaneous Bollards/Bunker Walls/Etc.	1	LS	\$ 12,000	\$ 12,000
Site Yard Electrical					
21	Site Lighting/Yard Service	1	LS	\$ 25,000	\$ 25,000
General Conditions					
22	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout (7%)	1	LS	\$ 120,225	\$ 120,225.17
23	Construction Facilities, Temporary Controls, Survey, and Safety (5%)	1	LS	\$ 85,875	\$ 85,875
CONSTRUCTION SUBTOTAL					\$1,923,603
CONTINGENCY ⁽²⁾ 25%					\$480,901
CONSTRUCTION TOTAL (Rounded)					\$2,405,000
A/E DESIGN 8%					\$192,400
A/E CM SUPPORT SERVICES (Limited CM) 4%					\$96,200
TAXES 6.00%					\$72,150
TOTAL (Base Cost)					\$2,766,000
Low Range (-30%)					\$1,936,000
High Range (+50%)					\$4,149,000

Notes:

(1) This is cost estimate based on concept-level design. This estimate assumes a 1-15% level of design and is considered a Class 4 estimate in accordance with AACE International's classification system (Study of Feasibility) with a typical range of accuracy between -30% to +50%.

(2) Contingency is for scope changes that are presently unforeseen.

City of Moscow - Engineer's Opinion of Cost
Prototypical Recycling Center Concept (2.5-Acre Site)

Prepared For: City of Moscow

Prepared By: Duncan Breedlove, EIT

Reviewed by: Travis Pyle, PE & Michelle Langdon, PE

Date: August 30, 2018

Project No. 4-17110

Revision No. 0

Approved By: Travis Pyle, PE

T.P.



Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Unit Price
Site Civil					
1	Site Clearing and Preparation	2.5	AC	\$ 2,500	\$ 6,250
2	Site General Cut	4,500	CY	\$ 2.00	\$ 6,000
3	General Site Fill	3,000	CY	\$ 3.00	\$ 19,200
4	Import General Fill	6,400	CY	\$ 15.00	\$ 96,000
5	Import Structural Fill	6,400	CY	\$ 28.00	\$ 179,200
6	Gravel Roads/Yard Surfacing (Lower Yard)	996	CY	\$ 25.00	\$ 24,888
7	Pavement Surfacing	3,400	SY	\$ 45.00	\$ 153,000
8	Site Yard Concrete Surfacing/Sidewalks	3,300	SF	\$ 15.00	\$ 49,500
9	Site Finish Grading/Drainage/Swales	4,100	SY	\$ 7.00	\$ 28,700
10	Hydroseeding	0.85	AC	\$ 5,500	\$ 4,659
11	Perimeter Fence/Gates	1,354	LF	\$ 40	\$ 54,160
12	Site Utilities (Water/Sewer/Stormwater)	1	LS	\$ 28,000	\$ 28,000
Structural/Architectural					
13	Steel Building (Office/Restrooms/Break Room)	840	SF	\$ 100.00	\$ 84,000
14	Steel Building - E-Waste and Storage Areas	1,360	SF	\$ 75.00	\$ 102,000
15	Z-Walls (Full Height) - Assume 1 cy/LF	270	CY	\$ 800.00	\$ 216,000
16	Low Retaining Walls - Assume 0.6 cy/LF	70	CY	\$ 800.00	\$ 56,000
17	Guard Rail	110	LF	\$ 50.00	\$ 5,500
18	Container Concrete Pads	2,080	SF	\$ 15.00	\$ 31,200
19	Recyclable Container Covers	3,600	SF	\$ 35.00	\$ 126,000
20	Miscellaneous Bollards/Bunker Walls/Etc.	1	LS	\$ 8,000	\$ 8,000
Site Yard Electrical					
21	Site Lighting/Yard Service	1	LS	\$ 20,000	\$ 20,000
General Conditions					
22	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout (7%)	1	LS	\$ 90,878	\$ 90,877.97
23	Construction Facilities, Temporary Controls, Survey, and Safety (5%)	1	LS	\$ 64,913	\$ 64,913
CONSTRUCTION SUBTOTAL					\$1,454,048
CONTINGENCY ⁽²⁾ 25%					\$363,512
CONSTRUCTION TOTAL (Rounded)					\$1,818,000
A/E DESIGN 8%					\$145,440
A/E CM SUPPORT SERVICES (Limited CM) 4%					\$72,720
TAXES 6.00%					\$54,540
TOTAL (Base Cost)					\$2,091,000
Low Range (-30%)					\$1,464,000
High Range (+50%)					\$3,137,000

Notes:

(1) This is cost estimate based on concept-level design. This estimate assumes a 1-15% level of design and is considered a Class 4 estimate in accordance with AACE International's classification system (Study of Feasibility) with a typical range of accuracy between -30% to +50%.

(2) Contingency is for scope changes that are presently unforeseen.



City of Moscow

Local Material Recovery Facility Feasibility Assessment

PREPARED FOR: City of Moscow

PREPARED BY: Travis Pyle, PE/Great West

CONTRIBUTING AUTHORS: Chris Bell/Bell & Associates
Bob Wallace, MBA/WIH Resource Group

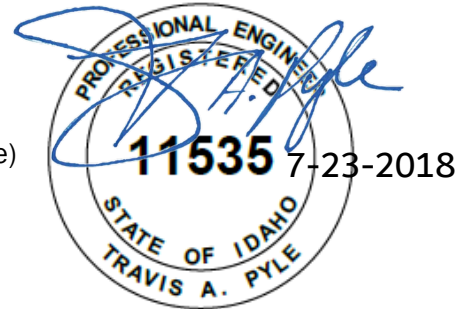
REVIEWED BY: Bob Church, PE/Great West (Principal In-Charge)

DATE: July 30, 2018

PROJECT NUMBER: 4-17150

REVISION NO.: 0

APPROVED BY: Travis Pyle, PE/Great West



1.0 Introduction

The City of Moscow retained Great West Engineering to evaluate the feasibility of the City investing in a local Material Recovery Facility (MRF). A MRF is a production plant that sorts, separates, bales, sells, and transports to market recyclable materials. Its primary function is to segregate recoverable materials for use as input materials for manufacturing and/or processing. For a MRF to be successful, an adequate and clean stream of recyclable materials must be available to process. Recycling markets must be reliable and established. The facility needs to operate near its maximum capacity, and markets for the processed materials need to be available.

This evaluation is being conducted under Task 3 (Deliverable 3.1 – Technical Memorandum #3) of the Comprehensive Sanitation System Master Planning Services Project (“Project”), in accordance with the contract between Great West Engineering, Inc. and the City of Moscow dated February 26, 2018.

1.1 Purpose/Objectives

The purpose of this task is to prepare a feasibility study in order to evaluate the viability of the City investing and/or hosting a local MRF. The MRF would be used to process single-stream recyclables from the quad-city area, which includes:

- Moscow/Latah County, Idaho
- Lewiston/Nez Perce County, Idaho
- Clarkston/Asotin County, Washington

- Pullman/Whitman County (and Washington State University), Washington

1.2 Background

1.2.1 Quad-City Recyclable Materials Collection Programs

The quad-city area recyclable materials collection programs include:

- **City of Moscow/Latah County** – The City began curbside collection of recyclables in 1999, with pick-up of source-separated materials. This program continued until February 2016 when the City adopted single-stream recycling collection every-other-week through its franchise agreement with Latah Sanitation, Inc (LSI). Comingled recyclables are also collected at drop box sites in the County. Source-separated materials are collected at the Moscow Recycling Center. The Center is also the site for baling, storing, and loading out materials for sale and transfer.
- **Lewiston/Nez Perce, Idaho** – The City of Lewiston collects recyclables at the City's solid waste transfer station and provides curbside collection for single stream recyclables. There are also two unmanned, satellite recycling drop box sites in Nez Perce County – one located in Sweetwater on US 95 and one at the junction of US 12 and Cottonwood Creek.
- **Clarkston/Asotin County, Washington** – Asotin County has a drop box site for recyclables at the front gate of the Asotin County Regional Landfill (ACRL). There are also three unmanned, satellite recycling drop box sites in the County – one at the First Presbyterian Church Parking Lot at 11th and Diagonal Street; one at the Dollar Store at the corner of 3rd Street and Fair Street; and one at Arnold Park. All of the materials that are collected are source separated. The types of recyclables that are collected depend on the current market prices.
- **Pullman/Whitman County, Washington (and WSU)** – Recyclables are collected curbside from the City of Pullman and on the WSU campus. The university manages and handles their recyclables separate from the City and Whitman County. The County offers recycling collection at the Carothers Road Solid Waste Facility (CRSWF), as well as rural drop box sites around the County.

1.2.2 Quad-City Recycling Tonnages

Table 1 presents the estimated tonnages of recyclables for Moscow and its quad-city neighbors. The 2017 figures are based on available data provided by Moscow and the other cities and counties in the quad-city area. Projected amounts are based on population growth rates provided by Moscow and published by state-available census data and the United States Census Bureau. The estimated amounts do not account for changes in the diversion rate, market trends or other variable factors.

Table 1 – Estimated Recycling Tonnages for 10 Years (Quad-City Area)

Program/Population	Recycling Tonnages									
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Moscow/Latah Co.	3,433	3,464	3,496	3,528	3,561	3,594	3,627	3,660	3,694	3,728
<i>Population (0.92%)⁽¹⁾</i>	39,440	39,803	40,169	40,539	40,913	41,290	41,670	42,054	42,441	42,832
Pullman/Whitman Co.	3,487	3,504	3,520	3,537	3,553	3,570	3,587	3,604	3,620	3,637
<i>Population (0.47%)⁽¹⁾</i>	47,250	47,472	47,695	47,919	48,145	48,371	48,598	48,827	49,056	49,287
Washington State U.	1,427	1,434	1,440	1,447	1,454	1,461	1,468	1,475	1,482	1,489
<i>Population⁽²⁾</i>	20,286	20,381	20,477	20,573	20,670	20,767	20,865	20,963	21,061	21,160
Lewiston/Nez Perce Co.	1,732	1,741	1,749	1,757	1,766	1,774	1,783	1,791	1,800	1,809
<i>Population (0.48%)⁽¹⁾</i>	33,030	33,188	33,348	33,508	33,669	33,830	33,993	34,156	34,320	34,484
Clarkston/Asotin Co.	518	521	524	527	530	534	537	540	543	547
<i>Population (0.60%)⁽¹⁾</i>	22,535	22,670	22,806	22,943	23,081	23,219	23,359	23,499	23,640	23,782
Total Recyclables (tons)	10,597	10,663	10,730	10,797	10,864	10,932	11,001	11,070	11,139	11,209
Total Population Base	162,540	163,515	164,496	165,483	166,477	167,477	168,484	169,497	170,518	171,545

Notes:

1. Annual growth rates provided by state statistical websites and the US Census Bureau.

2. Student body (and faculty) population for WSU was assumed to grow at the same rate as Pullman/Whitman Co. (0.47%).

Table 2 presents the estimated tonnages from single-stream recycling programs in the quad-city area for 2017 and the next 10 years.

Table 2 – Estimated Tonnages for Single-Stream Recyclables – 10-year Projection (Quad-City Area)

Program/Population	Single-Stream Recycling Tonnages									
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Moscow/Latah Co.	740	747	754	761	768	775	782	789	796	804
<i>Population (0.92%)⁽¹⁾</i>	39,440	39,803	40,169	40,539	40,913	41,290	41,670	42,054	42,441	42,832
Pullman/Whitman Co.	1,798	1,806	1,815	1,823	1,832	1,841	1,849	1,858	1,867	1,876
<i>Population (0.47%)⁽¹⁾</i>	47,250	47,472	47,695	47,919	48,145	48,371	48,598	48,827	49,056	49,287
Washington State U.	330	332	333	335	336	338	339	341	343	344
<i>Population⁽²⁾</i>	20,286	20,381	20,477	20,573	20,670	20,767	20,865	20,963	21,061	21,160
Lewiston/Nez Perce Co.	1,732	1,741	1,749	1,757	1,766	1,774	1,783	1,791	1,800	1,809
<i>Population (0.48%)⁽¹⁾</i>	33,030	33,188	33,348	33,508	33,669	33,830	33,993	34,156	34,320	34,484
Clarkston/Asotin Co.	0	0	0	0	0	0	0	0	0	0
<i>Population (0.60%)⁽¹⁾</i>	22,535	22,670	22,806	22,943	23,081	23,219	23,359	23,499	23,640	23,782
Total Recyclables	4,600	4,625	4,651	4,676	4,702	4,727	4,753	4,779	4,806	4,832
Total Population Base	162,540	163,515	164,496	165,483	166,477	167,477	168,484	169,497	170,518	171,545

Notes:

1. Annual growth rates provided by state statistical websites and the US Census Bureau.

2. Student body (and faculty) population for WSU was assumed to grow at the same rate as Pullman/Whitman Co. (0.47%).

Comparing **Tables 1 and 2**, less than half of the total amount of recyclables in the quad-city area are from single-stream programs that utilize a MRF to sort and process the materials. The other fraction of the materials is source-separated and is mostly cardboard collected from businesses. Future quantities are based solely on population growth with no changes to the diversion rate. The diversion rates may increase in time if there is a local MRF that can offer more cost-effective programs to these communities and if the communities are committed to helping make the local MRF viable for the host community.

1.2.3 Moscow's Single-Stream Recyclables Composition and Pricing

Table 3 presents the composition of the single-stream recycling from the City of Moscow's curbside program. Also shown in **Table 3** are the current commodity prices and commodity rates (i.e., the composition fraction of each material multiplied by the price is equal to the rate) as provided by the City.

Table 3 – Moscow's Single-Stream Recycling Composition and Current Pricing

Material	Composition Fraction ⁽¹⁾	Commodity Pricing (\$/ton) ⁽²⁾	Commodity Rate (\$/ton) ⁽³⁾
OCC	16.31%	\$55.00	\$8.97
Mixed Paper/ONP	58.72%	-\$33.00	-23.49
PET Plastic	3.70%	\$135.00	\$5.00
HDPE Plastic (Natural)	1.0% (est.)	\$340.00	\$3.40
HDPE Plastic (Color)	1.83%	-\$5.00	-\$0.09
Tin	4.07%	\$130.00	\$5.29
Glass	0.0%	-\$30.00	\$0.00
Aluminum	1.02%	\$1,460.00	\$14.89
Mixed Plastics	3.63%	-\$120.00	-\$4.36
Residue/Waste	9.70%	-\$120.00	-\$11.66
Total/Comingled Rate	100%		-\$2.07
Baling Fee			-\$38.82
Bale Breaking Fee			-\$5.00
Processing Fee			-\$89.67
Hauling Fee ⁽⁴⁾			\$30.00
Cost per Ton			-\$165.56

Notes:

1. The Composition Fraction of recyclables was provided by Moscow from Republic Services (June 2018).

2. Commodity Pricing is for baled materials as reported by Republic Services (June 2018).

3. Composition Fraction multiplied by the Commodity Pricing = Commodity Rate.

4. Hauling Fee to ship materials from Moscow to Seattle averages 26 tons per load at \$800 per load, or approximately \$30/ton.

Based on these rates, it is costing Moscow more than \$166 per ton to recycle. The processing fee is expected to climb to more than \$100 per ton in the coming months.

1.3 Recycling Markets

For a MRF to be successful, stable and reliable, recycling markets must be identified and established for the recyclable materials that are targeted. Unsold materials require temporary, dry storage and ultimately could even require landfilling if a market is not found. Storage is expensive and landfilling of the unsold or unusable material costs money and erodes profits.

The recycling market depends on the cost of recovering the raw materials and the quality of the materials generated by the MRF, as compared to virgin, raw materials. Also, there has to be a market and a means to accept and process the materials. For decades, China was accepting mixed recyclables from the United States and had significant capacity to handle and reuse the materials. However, the global recycling ban in China that was implemented earlier this year has completely changed the market. China instituted a new policy banning the import of 24 types of solid waste including unsorted paper products and low-grade plastics. They also instituted a new contamination threshold of 0.5% and suspended licenses for many recyclers in China. The Chinese government is extending this ban as of the latest reporting in the industry. Other countries have begun accepting recyclable materials from the United States. Vietnam is accepting scrap plastics and other materials but recently reported that their shipping terminals have been shut down as a result of material overload. This move is a significant development on the global recycling market since Vietnam has taken on more recyclable materials globally since China's ban. This ban and lack of other countries' capacities to process recyclables will continue to impact the recycling markets in the United States and around the world.

A primary factor moving forward will be the collection and processing of "targeted" recyclables. For the many years, single-stream curbside recycling has been the dominant trend to divert materials from the waste stream. There has been some re-thinking in the recent months on how best to implement recycling programs in the United States. Collection and processing are both very expensive, and without stable and dependable markets, some materials should not be targeted for recycling. However, there is also the political will of local government and habitual practices ("willful recycling") that are hard to change and could influence what recyclables are collected. Public education and outreach will become even more important to inform communities of what can and cannot be recycled.

1.4 Types of MRF Operation – Manual vs. Mechanical

Like most manufacturing and processing facilities, operations can be performed by labor or mechanical equipment, or a combination of the two. Older MRFs have traditionally relied on manual sorting, which is expensive and time consuming, but requires less capital investment cost. Labor is the largest cost in the operation of most MRFs. Automated processing is more cost effective than manual processing for larger facilities. Plastics are difficult to distinguish by manual sorting and require sophisticated and automated systems. Automated sorting has the advantage of reducing health and safety risks to workers who pick the recyclable materials off of conveyors.

1.5 MRF Sorting Systems

The five basic commodities that are targeted at MRFs are cardboard, also known as old corrugated cardboard (OCC), mixed paper, plastics, non-ferrous metals (aluminum), and ferrous metals (tin and steel). More advanced MRFs have the capacity to further sort out materials such as mixed paper and plastics. Basic MRFs tend to rely on third-party, specialty sorting facilities that will take mixed paper and mixed plastics and further sort them by type, as needed to supply to different manufacturers.

1.5.1 Tipping Floor

Materials are unloaded on the tipping floor of the MRF building when they are delivered. The tipping floor is typically sized for the peak number of collection trucks to unload without significant waiting time. **Exhibit 1** shows an example of a MRF tipping floor. The tipping floor provides a place to store materials. The tipping floor is engineered to withstand the weight of heavy equipment operations. Front-end loaders are used to move the materials on the floor and to in-feed conveyor system that delivers the material to the sorting line.



Exhibit 1. MRF Tipping Floor

1.5.2 Systems and Processes

The sorting of the mixed recyclables is performed through a series of systems based on the material properties of the mixed recyclables. The systems used to move and sort are as follows:

Conveyors

Conveyors are used to move materials to and from the mechanical equipment in the MRF. Typically, MRFs will have an in-feed conveyor (refer to **Exhibit 2**) where a front-end loader pushes and dumps material into the system to begin sorting and processing.



Exhibit 2. In-feed Conveyor

Sorting Stations

Flat belt conveyors deliver the recyclables to the material sorting stations (refer to **Exhibit 3**). Sorting stations remove trash, plastic bags, large/oversized materials, and other unwanted materials as well as segregate the materials by type. Personnel at the sorting stations can target certain recyclables that are not sorted by downstream equipment.



Exhibit 3. Flat Belt Conveyor Sorting Stations

Screens

Screens are used to separate materials of different sizes and densities. Disk screens separate fiber (cardboard, newsprint and other paper) from containers and other materials. They consist of a series of spaced rotating disks as shown in **Exhibit 4**. Heavy materials that are small and rigid drop between the disks and fall to another sorting system while the targeted fiber materials stay on top of the screen and discharged to a fiber pile or bin.



Exhibit 4. Disk Screen

Ferrous Metal Separators

Ferrous metals such as tin and steel cans are segregated from the material stream using overhead electromagnets (**Exhibit 5**). These units induce a magnetic field that attracts the iron contained in the objects. The collected metal objects do not contact the magnet directly – the current from the magnet pushes the objects into a storage bin.



Exhibit 5. Electromagnet Unit for Ferrous Metal Separation

Non-Ferrous Metal Separators

Eddy current separators use a powerful magnetic field to separate non-ferrous metals after all ferrous metals have been removed (**Exhibit 6**). The eddy current is applied to a conveyor belt. Non-ferrous metals are thrown forward by the force of the current into a storage bin.



Exhibit 6. Eddy Current Separator for Non-Ferrous Metals

Other Separators

Glass can be separated by a density blower and then is typically hammered into crushed glass known as cullet. Plastic separation can be done manually by workers on a conveyor sorting line or by optical sorters that identify different plastic resins and colors (**Exhibit 7**). Air classification can be used to separate certain targeted plastics such as high density polyethylene (HDPE) and polyethylene terephthalate (PET).

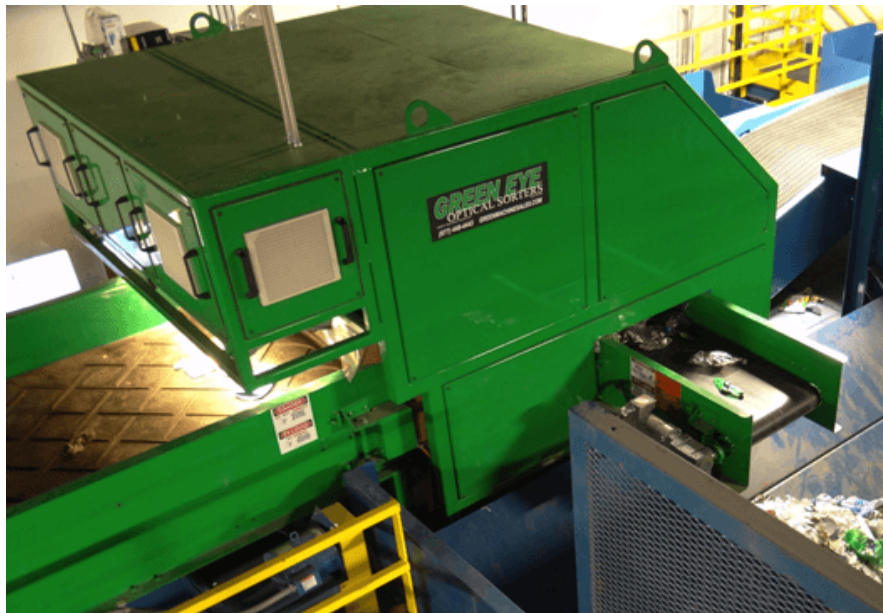


Exhibit 7. Optic Separator

Balers

The final step in processing is to bale the individual commodities. Balers compress the materials and bale by wrapping them with wire into manageable bricks for storage and transport (refer to **Exhibit 8**).



Exhibit 8. Baler

2.0 Existing or Planned Local / Nearby MRFs

2.1 Waste Management – SMaRT Center (Spokane, WA)

Waste Management, Inc. owns and operates the Spokane Materials and Recycling Technology (SMaRT) Center. The Center opened in 2012. Waste Management invested \$18 million in the 62,000 square-foot facility to process single-stream recycling for the Eastern Washington region. Situated on an 8-acre site west of Spokane and next to Spokane's Waste to Energy Plant, the facility can process up to 100,000 tons of recyclables per year. Waste Management recently quoted a price of \$109/ton on a trial basis with no rebate and final pricing dependent on material characteristics and the level of contamination.

2.2 Republic Services – Lander Facility (Seattle, WA)

In the 1980s, Rabanco (now Republic Services) converted an old U.S. Steel factory into a recycling facility. The 12-acre property is known as "3rd and Lander" for its location on 3rd and Lander Street in Seattle, Washington. This facility receives commingled recyclables from route trucks and other jurisdictions around the Northwest. The facility can process up to 200,000 tons of recyclables per year. Republic Services is charging almost \$90/ton to process recyclables with an increase to \$102/ton expected in September 2018.

2.3 Western Recycling (Boise, ID)

Western Recycling is located in Boise, Idaho and processes recyclables for the City of Boise and the rest of the Treasure Valley (Meridian, Nampa and Caldwell). It also processes recyclables from the cities of Rexburg, Idaho Falls, and Pocatello, Idaho. The sorting facility came online 4 years ago and processes approximately 40,000 – 45,000 tons per year.

The City of Boise implemented an energy bag program. Plastics that have a fuel content such as plastic film and bags and #3-7 plastics are source separated in orange bags and placed in the single stream bins collected at the curb. The orange bags are separated on the pre-sorting conveyor, baled and shipped to a facility in Utah that uses a pyrolysis to convert the plastics into synthetic diesel fuel (also called syngas). Approximately 2 barrels of diesel are generated per ton of plastic. The facility has a reported capacity of 20 tons per day, making 10 barrels of syngas.

2.4 Local Quad-City Area Processing/Baling Facilities

The following are known local recyclable material processing and/or baling facilities:

2.4.1 City of Moscow/Latah County

The City of Moscow owns the Moscow Recycling Center, and Latah Sanitation, Inc. operates it on behalf of the City. LSI also collects single stream recyclables in the City and at several drop box sites in Latah County. The Center itself also collects source separated recyclables. The mixed recyclables are baled at the facility and hauled to Republic Services' Lander facility in Seattle for processing. The source-separated materials are sold directly to the market by LSI.

2.4.2 Lewiston-Clarkston Area

Pacific Steel & Recycling is located in Lewiston and accepts the single stream recyclables from the City of Lewiston. The facility bales the materials for delivery to Waste Management's SMaRT Center in Spokane, WA for processing. Lewis and Clark Recyclers, Inc. in Lewiston accepts various types of metals, fiber products and some plastics.

2.4.3 Pullman/Whitman County, Washington

Whitman County bales mixed recyclables that are delivered to their Carothers Road Solid Waste Facility (CRSWF) from franchise haulers. The facility charges a fee of \$30 per ton to handle and bale the materials. The local regulated haulers use this baling service. The baled, mixed materials are then hauled to Republic Services' Lander facility in Seattle for processing. The costs for hauling and processing, less any commodity value, is charged to the regulated haulers.

Similar to the City of Moscow, Whitman County is also contemplating building a "mini-MRF" at the CRSWF by converting their former waste transfer building. Their assessment of the MRF feasibility is underway. Each community's decision to host a MRF will be heavily

influenced by one another. A regional partnership between the two communities to invest in a MRF together should also be considered.

3.0 MRF Siting Considerations and System Changes

3.1 Siting Considerations

A MRF is an industrial facility, similar to other manufacturing facilities, that produce noise and have truck traffic. The first issue that must be addressed when siting a MRF is zoning. In Moscow and Latah County, it is presumed that a MRF would fall under industrial zoning requirements; therefore, other zoning districts would be eliminated from further consideration unless the property goes through re-zoning or a conditional use permit.

The other important consideration is property size. At least five acres are typically necessary for an efficient and safe layout with buffer. One reason for a larger site size is to allow truck queuing and maneuverability. It is desirable to queue completely on the site and not back traffic onto public streets or highways. This should be one objective of a new MRF. Another reason is to have adequate space for storing baled materials. Ideally, all storage of recovered products would be in the facility or under covered storage to protect them from the weather.

Site utilities are also important. The MRF will need 480-volt, three-phase power to accommodate the large horsepower electric motors in conveying and baling equipment. This is standard in industrial parks serving true heavy industrial operations. The facility must have an adequate water supply for fire protection. The large quantities of paper present in a MRF could cause a large fire, and a fire pump and a fully-sprinklered building will likely be required by the local fire department.

As mentioned, route collection trucks and 18-wheel tractor-trailer trucks must have adequate ingress and egress. Tractor-trailer trucks with 53-foot-long trailers are nearly 70 feet in overall length; they require substantial turning radius for entering and leaving the public roadways. The roadway system connecting the MRF to major highways should be reviewed for their adequacy to handle the large semi-trucks and for turning radii at corners such that the semi-trucks do not jump the curbs when turning or pose a safety hazard entering and exiting the facility.

A MRF should also be enclosed by a tall screened fence at its perimeter. Although with adequate buffer, other types of screening systems and features that are aesthetically pleasing, such as a combination of a berm and plantings that could be used along road frontage, may also be considered. The perimeter fencing should be a minimum of 10 feet high. The fence, along with the recommended approach of all indoor tipping areas and no outdoor storage of bales, would mitigate blowing litter to a large degree.

3.2 Adapting to Changes/Modifications

There is uncertainty in the recycling program when it comes to the number and types of recyclables, changes in the quantity of materials, and the commodity market. A MRF needs to be designed to be flexible in changing processes and adding others to capture materials that could be marketable.

In addition to the general goal of increasing recycling, three primary factors can cause materials to be considered for future inclusion in the recovery system.

1. **Material Presence/Availability** – The materials have to be present in the waste stream in steady quantities. A material does not need to be present in large quantities. However, as a minimum, reliance on the material quantity to be included in route collection loads on a regular basis is required to justify processing equipment at the MRF.
2. **Marketable/Sellable Materials** – Economic markets must be available to justify collecting the material in the recycling system and processing it. Processing costs at the MRF, if higher than the City's waste disposal costs, can pose a conflict of interest in recovering recyclables versus disposal.
3. **Identifying Materials** – In Moscow, and in other communities in the U.S., even though materials are not on the list of "accepted materials" many people put them in the collection bins. Society has moved from questioning which recyclables can be put into the bin to assuming that all materials that look like they can be recycled are accepted and are recyclable. This philosophy of "wishful recycling" has been brought on by the single stream collection programs.

Some MRFs have the ability to add one or two materials to its existing array of materials sorted and aggregated in bunkers or large containers. When a market is identified for a material that has been part of the residue, the material can be assigned a sorting station(s) if available and trial processing and marketing can be conducted. In some cases, such materials prove to be viable for processing and marketing using these methods. In the case of HDPE and PET, the resins are acceptable, but the form of the items is not. For example, PET is used for egg cartons, food tubs and drink glasses. Water bottles use thinner plastics that tend to be challenging to separate from mixed paper and are notorious for contaminating mixed paper bales.

Certain materials meet one or more of these criteria and thus offer potential in the future:

- **Film plastics.** A significant portion of recycling program participants place paper or containers in plastic bags before placing them in the set-out containers. Thus, large numbers of plastic bags are received at the MRF. Most film plastic, primarily HDPE and including some LDPE, is typically removed in the pre-sort area in most MRFs and placed in the trash bunker or container. Film plastic not removed prior to screening will wrap around shafts of the disc screens, causing a reduction in separation efficiency and frequent maintenance to repair damage caused to the shafts. New MRF designs can include automated methods to open bags and remove film plastic.

Markets for film plastic exist, but separation systems in MRFs have not historically been used at the curb. Other programs have been employed by communities to recover film plastics such as retail drop-off centers at grocery or dry-cleaning stores. Therefore, significant quantities of film plastics continue to be received at MRFs and have typically become part of the residue. To facilitate sorting for plastic film, bag splitters and a pneumatic conveying system could be installed in the pre-sort line to deal with even greater quantities expected once this material would be named as an acceptable material. A concept for this system includes overhead intake of the bags

through a vacuum system. This system can discharge directly into a baler, reducing handling.

Another option is to provide separate collection bags to the community to collect the film and other plastics that are not sorted at the facility for fuel. As previously discussed, the City of Boise is using an energy bag program (“orange” bag) program that allows the community to collect film plastics and other plastics with a field content and send them separately to a regional syngas plant in Utah.

- **Other metals.** This category would include a wide variety of items made of ferrous metals, aluminum, brass, copper, and others. Currently, aluminum and tin/steel food and beverage containers that are relatively small and uniform in shape are processed in MRFs. Larger metal items are accepted in a number of other residential curbside programs. Examples of larger items are bicycles, auto parts, small appliances, lawn furniture, pots and pans, and other similar items. Like film plastic, larger metal items pose problems to the processing equipment, such as gouging conveyor belts and jamming disc screens. It is preferable to remove these items in the pre-sort system. The resulting mixture of large metal types is an acceptable feed stock for metal scrap processors who have the equipment to process the material further. These processors generally will pay for this mixed scrap metal.
- **Number 3 through 7 plastics.** Depending on quantity, two or more sorting points on the pre-sort conveyor may be required. Three sorting points would be ideal to enable each sorter at the pre-sort station to pick film plastic and feed it through each pneumatic hood, to pick large rigid 3 through 7 plastics, and also to remove other trash, especially materials that would cause damage to the downstream process system. Smaller plastic items could be allowed past the pre-sort to the process system. An optical sorting system would be desirable to perform automatic removal as opposed to approximately two or more sorters required if these materials were manually separated. This is labor intensive and oftentimes, in smaller, less sophisticated MRFs, the plastics are mixed together and sent to a specialty MRF for further sorting and processing.

Larger rigid plastics having these number designations include water containers greater than one-gallon capacity and other containers up to five-gallon buckets. These larger containers have dimensions that are too great to pass through some of the process system elements. As MRFs receive these rigid plastics in quantities, some have found export markets for them.

This list is not intended to be exhaustive of all materials that could be added in the future to a basic MRF processing/sorting system. However, the MRF operators that would take an interest in the City’s project should have some experience with these three types of materials, providing evidence that they might be feasible to sort out in the future. Automated systems may require some level of development to be reliable as well. In the meantime, manual sorting would serve to ensure success – success defined as sorting to produce marketable/sellable materials and avoiding problems with process equipment.

4.0 MRF Design / Construction Procurement Alternatives

There are essentially three design and construction alternatives for developing a MRF, with the third also including operating the facility. Each of these three options is discussed in further detail below.

4.1 Design-Bid-Build Method

The Design-Bid-Build (D-B-B) method is the traditional method for procuring professional services and building the facility. For this option, the City would hire an architectural and engineering (A&E) firm to prepare design documents. The A&E's product is a set of plans and specifications (also known as Contract Documents). The plans detail each feature of the project to be constructed while the specifications include the front-end administration/contract conditions as well as the technical specifications. The City then issues a Request for Proposal (RFP) that includes the Contract Documents. The bid is advertised and the bidders respond. Under this method, the Contractor has no authority to change or optimize the design. The lowest qualified bidder is typically awarded the contract. The City or its A&E firm is responsible to provide construction oversight to ensure that construction conforms to the plans and specifications. This implementation approach is common for non-process and less sophisticated facilities, including roads, bridges, office buildings, and schools.

An advantage of this procurement approach is that the City maintains control of the entire design and construction process. A disadvantage is that process design of MRFs can be quite dynamic, having to react to process modifications such as the introduction of new process technologies to enhance recovery. Thus, technology-oriented success of the MRF is dependent upon the City hiring an A&E firm that has the expertise to select an integrated process design and provide flexibility to modify the process in the future. An additional disadvantage is that, once the facility is completed, the City accepts the risk that the facility will work following successful completion of start-up and performance testing, and only has the A&E to share that risk.

4.2 Design-Build Method

For this method, the City, with its engineering consultant, develops concept-level design plans and/or performance (also known as “functional”) specifications, and issues them in a RFP. An example of a performance specification is a facility that will process a minimum of 150 tons of recyclable materials in ten hours, providing on-site storage for up to five days of processed material, and is capable of sorting five materials for resale – cardboard, mixed paper, tin/steel, aluminum, and plastics. The RFP would require the selected contractor to provide the design and engineering, equipment, construction, and acceptance testing, all in one contract. Proposals would allow the City to review the technical approach proposed to fulfill the minimum functional requirements of the facility, evaluate these against the cost of each proposal, and decide which is the most cost effective and in the best interest of the City. Unlike the D-B-B method, the proposing contractors would be restricted to those that have experience in not only building but designing MRFs. Contractors may take on partners that have process system expertise, perhaps even a process equipment manufacturer.

The D-B method can be advantageous when the City wants to have a facility quickly online and operating. The City can also shift all the responsibility of design and construction of the MRF to the contractor. The contractor also has the responsibility to ensure that the facility performs at the levels and capacity that is specified in the minimum functional requirements. Offsetting these advantages is the lack of control over a facility design for which the City would have to deal with for its operational life. The designs that are proposed by the proposing contractors may be vastly different due to the need for contractors to offer competitive prices. This in and of itself can be complicated in selecting the contractor. Also, the D-B contracting market is much smaller than the traditional build and reduces the competitiveness of the bids and costs and could increase the price.

4.3 Full Service (“Turnkey”)

Full-service (also known as “turnkey”) is an extension of the D-B method but adds the operation component. For this option, the City would include in the proposal request that the contractor also operate the facility for an initial operating period, although this period could be ten years or longer. It is typically referred to as the Design-Build-Operate (DBO) method. It is becoming more and more popular in the public sector. New publically-owned advanced wastewater treatment plants, for example, have been implementing this method because of the specialized nature of the facility. MRF’s also have a special type of operation that is not typical for a local government to typically run. Proposals submitted to the City would include the capital cost of designing and constructing the facility along with the annual operating and maintenance costs offset by commodity revenues.

5.0 MRF Ownership / Operation Alternatives

5.1 Public Ownership / Operation

Under this scenario, the City takes full ownership and operation of the facility. Design and construction are implemented by either D-B-B or D-B as described in the previous section. Once the construction is completed and all start-up and performance tests are finished, the City operates the facility.

Entering into the MRF operations business means that several management systems within the City must be developed and executed to support these specialized pieces of equipment and systems, including, but not limited to, safety (regarding processing system), production, maintenance and repair, risk management (insurance), product marketing and sales. While the City has certain systems already in place that could be used, such as human resources, a management structure, general safety training, and perhaps others, the majority of systems fall into a “new” category, posing another level of complexity on the City and requirements for ongoing stand-alone resources specific to the MRF. The City would be responsible for marketing and selling materials, maintaining and repairing the equipment (with most likely added costs for third-party contractors and vendors), and, in general, operating an industrial process that is unlike any others typical to local government.

An advantage of this option is that the City would have full and complete control over the facility. This one advantage, however is outweighed by a long list of disadvantages. MRF systems consist of a number of pieces of specialty equipment that can present a complexity

not generally found in any other facility typically operated by City government. One of the more notable cost differences between publically-operated and privately-operated facilities is the cost of labor. Public MRF operations tend to have a higher labor cost than private MRF operations due to several related factors, such as redundancy of staff to cover leave obligations; increased cost related to expansive fringe benefits; and general limitations in productivity caused by inflexibility of job descriptions. This is exacerbated by possible changes to the City's management systems, needed to oversee unique MRF operations.

Another added cost is the way materials and equipment are procured by local government. Equipment and materials typically require procurement processes. Even consumables such as baling wire are compelled to be acquired through time consuming bid processes that add cost and delays of essential materials. While rigorous procurement standards protect the public from potentially fraudulent activities, they also burden the public with increased red tape that results in additional administration costs and inflexibility.

5.2 Private Ownership/Operation

A private, third-party company would own and operate the facility under a long-term service agreement with the City. The private company may choose to design and build the facility themselves through their own forces, if they have the capability, or out-source those services to an A&E firm and construction contractor. The private company may also own the property or lease the property from the City. The agreement would also take into account the cost of processing the materials and commodity pricing. There are multiple types of agreements that are used for this type of agreement. The cost to the City to process the recyclables might be on a cost per ton basis with offsets for commodity sales as an "open-book" type arrangement. This option is less risky to the contractor and can result in more favorable pricing to the City by essentially sharing the risk. Alternatively, the agreement could be more "closed" book where the private company charges the City a higher rate but also takes on more risk of the commodity market prices dropping.

An advantage of this option is that the City may only need to commit a certain amount of tonnage to the facility with the private company being responsible for all management, operations, marketing, and sales. However, there is a lack of recyclables in the quad-city area to make such an investment by a private company attractive and profitable. Moscow and the quad-city area are relatively rural and have a low population density that equates to a low tonnage generation rate. In order to make a MRF profitable, it has to have the materials to process. The entire quad city area only has approximately 10,000 tons available if all of the quad-city areas contribute. This is not attractive for large waste companies, such as Waste Management and Republic Services, that typically build and operate these types of facilities. By comparison, the capacity of Waste Management's SMaRT Center in Spokane, Washington only 80 miles away is 100,000 tons per year. That facility is also drawing on materials from the major metropolitan area of Spokane and nearby Idaho cities as well as communities in British Columbia, Canada. The City of Lewiston is also shipping their recyclables to the SMaRT Center.

Full investment in a MRF by a private contractor is a large capital commitment. The quantities of recyclables need to be there for the facility to be lucrative. Given the relatively low population density in the quad-city area, it is unlikely that a private contractor would be interested.

5.3 Public-Private Partnership

There are multiple scenarios that the City could enter into under a public-private partnership (PPP) agreement with a private company. The level of investment of the two parties is variable. The City or the private company could come up with all the capital for investing (designing and building) in the facility, or there could be some level of shared investment. The property could also be owned by either the City or the private party. These elements need to be considered in the long-term service agreement that is fair for both parties to build and operate the facility. Like the private ownership and operation scenario, the City can establish various types of contracts with the private operator. One option for this partnership is for the private operator to be required through the proposal process to provide a “best value option” where the City leaves the requirements open-ended so that proposers can provide value options to the City that enhance the recycling program. This offers “value-added” incentives to the City and processing of commodities through the procurement process.

The City currently has a favorable public-private partnership with Latah Sanitation, Inc. for operating the Moscow Recycling Center. LSI’s responsibility in addition to operating the City’s MRF is to contract with neighboring communities in the quad-city and more regionally to increase the amount of tonnage and keep the processing rate economically feasible for Moscow and other partners. These scenarios all come with a level of risk and liability that needs to be carefully considered by the City and the private contractor. This option is the most feasible in which both parties (City and private contractor) share responsibility and risk in the investment and successful operation.

An advantage of this approach is that the City would retain ownership of the site during the contract and, after the operations contract expires, would provide a degree of control over the MRF. The City would be responsible for locating a site that meets City zoning and community acceptance; such a site acquisition process can oftentimes be problematic and possibly hold up construction of the MRF beyond the needed date. Difficulties contractors face in siting a solid waste or recycling facility has been a primary reason for cities and counties to provide sites for MRFs and other related facilities.

A disadvantage of this option is the Contractor could make significant profits and charge the City exorbitant amounts of money if the contract conditions are not written fairly. The City would also have expectations of the general public to keep the facility presentable, especially if the facility is in a highly trafficked area. If the contractor has financial difficulties, the contractor could possibly allow aspects such as housekeeping to deteriorate or worst case, abandon the building, leaving equipment and material for the City to take responsibility.

5.4 Collaborative Partnerships

The City of Moscow may also consider entering into collaborative partnerships within the quad-city area or more regionally depending on need and interest. This partnership could include other communities contributing capital to build the facility and/or committing that they will send their recyclables to the facility for processing. The private company of a public-private partnership may also collaborate with these communities and secure contracts to increase tonnages, improve on profits and also help to reduce costs to Moscow. With

Whitman County also considering building a MRF, the City of Moscow should consider discussing the opportunity to partner.

5.5 Other Communities/Jurisdictions Operating MRFs

5.5.1 City of Chelan, Washington (950 tons per year)

The City of Chelan was operating a public drop-off depot until May 2018. The depot provided limited sorting and baling operations and accepted approximately 950 tons annually (including glass). The depot served the residents of Chelan and the surrounding community. The depot's annual cost of operation was approximately \$300,000 and was staffed with 3 full-time employees until the operation changed in May 2018, when the City implemented a curbside, single-stream recycling program for its residents. Currently, the facility does an initial sort at the depot building to remove contamination and then bales and transports the material to Waste Management's SMaRT Center in Spokane for processing.

5.5.2 Clark County, Washington (60,000 tons per year)

Waste Connections, under an exclusive contract with Clark County and in conjunction with the City of Vancouver, Washington, constructed a combined transfer station and MRF in Vancouver. Waste Connections operates the facility where all recycled tons from Clark County and some of the neighboring areas are processed. Under the current market conditions, the facility processes approximately 60,000 tons per year of residential and commercial commingled materials. The recycling contract provides revenue sharing with Clark County and the City of Vancouver after the cost of processing has been considered. At the end of the contract, the County has the option to purchase the land and facility for \$1 from Waste Connections.

5.5.3 City of Phoenix, Arizona (100,000+ tons per year)

In 2004, the City of Phoenix awarded their first MRF operations and maintenance contract for its 27th Avenue facility to a private contractor. In 2007, upon completion of the City's new MRF, the North Gateway Transfer Station & MRF, the City issued an RFP for and contracted the operations of the MRF and marketing of recycling commodities to Hudson Baylor, who was later acquired by ReCommunity. ReCommunity was later acquired by Republic Services.

The MRF is co-located with the City's transfer station and is a single-stream processing facility. The 60,000-square-foot North Gateway MRF (which includes a 21,000-square-foot tipping floor) processes curbside-collected, commingled material generated by residents living in the northern sector of Phoenix and in the communities of Peoria and Anthem. The plant does not handle commercially-generated material. The recycling facility operates one processing line. Recycled fiber accounts for an estimated 85 percent of the material processed at the North Gateway MRF.

In recent interviews with former and current staff that were responsible for the City's MRF RFPs, administration of contracts, and oversight of the MRF subcontractor, they shared the following information pertaining to their experience and recommendations:

- The City was very pleased with their original decision to outsource the operations of the MRF and the marketing of the recycled commodities, especially given current challenging commodities markets, citing that having Republic Services (now, after

their acquisition of ReCommunity) provides a benefit due to their ability to “drive deals” relative to commodity sales in the marketplace, since they control so much recycled volume across North America, something the City states it would not be able to do on its own.

- Commodity sales can be a great revenue source when prices are up, however floor pricing can become an issue between the City and the MRF operations subcontractor when commodity pricing is down.
- Make sure when selecting a MRF and commodities marketing subcontractor, that they are well financed and leveraged to pay any floor pricing contract penalties when commodity pricing drops.
- The City of Phoenix initially spent \$5.5 MM on its North Gateway MRF.
- The City recommends not going for the lowest cost when selecting the baler and other MRF processing equipment and recommends Bollegraaf Balers (<https://www.bollegraaf.com/technologies/balers>). Their primary reason is to avoid downtime. If the baler is down, the entire plant gets backed up and production is lost and becomes costly.
- The City recommends a longer-term operating agreement with a highly valuable, operationally proficient and commodity marketing experienced subcontractor/partner, one that has established relationships with recycled commodity buyers.
- Select a larger company to form a public/private partnership or subcontract with one that can leverage recyclables commodity pricing in the marketplace - driving larger scales of economy - related to commodity sales since they are trading in the commodities marketplace all over North America, verses just one small volume recyclables generator.
- Commodity markets for recyclables limit items a city should consider collecting at the curb. As an example, a year ago mixed paper was at \$100.00 per ton and currently around \$10.00 per ton. As such, collecting and processing it currently does not make economic sense. Design the recycling program around the commodities markets and long-term trends to maximize processing and sale of commodities for a true ROI.
- Consider surrounding communities – cities, counties and regional solid waste districts – for adding recycling commodity volumes to the MRF to create economies of scale.
- Consider a “best value option” RFP, one where the City leaves the requirements open-ended, so proposers can provide value options to the City to enhance the recycling program, offering “value added” incentives to the City and processing of commodities through the procurement process.
- If the City is too far away from the end markets (regional mills) or shipping Ports for exporting the recyclables, consider baling and shipping the recycled commodities to either a larger MRF within the region and avoid building a MRF altogether.
- Rail is typically not a viable option as the loading railcars and expecting them to get serviced, transported and delivered to either domestic mills or to the ports for export; they recommend relying on trucks.
- Shipping routes are critical to be able to get the recycled commodities to market efficiently, cost effectively and on time.

- Consider getting away from commingled to clean up the commodities, especially with China's "green fence" and associated stringent requirements.
- Produce clean curbside recyclables by educating residential and commercial customers. The key is educating the customers as to what is truly recyclable to keep the recycling commodities as clean as possible reducing contamination and downtime at the MRF from materials damaging the equipment.

5.5.4 City of Albuquerque, New Mexico (80,000 tons per year)

During the solid waste planning process in 2007, Albuquerque's Solid Waste Department (SWD) determined that it did not have the expertise to operate a MRF capable of processing the region's estimated 80,000 annual tons. At the time of the decision, SWD was operating a processing facility, but the tonnages amounts were less than 20,000 tons and the annual cost of processing was more than \$80 per ton. SWD also had difficulty marketing the processed materials. SWD issued an RFP for a company to build and operate a new MRF. Financing for the facility was a municipal bond backed by the City. The cost of the land, building and processing line was approximately \$20 million. The PPP contract between the City and contractor, Friedman Recycling, included a put-or-pay clause that guaranteed either incoming material tons or payment. After opening in 2014, it took Albuquerque four years to reach the minimum tonnage requirement. In the meantime, payments were made to Friedman because the tonnage volumes were below the contracted minimums.

5.6 Transportation & Logistical Challenges

No significant population centers exist within 50-80 miles of the City of Moscow. Given the lack of population density and the long distances to transport materials, the opportunity for the City of Moscow to attract other recyclables and process materials from other communities even in the quad-city area will be challenging. Waste Management's SMaRT Center in Spokane will undoubtedly compete with this MRF for materials. Republic's Seattle MRF, although almost 300 miles away, will also be a competitive market as they are reaching out regionally to multiple communities in order to supply enough materials to make their facility efficient and economically viable. Their cost per ton to process is significantly lower than at smaller MRFs. Large MRFs do not have to rely on brokers to sell their materials like smaller MRFs, which increases their revenues and further offsets processing costs. In the end, it comes down to the aggregate cost of processing and transportation that compete with local MRF prices.

Transportation and costs are two significant factors when considering the feasibility of recyclable materials to be delivered to a MRF in Moscow. The general movement of the recyclables, whether mixed or sorted, is toward the west coast seaports and the paper mills. Moving recyclables east to Moscow from any communities in the area, for example, is counterproductive and will add cost.

5.7 Contracting Considerations

5.7.1 Request for Proposals (RFP) Process

A well-developed and mindful RFP is required to ensure that the City obtains the desired performance over the life of the contract. Development of such performance terms often times are provided with the assistance of a specialty engineering firm that are experienced in the design and operation of these types of facilities. MRF operation services should also

be contracted on a long-term basis typically for a minimum of 7 years. The RFP should sufficiently address current needs and future contingency events.

One recommended method is for the City to seek interest from private parties, by issuing an expression of interest (EOI). This approach may be a feasible next step for the City in considering a local MRF. The critical contractual terms and conditions (T&Cs) that the City should consider are discussed below. These include T&Cs in the RFP or EOI that is released to the private sector.

5.8 Contractual Term and Conditions

A contract to provide services for processing and marketing recyclable materials for the City should be a long-term arrangement, no shorter than 7 years and ideally 10 to 20 years to allow the contractor to fully depreciate its capital investment. The stationary process equipment and mobile equipment needed to operate a MRF are capital intensive and will require several years of potentially profitable operation for a private contractor to justify making the investment. Most or all equipment will be subject to federal income tax regulations that require the owner to depreciate equipment over several years; therefore, most private contractors will require a contract for service with the City for at least 10 years as an adequate incentive for them to invest funds to construct a MRF. Periods of 15 or 20-year contracts are not unusual in this type of business.

Because the relationship between the private contractor and the City will be close and long, setting up the details of expected actions by the two parties is important. Any action or operational aspect falling short of expectations could become an ongoing issue, in some cases curable by mutual agreement between the contractor and the City. Those actions on which the City is not able to reach agreement with the contractor during the term of the contract can become a source of dissatisfaction. Equally important, the City would have to wait until the contract expires and then revise the requirement to ensure that source of dissatisfaction will be reversed to meet the City's expectations.

The preferred approach begins with development of the RFP (or an EOI). This will ensure that the City avoids undesirable aspects of MRF services and simultaneously develops a comfort level before entering into an agreement that may run 10 years or longer.

In this section, important points to include in the RFP for a full-service "turn-key" PPP arrangement are summarized to assist in satisfying the City over the contract period. Numerous details would accompany each point in the RFP; however, the details of each requirement are not presented here but would be developed during the RFP process. Details of certain items would be common to other MRF procurements in the U.S., while other items would be developed tailored to the City's situation and needs.

Beyond development of the RFP, other important steps in the selection of a MRF contractor include proposal evaluation, the process of clarification of ambiguous points in each proposal, potential interviews with proposers, contract development, and final negotiations. Important points to include in the RFP are as follows:

Design and Construction Phase

Clearly specify the parameters upon which contractor proposals will be evaluated. If a

scoring or points method is used, provide the details. In response, contractors will more consistently describe those parts of their proposals. A recommended list of parameters includes:

- City objectives, such as diversion rate.
- Proposed site feasibility and proximity to population centroids.
- Experience in operations of single-stream processing and other recyclables processing.
- Marketing plan. All materials that generators may put into the collection container should be fully marketed, that is, multiple markets should be proposed if one market will take less than 100 percent of the material.
- Materials markets and net revenue formula to City. Monthly payment by contractor to City or to the Contractor by the City.
- Proposal security, performance bond (during operational years of the MRF), payment bond.

Facility Design and Operations

The following requirements could be written into the RFP. For a new MRF sited on City-owned property, the City will want greater control over the MRF and should specify limitations or ranges on certain parameters, such as:

- Conceptual design – for example, building size and architectural style
- Site plan – to have control over location of trailer storage, limit on storage location of other vehicles, and a prohibition on making the site a waste collection vehicle or waste collection container storage lot. Site plan limitation also would specify limitation on acreage that would be provided.
- Hours of operation – to more closely correspond to other facilities at the landfill site
- Limit the quantity of processed (baled) material storage on site
- Operational approaches to prevent materials from exiting the building and becoming litter
- Placement of exterior lights and other security features

For a new MRF sited at a contractor-provided site, the contractor will typically require maintaining control over certain features of the MRF on a site the contractor selects. The contractor may want to store vehicles used by its waste or recycling collection business, as well as collection containers. The contractor also may want to process materials other than those supplied by the City curbside residential recycling program, such as other metals or other industrial materials.

For a site provided by City or Contractor - whether the MRF is sited on City property or at a site provided by the private contractor, the City could influence building design elements by specifying functionality requirements for education, such as:

- Parking for a specified number of visitor vehicles and for one bus;
- Meeting room for presentations to visitor groups and other educational activities;
- Observation areas – A mezzanine walkway at the second level will provide safe viewing of several process activities without interfering with process floor operations. This approach has been used in numerous other facilities. An additional benefit is

that the viewing areas, isolated from process operations, would allow school-age children to view the process.

Schedule

A listing of the major milestone dates that the City expects during the selection and contract development stages, construction, and commencement of commercial operations would aid in the contractors' understanding of the timing of the various resources that they must make available to the City to conclude a successful procurement process and then meet construction deadlines. For the alternative that the contractor will provide a site, the City would need to allow an adequate amount of time between RFP issuance and proposal submittal for contractors to conduct the site search activities necessary for their proposal to be responsive to the RFP. Contractors would need time to identify and conclude at least a preliminary level of commitment from the owner – for sale or for lease to the contractor.

City Responsibilities

This section should spell out the City's responsibilities during the construction of a new facility and during the term of MRF services provided by the contractor. The primary reason for this section is to let the contractor understand all of the items that the City will provide.

Acceptance/Demonstration Testing

Whether the City or the contractor provides the site, the City should expect the contractor to prove process performance demonstrations including the following:

- **Quantities** - The RFP should specify performance that matches the greatest quantity expected over the life of the contract. Annual quantities will be greatest during the last year of the contract, as quantities are expected to grow with population and increased diversion rates. The City could require the contractor to accumulate a portion of one day's receipts for a following day test, to ensure that the greater future daily quantity would be tested. Similar to the capacity provided in the conceptual design in a prior section of this report, the MRF should be required to receive and process the tested amount over a time period proposed by the Contractor. This requirement will help ensure that the contractor does not undersize the facility as a means to reduce the initial capital cost.
- **Process Efficiency** - Two aspects of process efficiency should be tested. The first is separation to achieve the grade requirements or specifications for each material in its ready-to-ship condition. Material grade requirements will be included in the marketing plan submitted by the contractor with the proposal. These requirements usually specify allowable quantities, as a percent of the total, of other materials, such as other grades of paper, and of contaminants, materials that cannot be processed by the mill receiving processed recyclables.
- **Residue Quantity and Quality**. Recycling program participants always place some small amount of non-recyclable materials into the collection system. The MRF process removes these materials and they form the process residue from daily operations. Also, some quantities of recyclable materials fail to be separated during the process, adding to residue quantities and resulting in lost revenue. Prior to development of the RFP, it would be helpful for the City to obtain a measurement of

the quantity of recyclables contained in the materials it currently collects in its waste stream. This would form a baseline value for performance.

A performance test would be witnessed by a City representative, either staff or a consultant, another common practice for such contracts. The test report with the results would require approval by the City prior to facility acceptance.

Service Agreement During Operations

To more clearly identify the performance requirements that the City would impose on the private contractor, those requirements should be written into a Draft Service Agreement. The Service Agreement would specify requirements of the contractor during construction of a new facility, if applicable, and operating requirements that would be imposed during the entire term of the service. The Draft Service Agreement would be prepared typically with input from the City's Sanitation Department, the City's Purchasing Department and City's legal counsel. The balance of items in this section would be recommended for inclusion in the draft Service Agreement, which would be made a part of the RFP document issued to potential proposing contractors.

Marketing Plan

The private contractor would be required to submit a detailed marketing plan with their proposal. Contractors would be responsible for marketing all recyclable commodities for the City. Marketing requirements should specify the materials that are to be marketed. During each operating year of the Service Agreement, the contractor would be required to update and submit to the City the Marketing Plan prior to the beginning of each year. The contractor should be required to state market development efforts expected during the coming year as a means to provide evidence of the contractor's ongoing capability to successfully market the City's materials. Also, the contractor should provide a financial risk discussion or each ongoing or potential market.

Compensation

Due to demand for recyclable paper by several paper mills constructed since 2000 in Asian countries, paper prices offered by those markets had been high. Other commodity prices had also been high. However, since 2008, prices have started to decrease.

The RFP should require a fee and revenue share such that as long as material revenue share exceeds the fee, similar to the City's current situation, the City makes no payment, thereby avoiding an annual budget line item, and the contractor pays the City according to formulas in the Service Agreement.

Should costs exceed revenue, the City would have to pay the Contractor. Effects of inflation should be allowed in the fee and proposing contractors should be required to cite the basis for annual inflation, so that fee increases can be easily calculated and reasonably projected for budget purposes. The RFP should suggest that the City would be amenable to a compensation structure that would allow the contractor to pay all costs and provide for a nominal profit even if material market conditions significantly deteriorate. Such a condition should be contingent upon the contractor providing detailed cost data and executing the Marketing Plan.

Reporting

In addition to the Marketing Plan, the RFP should require the reporting of several operating parameters, including, but not limited to, hours of operation, quantities (tonnage) processed, and revenue for each recycled commodity.

Residue Disposal

The City should specify terms by which it would provide landfill disposal capacity for MRF residue. A fee for disposal or no fee structure is feasible. An approach to provide no-fee disposal up to the maximum guaranteed residue rates would be reasonable, accompanied by a fee structure for quantities exceeding the guaranteed level. Other penalties for exceeding the maximum guarantee level would be specified elsewhere in the Service Agreement.

Capital Repairs

To ensure the long-term viability of the MRF (facility), process equipment and vehicles must be adequately maintained. Certain smaller expenses are required as they occur and manufacturer's preventive maintenance should be conducted each year. However, other larger, capitalized expenses occur at large intervals, such as three years, five years, or more, that are required to maintain the equipment's performance. A plan for capital repair schedule should be a proposal requirement. The Service Agreement should require that it be updated each year, including a report on items and their cost that were replaced during the year, as part of a year-end report.

Continuous Monitoring

The City would want rights to monitor the performance of the MRF on an ongoing basis, with rights to come on site daily, at the City's discretion.

Additional Materials

The RFP should specify the process that the City would want to use to add any new recyclable commodities/materials to the program. Additions would be a negotiated revision to the Service Agreement. Acceptance of materials from non-City sources should benefit the City in the form of higher revenue sharing. Proposals should specify how the contractor would modify the system in the future. Included in this item would be assurances that system components will be designed to accommodate certain specified types of modifications at reasonable costs.

Event of Default

The RFP should specify all of the events of default that are common with MRFs. This section provides the understanding of conditions that the contractor must "fix" in order for the contractor to continue meeting the City's expectations and continue serving the City. Examples are overnight storage of incoming materials (due to unavailability of processing capacity), failure to meet residue or other Performance Standards, failure to market materials, and others.

City-Owned and Provided Site

For a MRF constructed on a City-owned property site, the RFP should state the requirement of the City, or its representative or consultant, to have oversight and judgment regarding acceptability of work as it pertains to the use of the site. For example, input on the site plan, utilities, building, and possibly others.

5.9 MRF Capital and Operational Costs

An important element of the feasibility analysis is to identify expected capital and operations cost to develop and operate a MRF. Without knowing the contractual conditions that would be negotiated with a private contractor, the cost estimate provides a basis for general costs for designing/building and operating the facility. A basic MRF facility is assumed for this assessment as shown in **Exhibit 9**. This facility would sort and process the five basic commodities, including cardboard, mixed paper, tin/steel cans, aluminum cans, and mixed plastics.

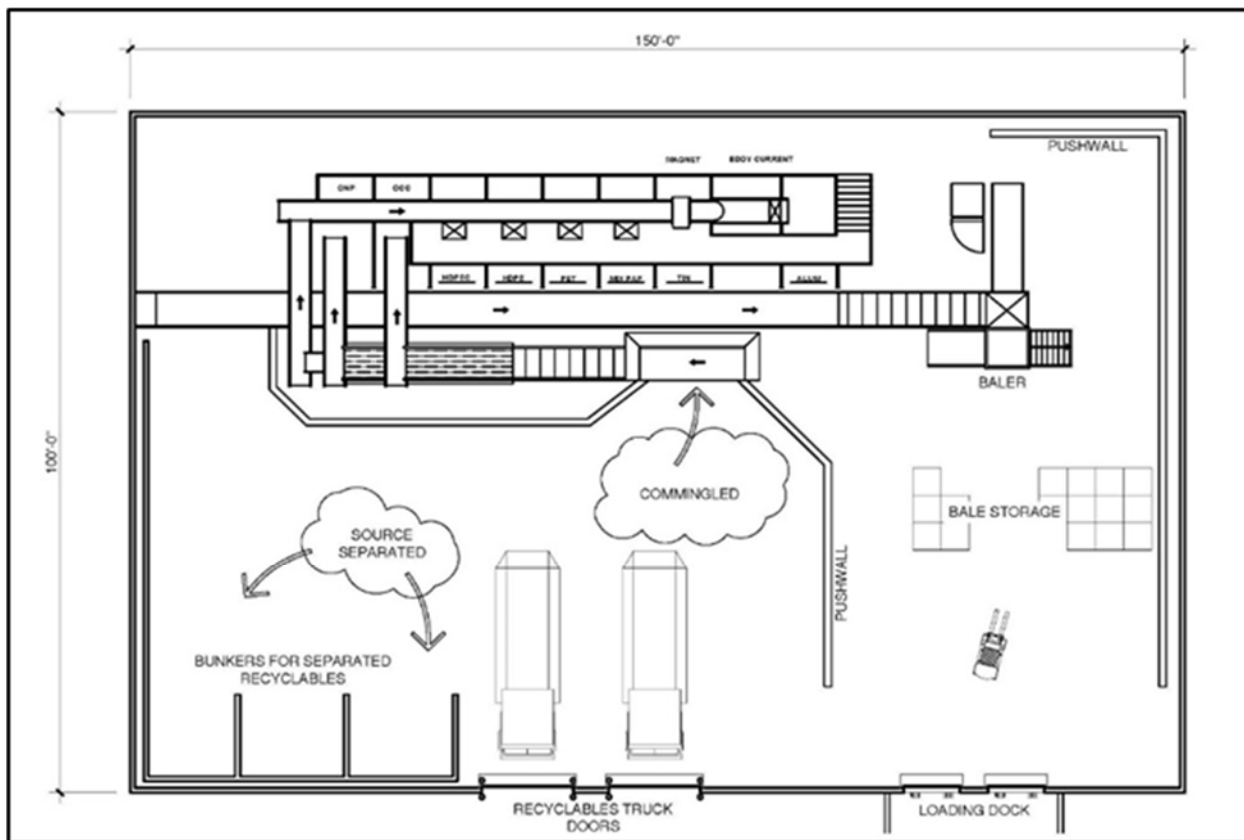


Exhibit 9. Basic MRF Building Layout Plan (courtesy of Bell & Associates)

A MRF to serve the City and its quad-city area (and possibly regional) partners would be sized to handle the maximum quantities expected for the planning horizon. Based on the quad-city area collecting approximately 10,600 tons in 2018, this quantity would be expected to grow at an aggregate rate of approximately 0.6% per year – the same as expected population growth. Assuming three years for planning and implementation, the first year of operation would be 2021. In 2021, nearly 11,000 tons per year (tpy) is forecasted for the quad-city area. This translates into approximately 900 tons per month and 42 tons per day (tpd) on a five-day week basis. Quantities projected for 20 years after startup, or in year 2040 are approximately 12,400 tons per year, or 6 tons per hour (tph) over an 8-hour work day (2080 hours per year). For this assessment, a range of tonnages was considered from 10,000 tpy to 20,000 tpy to determine the impact on cost. Thus, design capacities between approximately 5 to 10 tph were evaluated, assuming a single processing system. Above 10 tph, a second process system would be required, needing a larger building and likely doubling the existing process equipment capital costs.

As an example, a 10 tph system would be capable of 70 tons in seven hours of actual processing. With this system, operating hours could be expanded, growing to 10 hours of actual processing a day in the distant years and increasing the daily tonnage to 100 tpd. These greater hours of operation could be handled with a split shift (a second shift running less than eight hours). For the private operation alternative and likelihood that the operator would bring commercial business into the MRF, daily quantities would be even higher, improving the economics of the second shift of plant operations. Additional quantities of materials generated by increasing the types of items in the recycling program have not been included. As additional feed stock is added, the facility could move from eight-hour shifts to ten-hour shifts as required.

A facility of this capacity would require a minimum 15,000-square-foot building with approximately 1,000 square feet allocated for office space and staff locker rooms on a minimum of 5 acres (2 acres developed). Land purchase price and other acquisition costs, and demolition costs, if needed, are not included. It is assumed that the vacant land will be provided and if a siting study is needed, it will be paid for by another source. It is assumed that construction site work will include the need for all new utilities. Cost allowances for power feed lines, electrical transformers and natural gas are included. Allowances for water, sewer, and sanitary lines are also assumed.

Processing equipment is included in the building costs to recover the five basic commodities – in-feed conveyor, belt conveyor with pre-sorting stations to remove garbage and materials that could cause damage to downstream equipment, OCC and mixed paper separation using disk screens, ferrous metals (tin and steel) separation by magnet, nonferrous (aluminum) separation using an eddy current with the remainder being mixed plastics, and a compactor/baler. Allowances are also provided for steel bunkers, control panel/wiring, and steel platforms.

Cost factors are based on historical costs on comparable past projects constructed in the past three years that have been adjusted to 2018 pricing. Applicable sales tax is not included. Estimated capital cost are presented in **Table 4**. The total capital cost is then assumed to be paid through City-issued certificates of participation over a 20-year period at a 6% interest rate. This results in an annual capital cost \$801,000.

Table 4 –MRF Construction Cost Estimate ⁽¹⁾

Cost Item	Cost	Notes/Assumptions
Site Work	\$614,000	Site clearing, earthwork, surfacing, signage, fences and gates, and landscaping
Site Utilities	\$135,000	Fire suppression water service and hydrants, BFP valves, domestic water and sewer, storm drain system, electrical and site lighting
Building	\$1,913,000	Approximately \$128/sf pre-engineered metal building
Processing Equipment	\$1,966,000	In-feed conveyor, sorting belt conveyor, OCC and mixed paper screens, magnet, eddy current separator, platforms, steel bunkers, and baler
Scales/Scale House	\$148,000	200 sf stick-built structure, two 35-ft above ground scales, and electronic systems.
Subtotal Direct Costs	\$4,776,000	
General Conditions	\$1,003,000	Includes overhead and profit, mobilization, demobilization, insurance, bonds, etc.
Total Direct Costs	\$5,779,000	
Engineering/Professional Costs	\$1,300,000	Permitting, design, inspection/testing, and service during construction (construction administration and oversight)
Project Subtotal	\$7,079,000	
Contingency – 30%	\$2,121,000	For unknown costs based on the concept-level of design
Project Total	\$9,200,000	
Annual Payment	\$801,000	Assumes 20-year loan or bond at 6%

Notes:

¹ This cost opinion is based on concept design as a study of feasibility with a level of design between 1%-15%. As defined by AACE International's standard classification this is considered a Class 4 Estimate with a typical accuracy range between -30% to +50%. The cost of the project will depend ultimately on final design, market conditions, actual labor and material costs, actual site conditions, productivity, project scope and schedule, and other factors. As a result, the actual project costs will vary. Because of these factors, funding needs must be carefully reviewed by the City before making specific financial decisions or establishing final budgets.

In the past decade, significant increases in prices for process systems have been experienced. This is due to a large degree to price increases for raw materials, especially steel. Steel prices reached levels more than 40 percent higher in the last decade. Another factor is the lower U.S. dollar purchasing power when purchasing system components from manufacturers located in European and Asian countries. Additionally, are the higher costs associated with designing a system that has provisions for adding materials to the recycling program, usually resulting in longer sorting conveyors or similar effects.

Replacement funds for both fixed and mobile equipment are also required. Because mobile equipment is expected to have a life cycle of 10 years, it is assumed that money will need to be set aside annually so that at the end of the 10 years, the funds will be available to purchase replacement equipment. The same is assumed for the fixed equipment but with a life cycle of 20 years. Building replacement costs are not included. Both replacement funds account for inflation in equipment prices.

Operations and maintenance costs are estimated for a basic MRF operating five days per week. Operations and maintenance costs per ton for processing are provided in **Table 5**. The

equipment used in the cost analysis could process on average 10,000 tons per year, up to a maximum of 20,000 tons per year. For a point of comparison, the cost to operate a MRF with only 1,000 tons per year was evaluated. This is close to the estimated amount of single stream available from Moscow/Latah County of 740 tons in 2017. This tonnage is expected to climb to almost 1,000 tons with the addition of the commercial accounts in January 2018.

Table 5 – Annual MRF Operating Cost Estimate ⁽¹⁾

Operating Cost Item	1,000 tons	5,000 tons	10,000 tons	15,000 tons	20,000 tons	Notes/Assumptions
Labor Costs	\$187,000	\$224,000	\$297,000	\$334,000	\$407,000	Scaled costs for labor – 250 work days
Bond/Loan Repayment	\$801,000	\$801,000	\$801,000	\$801,000	\$801,000	20-year loan/bond at 6% interest
Operational Costs	\$97,000	\$251,000	\$446,000	\$602,000	\$821,000	Utilities, supplies, maintenance, etc.
Subtotal Operating Costs	\$1,085,000	\$1,277,000	\$1,544,000	\$1,737,000	\$2,090,000	
Total Processing Cost	\$1,118,000	\$1,315,000	\$1,590,000	\$1,789,202	\$2,090,000	With 3% operating reserve
Material Value (Revenue)	-\$3,000	-\$14,000	-\$28,000	-\$41,000	-\$55,000	Based on June 2018 commodity pricing as reported by Republic – refer to Table 3; assumes \$84/ton for disposal (LSI's rate)
Cost Less Revenues	\$1,115,000	\$1,301,000	\$1,563,000	\$1,748,000	\$2,035,000	
Cost Per Ton	\$1,115	\$260	\$156	\$117	\$102	
Cost Per Ton w/ Operating Margin/ Reserve	\$1,394	\$325	\$195	\$146	\$127	Assumes 25% margin/reserve
Monthly Customer Set-out Weight (Moscow)	12.3 lbs	12.3 lbs	12.3 lbs	12.3 lbs	12.3 lbs	Assumes set-out rate stays the same in Moscow regardless of annual tonnage contributed from the quad-city communities
Cost per Customer per Month	\$8.56	\$2.00	\$1.20	\$0.89	\$0.78	

Notes:

¹. Refer to Table 4 for general assumptions and assumed level of accuracy for this Engineer's opinion of cost.

The net cost of receiving MRF services are driven by a number of factors, such as:

- Size and design of the facility;
- Location of the facility;
- Ownership of the facility;
- Length of contractual arrangement;
- Allocation of risks and price by the service provider;
- Value of recyclable commodities in the marketplace;
- Amount and cost of residue disposal in recyclables processed; and
- Direct or implicit sharing of product revenues, net of transportation costs to get to purchaser.

Recyclable products are commodities whose value rises and falls with demand, both domestic and worldwide. It should also be recognized, that as this report is authored, there continues to be a volatile market with speculation on the market demand and pricing for recyclable materials. It will be important to track the marketplace as decisions about developing a future MRF is made.

5.10 Estimated Service Fees and Rates

The City collected approximately 700 tons of single-stream in 2017. With approximately 9,500 accounts (single-family and multi-family residences) in the City of Moscow, the 700 tons equates to 147 lbs per customer (“account”) per year, or 12.3 lbs per month. LSI, through the franchise agreement with the City, is paying approximately \$166 per ton (refer to **Table 3**) to haul and process the single-stream at Republic Services’ Lander Facility in Seattle, Washington. This equates to approximately \$1.02 per customer per month.

Exhibit 10 presents a graphical representation of the material processing costs by quantity and a cost percentage increase as compared to the baseline cost of \$1.02 per customer per month.

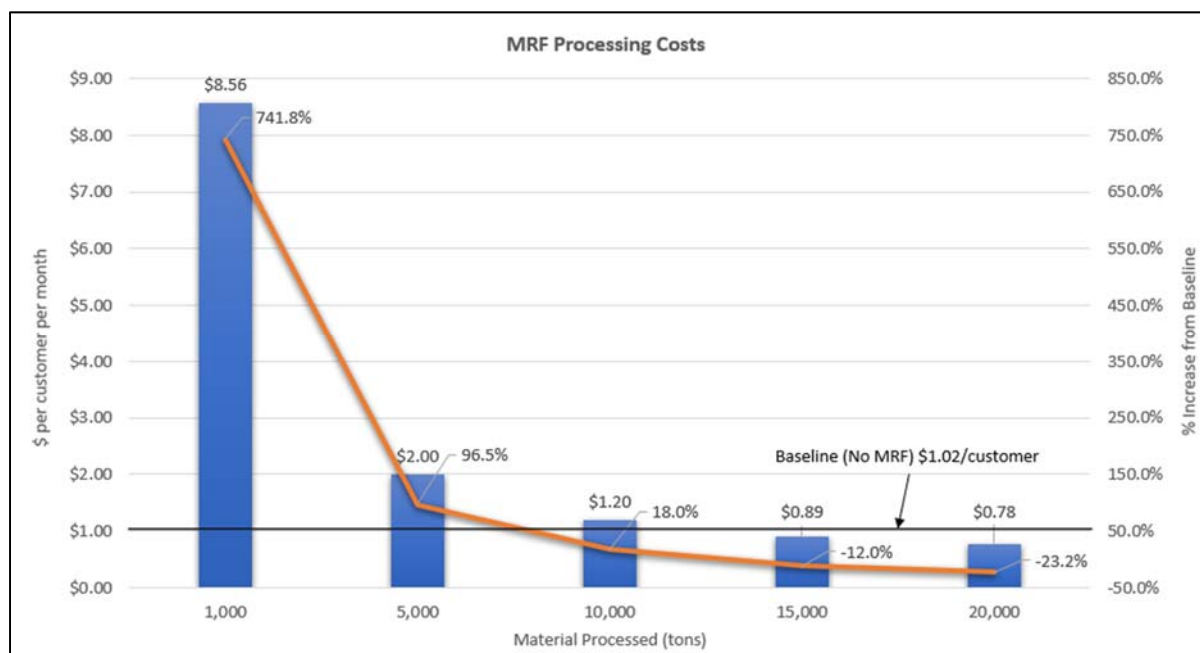


Exhibit 10. MRF Processing Costs on a Per Monthly Customer Basis

Assuming that only Moscow and Latah County would contribute recyclables to this program (and all are single stream), it would cost each Moscow customer \$8.56 per month to process minus prospective revenues, which is a fee increase of over 700%. By comparison, if Moscow can attract the projected amount of recyclables that are available today in the quad-city area of approximately 5,000 tons, the cost per customer would be \$2.00 per month or an increase of approximately 97%. With the maximum amount of 20,000 tons per year that the facility could handle, the monthly fee would go down to \$0.78 per customer – a decrease of about 23% of what each account is paying today.

With the exception of processing only 1,000 tons per year, this cost differences seem relatively low with the assumption that they could be easily absorbed in a small fee increase

for the customers. However, by percentage, these are large increases until about 10,000 tons per year are processed. Furthermore, there are other possible fees that would need to be added especially for contingencies in case the market has another sudden drop. That contingency might be on the order of an additional \$1 to \$2 per month per customer.

6.0 Summary and Recommendations

Assuming the City fully funds and operates (“hosts”) a MRF, the cost (\$ per customer per month) increase is not excessive as long as the City can attract single stream from all, or almost all, the quad-city area. If the City can also attract recyclables outside of the quad-city area, this would only help to offset the cost of operation. By itself, the City’s 1,000 tons per year of single stream would increase the rate by more than 7 times (over 700%). With contributions from the entire quad-city area, the total amount of single stream would increase to nearly 5,000 tons per year and the rate would still almost double what the customer is paying today.

It is expected that the processing costs and haul costs will continue to climb until there is a better market. The benefit of the City, or a quad-city area neighbor, to host a MRF is that it could pass along rebates it receives from the sale of commodities. These rebates are provided today by the large, regional MRFs but also the rebate pricing is offset by the companies need to generate a profit. A local government entity such as the City of Moscow would not be hosting a MRF to make a profit. It would be providing a service for their community and their quad-city area partners.

The investment could also be lowered with collaborative partnerships (that is, from quad-city neighbors) and/or entering into PPP arrangement with a private operator/investor. The investment is further complicated with the risk of owning and operating a MRF. Risk is a major consideration given the recent changes and uncertainties in the domestic and global recycling markets. The small MRFs will be the first to suffer if markets fall again as compared to the larger MRFs who have direct accounts and relationships with mills and remanufacturing plants. Small MRFs do not have the direct access, and therefore, do not have the same level of negotiation leverage in the sell price of their commodities.

Likely, the most feasible alternative for developing a local MRF by the City would be involving a private company in a PPP arrangement. This venture, however, has to be attractive to both parties. The contractor needs to fully and completely understand the local markets and how they will bring in other regional materials to make the facility sustainable. There are several advantages of involving private contractors in the process. Private contractors have developed equipment and systems specifically designed for waste materials, as well as relationships with product purchasers. Private sector companies typically operate multiple MRFs with systems already developed.

The main advantage of a private company is their ability to market broad ranges of materials. Private operators with significant market standing are able to market materials at prime dollar. Most private companies have longstanding relationships at mills. Certain materials can be very challenging for a small operation to market as most mills use exclusive supply agreements to control the flow of feedstocks. The small operator is rarely

able to break through to direct mill marketing, and therefore, must rely on brokers, who in turn retain a percentage of the market value for themselves and erode profits.

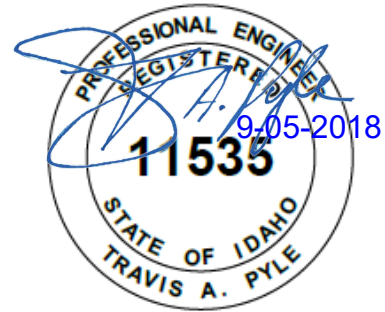
Perhaps the most important difference between private and public operations is experience. The private companies generally bring a wealth of knowledge related to the specific operation. From acquisition of appropriate equipment to the specialized maintenance requirements of these systems, the private companies have a great advantage. Public operators rarely have history managing and maintaining the complex manufacturing systems which MRF's represent. This lack of experience can lead to higher system costs with reliance on third-party companies to provide maintenance and service. The City of Albuquerque's experience with their processing facility, which stopped processing commingled materials in 2014, exemplified this challenge.

There are a lot of factors to consider should the City continue to contemplate hosting a local MRF. Risk, as previously mentioned, is a major factor. It also comes down to interest from a private contractor to establish a PPP and having enough material in the area to make it attractive. The City should consider discussing the option of investing in a local MRF with their long-time waste contractor, LSI. Another option to consider is issuing a EOI to see what level of interest there is from other private companies. This would give the City a chance to evaluate the level of interest in the marketplace. And lastly, the City should consider a collaborative partnership with Whitman County who is also assessing the viability of hosting a MRF at the Carothers Road Solid Waste Facility.



City of Moscow Sanitation Program Review

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DATE: September 5, 2018
PROJECT NUMBER: 4-17150
REVISION NO.: 0
APPROVED BY: Travis Pyle, PE/Great West *T.P.*



1.0 Introduction

The City of Moscow retained Great West Engineering to provide a review of the City's sanitation services program. This evaluation is being conducted under Task 3 (Deliverable 3.1 – Technical Memorandum #3) of the Comprehensive Sanitation System Master Planning Services Project ("Project"), in accordance with the contract between Great West Engineering, Inc. and the City of Moscow, dated February 26, 2018.

1.1 Purpose/Objectives

The purpose of this task is to prepare a general review and limited assessment of the City's current sanitation system that includes both solid waste and recycling programs. The objectives are to provide a summary of the services that are provided by the City, an overview of the recent public outreach activities, and a relative cost comparison of Moscow's services with other similar programs in the Pacific Northwest region.

1.2 County and City Population Growth Estimates

The population of the City of Moscow is expected to grow an average of 1.15% per year, while Latah County, without the City, is anticipated to grow 0.56% per year (per the City's Finance Department). The County, including the City of Moscow, is expected to grow 0.92% per year. **Exhibit 1** provides a bar chart showing the growth of Moscow relative to Latah County (without Moscow).

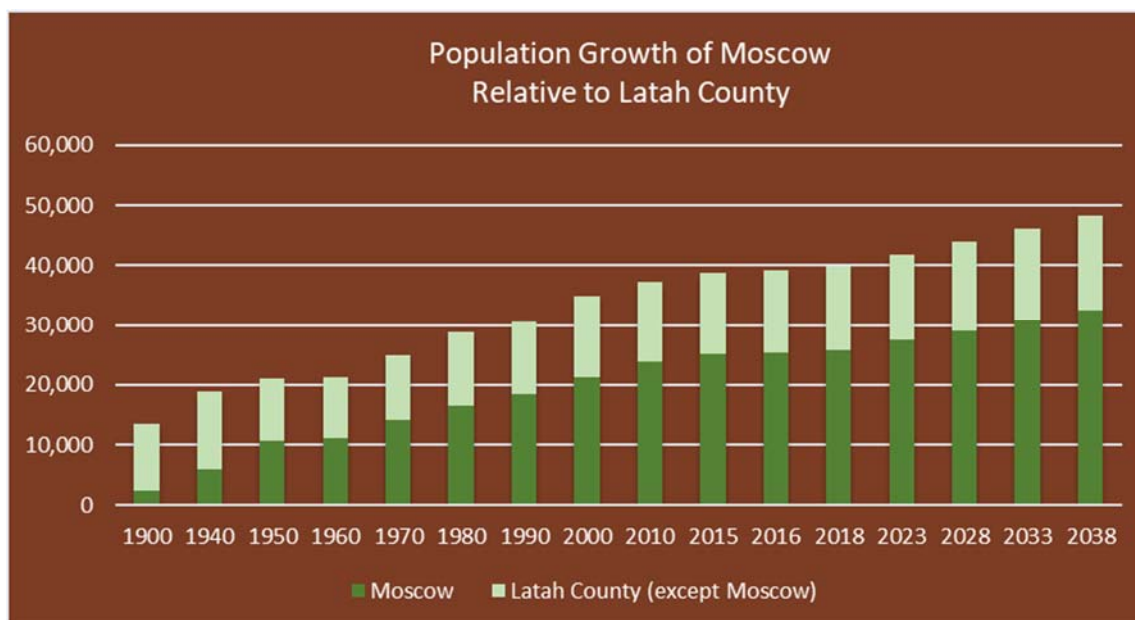


Exhibit 1. Population Growth of Moscow Relative to Latah County (Courtesy of Moscow)

1.2.1 City and County Solid Waste

In Latah County, the total solid waste generated per year averages approximately 38,000 tons, based on 2013-2017 tonnages (refer to **Table 1**). Solid waste includes all the various waste types and those materials that are recycled or otherwise diverted from disposal. These include the following materials:

- **Municipal Solid Waste (MSW)** – Collected curbside in the City and direct-hauled waste to the Solid Waste Processing Facility (SWPF) by residents and commercial customers.
- **Non-Municipal Solid Waste (NMSW)** – Inert and construction and demolition (C&D) wastes collected from commercial accounts in the City and also direct-hauled to the Non-Municipal Solid Waste Landfill (NMSWFL) at the SWPF.
- **Conventional Recyclables** – Single-stream recyclables collected at the curb from both residential and commercial accounts in the City, and presorted materials dropped off at the Moscow Recycling Center (MRC).
- **Yard Waste** – Collected at the MRC and direct-hauled to the SWPF for grinding and composting. Yard waste materials include lawn clippings, clean wood, and brush.
- **Biosolids** – Dewatered sludge, generated from the City's wastewater treatment plant, which is direct-hauled to the SWPF for composting.
- **Other Diverted Materials** – Materials direct-hauled to the SWPF, including scrap metal, appliances and tires.

Of the 38,000 tons of total solid waste generated by Latah County, about 26,000 tons (or 68%) is municipal and non-municipal garbage. The remaining 12,000 tons (or 32%) is diverted from the waste stream by recycling and composting operations.

Table 1 – Solid Waste Tonnages

Waste	2013	2014	2015	2016	2017	Average
Total Solid Waste	26,493	24,442	25,489	26,910	26,985	26,064
MSW	18,207	18,266	18,690	19,527	20,059	18,950
NMSW	8,286	6,176	6,799	7,383	6,926	7,114
Total Recyclables	11,977	12,080	11,699	12,620	12,498	12,175
Conventional Recyclables	3,638	3,605	3,417	3,538	3,433	3,526
Curbside Pickup	514	524	454	537	697	545
Moscow Recycling Center	3,124	3,080	2,963	3,001	2,736	2,981
Yard Waste	3,842	3,891	3,761	4,335	4,81	4,042
Biosolids	4,000	4,000	4,000	4,000	4,000	4,000
Other Materials ⁽¹⁾	497	584	521	747	684	606
Total Waste	38,470	36,522	37,188	39,530	39,483	38,239
Diversion Rate	31%	33%	31%	32%	32%	32%

Notes:

1. Includes scrap metals, appliances, and tires.

Of the total approximate 19,000 tons of MSW collected annually in the County, 9,000 tons (or 47%) of it is collected curbside in the City of Moscow. Moscow residents also direct-hauled their MSW and NMSW to the SWPF.

As Latah County continues to grow, so will its generation of solid waste. Solid waste is expected to increase at the same rate as the population growth rate. **Exhibit 2** shows the 20-year growth projection of total solid waste (MSW and NMSW).

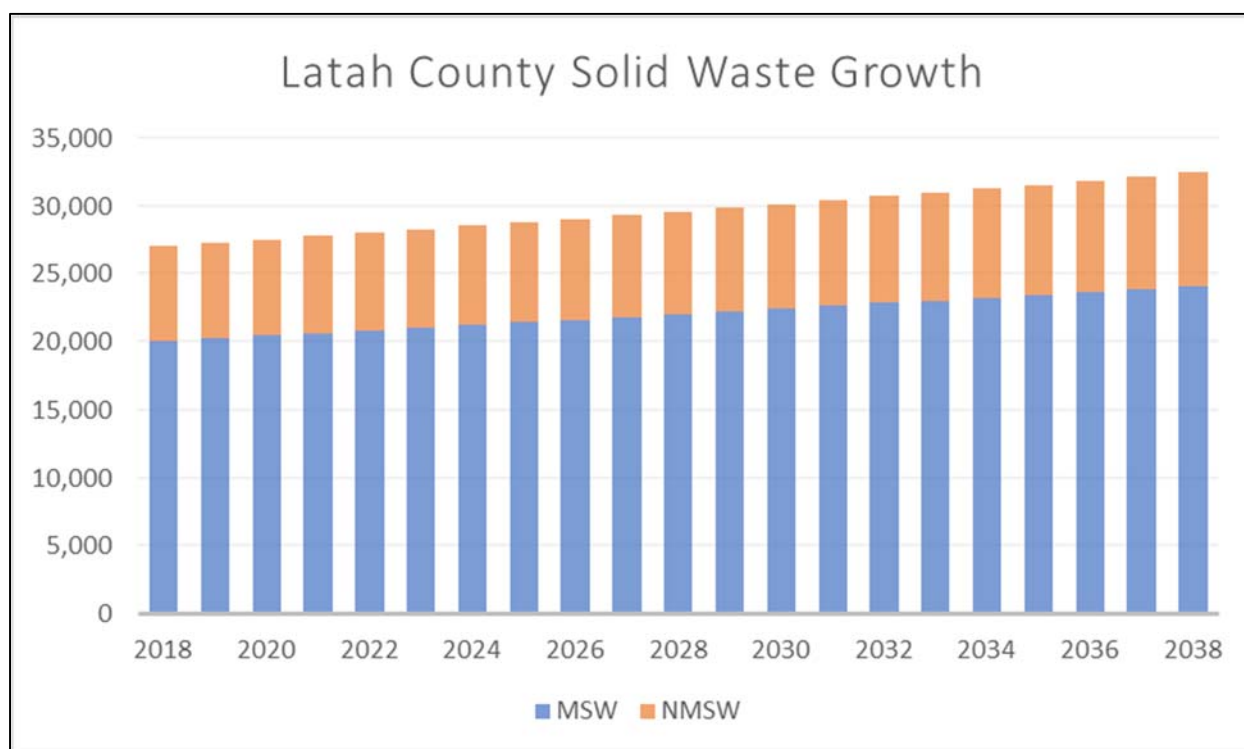


Exhibit 2. Solid Waste Growth Projection

1.3 City and County Recycling

At the curb, Moscow residents are currently recycling about 700 tons per year. These recyclables are hauled to the MRC and account for 20% of the total conventional recyclables

handled through the facility. Comparing curbside recycling to curbside waste collection amounts, only 9% of the waste stream is currently diverted in the City through the curbside collection program. In addition to curbside collection, a good portion of the City’s resident’s drop-off pre-sorted recyclables directly at the MRC. The center, however, is used by a combination of City of Moscow and Latah County residents, and some out of county residents. A recent 2018 intercept survey at the MRC indicated that 67% of the users are from the City of Moscow. Assuming that this same percentage corresponds to the total tonnage of recyclables collected at the center, the diversion rate increases to over 2,000 tons per year, equating to a total diversion rate of approximately 20% in Moscow.

With the implementation of the single-stream recycling program in February 2016, the annual amount of conventional recyclables collected at the curb in Moscow increased by over 130%¹. The total amount processed at the MRC, however, has remained relatively steady over the last 5 years (2013 – 2017) (refer to **Exhibit 3**). The average amount of materials handled at the center, over this same period, is approximately 3,500 tons per year². The single largest tonnage of any one recyclable is corrugated cardboard, which makes up an average of 1,300 tons per year (or 30% of the total tonnage). Of the 1,300 tons, about 300 tons are collected from direct drop-off at the MRC, and the remaining approximate 1,000 tons are collected from City businesses.

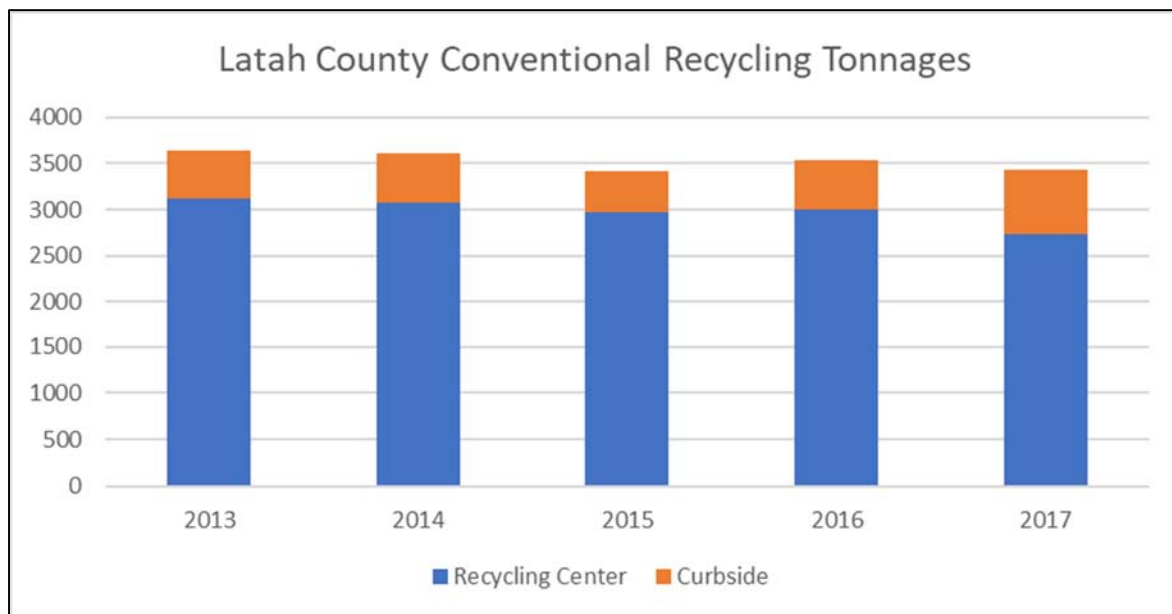


Exhibit 3. Moscow Recycling Center – Recyclable Material Tonnages (Conventional Recyclables)

Based on the population estimates (and excluding the amount of cardboard collected from businesses), the City and Latah County residents together recycle approximately 0.06 tons

¹ Previous to roll-out of the single-stream program, the City also collected glass curbside as part of the pre-sorted curbside collection program. Glass collection was not included in the single-stream collection program. Subtracting the amount of glass collected previously and comparing the two one-year periods of February-January 2015 (281 tons) and February – January 2016 (651 tons), curbside recycling increased by over 130% in accordance with the City’s estimates.

² This total tonnage includes on average approximately 50 tons of “out of county” recyclables, which are collected from a bordering Nez Perce County site that LSI operates.

per year per person. This per capita figure has also remained relatively steady over the last five years (2013 – 2017).

At this point in time, recycling in Latah County is expected to grow at a rate equal to the population growth rate. Although the City of Moscow has implemented a commercial curbside collection program, which is expected to increase the amount of recyclables collected per capita, this will be offset by a reduction in the types of materials that can be recycled. Changes in the global markets are affecting the types of materials that can be recycled. As a result, the City is embarking on an education outreach program to inform the community of upcoming changes and will be changing the types of recyclables collected both curbside and at the MRC.

Exhibit 4 shows the 20-year growth projection for County-wide recycling. The category “Other Diverted Waste” includes yard waste, biosolids and other miscellaneous materials (scrap metal, appliances, and tires).

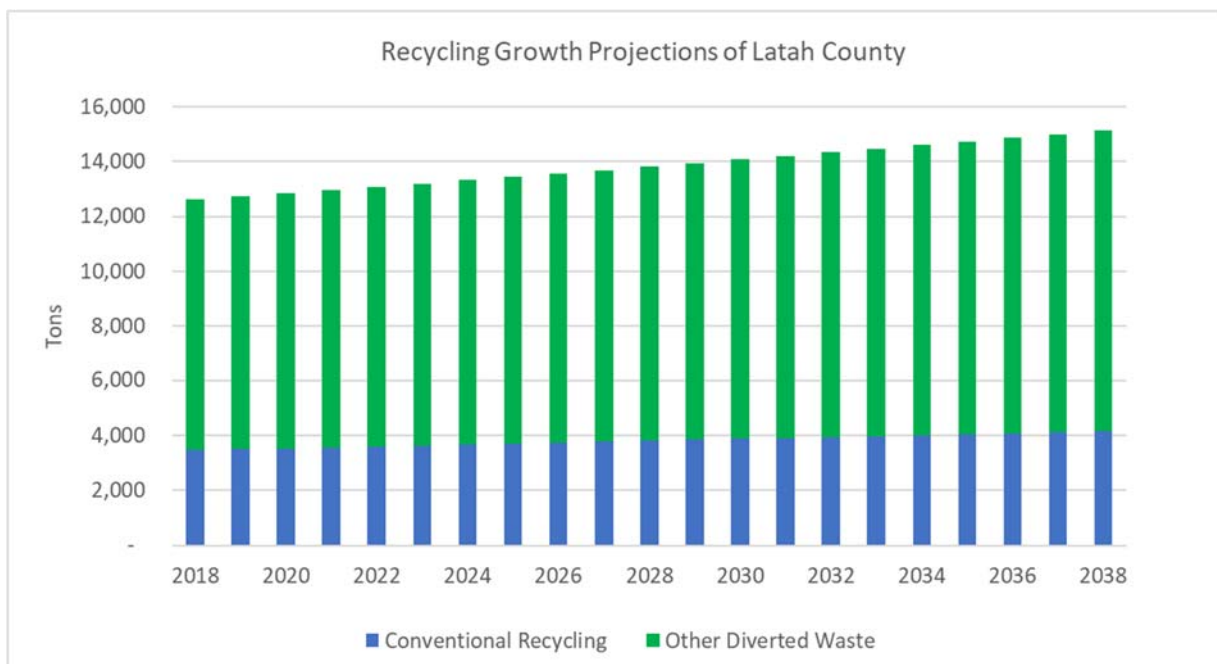


Exhibit 4. Latah County Recycling Growth Projections

2.0 Sanitation Services Program

The City’s Sanitation Division is administered through the City’s Finance Department. Tim Davis is Sanitation Operation Manager and oversees the program for the City. Mr. Davis works closely with the City’s sanitation service provider, Latah Sanitation, Inc. (LSI). The sanitation program includes the SWPF, the MRC, and the curbside collection program MSW and single-stream recyclables.

In 2015, the City granted a franchise agreement extension with LSI for an additional 20-year term. The agreement is for: (1) solid waste and recyclable collection services within the City; and (2) operation of the waste transfer station at the SWPF, the MRC, and associated solid waste facilities.

LSI owns, operates and is responsible for all capital assets and equipment utilized in the sanitation system operations, except for the MRC which is owned by the City of Moscow. It is anticipated that the City will continue to receive sanitation services under the current franchise agreement with LSI until the end of the agreement term. Additionally, the City contracts with Waste Connections for MSW transport and disposal (T&D) services. MSW is long-hauled to Waste Connection's Finley Buttes Landfill in Boardman, Oregon.

2.1 City's Sanitation Division Goals

The Sanitation Division strives to build community confidence by actively exploring and assessing viable new technologies and opportunities in the management of the waste stream which protect the health, safety, and cleanliness of the City of Moscow. The goals are to:

- Deliver quality, efficient, and effective solid waste sanitation services and programs to the community at a good value.
- Deliver a system which encourages the reduction of solid waste and remains flexible and readily adaptable to the complexities of growth, change, and customer service needs.
- Design sanitation programs which recognize the fiscal and environmental responsibilities entrusted in the City.

The Sanitation Division continually strives to improve neighborhood collection day aesthetics and conditions, promotes product stewardship and producer responsibility and informs the public through the waste reduction education program efforts to rethink, reduce, reuse, and recycle.

Solid waste is regulated under the City's Solid Waste Ordinance (Chapter 9 of the Title 9 – Business Regulations). Solid Waste fees, along with other City service fees, are set through City resolutions. The current resolution setting fees were adopted on August 15, 2016 (Resolution No. 2016-15).

2.2 Solid Waste Processing Facility (SWPF)

The SWPF is located approximately 5 miles east of the City of Moscow on Highway 8 (3299 ID-8) (refer to **Exhibit 5**). LSI owns and operates the SWPF. The facility accepts both MSW and NMSW such as demolition debris, clean wood waste, yard waste, large appliances (whitegoods), scrap metal, asbestos, household hazardous waste (HHW), and tires.

The SWPF is open from 8:00 am to 4:00 pm, Monday through Saturday. The HHW facility is open every Saturday from 8:00 am to 3:30 pm from April through October, and the first Saturday of each month from November through March, during normal SWPF business hours.

The SWPF generally consists of the following buildings and infrastructure:

- A single in-ground platform scale with a scale shack at the entrance that is used for both inbound and outbound customers;
- A waste transfer building (WTB) used for MSW drop-off and top-loading of long-haul waste trailers;
- A non-municipal solid waste landfill (NMSWLF) – both closed and active areas;

- A composting facility with yard waste/woody debris piles and grinding operations (and biosolids drop-off area);
- A household hazardous waste (HHW) facility;
- Collection points for appliances, scrap metal and tires; and
- Various supporting facilities and infrastructure, including an office/administration building, maintenance shop building, fueling station, roads, and stormwater management systems.

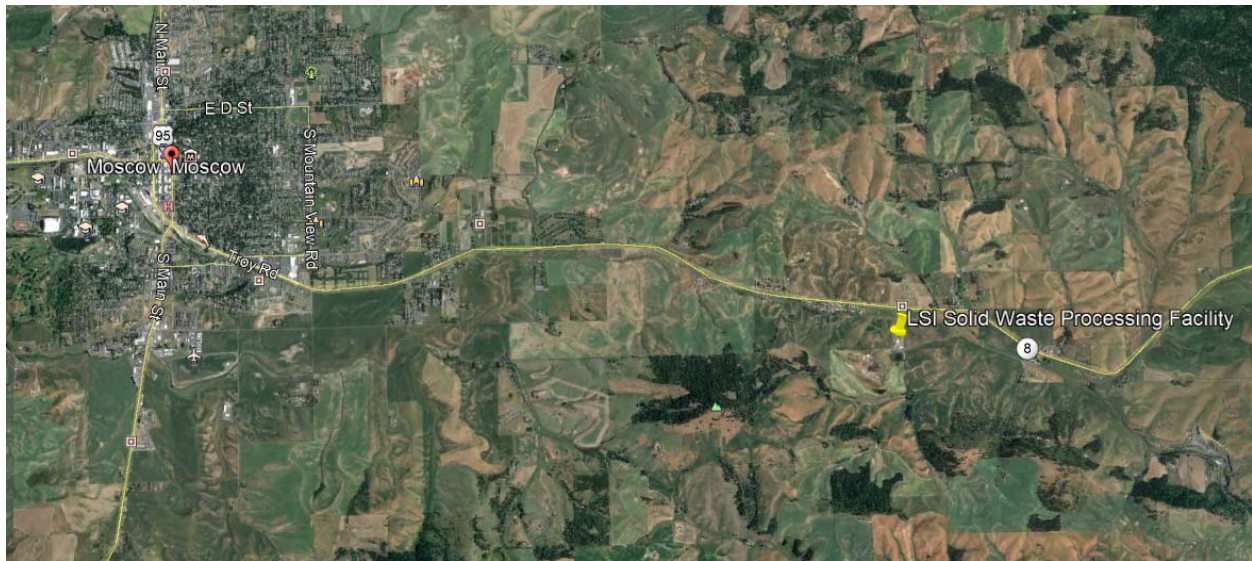


Exhibit 5. Location of the Solid Waste Processing Facility

2.2.1 Composting Facility

Composting operations are conducted as part of the franchise partnership with LSI at the SWPF. Compost is produced from two primary feed stocks – biosolids and yard waste. The City produces approximately 4,000 tons of dewatered sludge (biosolids) annually at the City’s wastewater treatment plan. Approximately 3,500 tons of yard waste (grass clippings, tree limbs, brush and the like) are collected annually from a number of sites in Moscow and Latah County, including: the MRC, City of Potlatch and City of Genesee. Material is also self-hauled directly to the SWPF.

The composting operation also includes collection of clean wood waste. Collection of this material started as a pilot program in October 2014 and has gained popularity ever since. Woody materials containing nails and screws are acceptable and can be processed with the metals removed utilizing magnets. Other metals and foreign materials that could cause damage to the grinding equipment are not accepted. Clean lumber materials that are unpainted and untreated are accepted (e.g., pallets and scrap dimensional lumber). Plywood, wafer board and particle board-type lumber that contain glues are not accepted.

Once received at the SWPF, the yard waste and clean wood waste is ground, using a large grinder, then blended with the biosolids at approximately a 5 or 6 to 1 ratio, by volume. The blended material is then piled in covered bays that are equipped with a controlled and sophisticated static pile aeration system built under the concrete floor (refer to **Exhibit 6**). Composting is an aerobic process that begins as air is forced into the piles. This increases the temperature of the pile, which is constantly monitored from various locations, to a point

where pathogen destruction and reduction of vector attraction occurs. This process can be completed in 15 to 30 days.



Exhibit 6. Static Pile Composting Operations at the SWPF

After the process of pathogen reduction is complete, the piles are then moved outside to windrows, to cool and cure (refer to **Exhibit 7**). The curing piles are sampled and tested before the screening and distribution takes place to ensure the material meets the requirements for Class A material in conformance with EPA 40 CFR 503 regulations. The composting facility and process is regularly inspected by regulatory agencies and the City of Moscow.



Exhibit 7. Curing Compost Piles at the SWPF

The City of Moscow offers compost free of charge to residents of the City of Moscow and Latah County. It is available at the SWPF during normal business hours. The uses and best practices of the compost offered by LSI are:

- The compost is safe for use on lawns, turf, and as landscape mulch.
- The compost is not recommended for use in vegetable or flower gardens. Trace residues of broadleaf herbicide may be present and potentially affect sensitive plants.
- This compost is recommended to only be used in a manner consistent with these recommendations to avoid risks to sensitive plants.

2.3 Moscow Recycling Center (MRC)

The MRC is located at 401 N. Jackson Street in the City of Moscow. Moscow Recycling is a public/private partnership between the City of Moscow and LSI and offers recycling services for both commercial and residential customers with over 30 commodities accepted. The center sits on a parcel of land with an area of approximately 72,900 square feet (or 1.67 acres) and is situated between N. Almon Street to the west, N. Jackson Street to the east, private property to the north, and C Street to the south. **Exhibit 8** shows a photograph of the MRC.



Exhibit 8. View of Recycling Center and Redemption Office Looking Northwest

The facility is open 24 hours a day, 7 days a week for drop-off of recyclables and yard waste. The buyback office and main office hours are Tuesday through Saturday, 9:30 am to 5:30 pm. The facility offers large volume drop-off Tuesday through Saturday from 10:00 am to 4:00 pm. Much of the property is enclosed by perimeter chain link fencing. There is a grade-break with a z-wall (retaining wall) between the yard waste drop-off area on the west side of the property along N. Almon Street and the main building.

In 2013, the City reported that there was insufficient expansion capacity at the MRC. Recycling had grown from approximately 2,424 tons annually in 1995, to 3,644 tons in 2013, over a 50% increase since the center was opened. Operating with the original 1993 design, it was reported that warehouse/dry storage areas of the MRC were becoming inadequate and there were safety concerns with vehicles/equipment interfacing with people. These issues will continue to become increasingly problematic with continued population growth and increased volumes of recyclables.

The long-term goals reported by the City in 2013 were to:

- Increase the overall capacity and capability of the City's recycling program and facilities,
- Reduce the number of risk factors involved with public interaction with forklift/skid steer equipment at the Recycling Center, and
- Decrease the frequency and length of wait times at the MRC.

The City is currently looking at relocating the existing recycling processing and baling components of the MRC to the SWPF, when property where the existing MRC is located gets repurposed for a different City use. The primary intent of the changes proposed for the new recycling center is to decouple the processing and baling components and still provide a convenient drop-off location for recyclables and yard waste for the public within the City limits. This will require development of a new piece of property somewhere in town to continue to provide this convenience to its residents.

Prototypical layout concepts for the new recycling center are being prepared and are included in a separate technical memorandum, "City of Moscow Recycling Center Prototypical Layout," (Great West, September 2018).

2.4 Curbside Collection Program

The City of Moscow provides curbside collection of MSW on a weekly basis through its franchise agreement with LSI. The curbside recycling program began in 1999, with collection of pre-sorted materials. This program continued until February 1, 2016 when the City implemented single-stream ("no sort") recycling collection every other week with single family customers collected on one week and apartment complexes and Good Samaritan Society duplexes collected on alternating weeks. The single-stream curbside recycling program costs are included in the refuse rates whether one chooses to participate in the program or not. Participation in the single stream curbside recycling program is easy and may potentially result in downsizing of current solid waste service levels, resulting in savings on monthly refuse bills. In January 2018, the City extended the curbside collection program to businesses.

The single-stream recycling program adds convenience and customer participation, resulting in an increased diversion rate and reduction of garbage going to the landfill. Residents can choose either a 65 or 95-gallon recycling roll cart. Materials that are currently accepted in the single-stream bins are shown in **Exhibit 9**. Glass is collected at the MRC.

 YES 	 NO 
These kinds of things go in the recycling cart.	These kinds of things DO NOT go in the recycling cart.
Plastic: <i>Empty, Rinse and Remove lids & caps</i> <i>Labels OK</i> #1 through #7 Milk, water, juice & pop bottles Yogurt, dairy & margarine tubs Shampoo & conditioner bottles Bathroom, kitchen & window cleaner bottles Detergent & fabric softener bottles Plastic bags (<i>must be combined, bagged & tied tightly within a plastic bag</i>) Clean plastic cups Clean plastic plant pots	Glass: NO glass of any kind!
Metal, aluminum & tin: <i>Empty and rinse out food residue - Labels OK</i> Beverage cans Food cans Clean aluminum foil and foil trays Pots and pans	Plastic: NO Styrofoam of any kind! NO Plastic caps or lids NO Plastic plates or utensils NO Plastic clothes hangers NO Plastic motor oil or anti-freeze containers NO Plastic prescription containers NO Candy wrappers or chip bags NO Ziploc bags
Mixed paper & newspaper: <i>Keep it loose - don't bundle, bag or tie</i> Newspaper, inserts and advertising Junk mail, envelopes, and office paper Shredded paper (<i>bagged in clear plastic bags</i>) Cereal & dry food boxes (<i>remove liner</i>) Paperback books, magazines, catalogs & phone books Non-foil wrapping paper Frozen food and juice boxes Milk, juice and broth cartons Clean paper cups	Metal, Aluminum & tin: NO Caps, rings or lids (<i>under 3 inches</i>) NO aerosol spray cans NO Paint cans NO Sharp or greasy metal NO Metal clothes hangers
Cardboard: Flatten <i>(less than 3 ft x 3 ft)</i>	Paper: NO Food-soiled food boxes NO Disposable diapers NO Ribbons or foil wrapping paper NO Wax or plastic-coated cardboard NO Paper towels, plates or napkins NO Dirty or soiled paper or facial tissue NO Hardback books* *Tip: remove covers & binding for garbage (<i>pages are recyclable</i>)
	Miscellaneous: NO CD's or DVD's, Blu-rays or cases NO Household batteries NO light bulbs or fluorescent bulbs NO Ceramics or dishes NO Electronics
When in doubt leave it out	

Exhibit 9. Acceptable and Unacceptable Materials for the Curbside Collection

Moscow residents are encouraged to drop-off extra recyclable materials at the MRC or wait until the following week for the next curbside pick-up. If residents try to put more garbage than will fit into their roll carts, they are charged additional fees. Residents that produce more waste, pay more, under this “volume based” system. Volume based billing reflects the idea that residents who produce more waste should be charged accordingly. Tailoring the size of the roll cart to the amount of waste produced and charging a higher fee for larger cart sizes encourages residents to recycle and reduce the amount of waste they produce.

Currently, aluminum cans, tin/steel cans, cardboard, mixed paper, shredded paper, plastic grocery sacks, and plastics #1-7 are accepted for recycling both curbside and at the MRC. Glass is not accepted at the curb but is accepted at the MRC. Lightbulbs, window glass, lead glass, fluorescent bulbs, ceramics, and dishes, are not accepted at the MRC.

Changes in the global recycling markets are affecting the types of materials that can be readily recycled. This in turn is impacting recycling programs across the U.S. and driving

communities to reassess their recycling programs. The City of Moscow is embarking on an education outreach program to inform the community about these changes and plans to revamp the list of materials that are collected for recycling. For example, there is currently no market for #3 through #7 plastics. Comingled plastics that are collected in single-stream programs are baled and hauled all together to regional material recovery facilities so that #1 and #2 plastics can be separated. The rest of the plastics are landfilled. This adds extra costs for hauling and handling of these materials that could otherwise be avoided if they were not collected in the first place.

2.5 Community Outreach

The City of Moscow utilizes several social media platforms to reach their citizens and keep them informed and educated on new policies, programs and events. The City uses Facebook, Instagram, Twitter, and YouTube to stay connected with its citizens.

As part of the sanitation system master planning, a series of community outreach and surveys were conducted in 2018 to gather feedback from system users. A “three-pronged” survey approach was administered by the City that included mailed written surveys, focus group interviews, and intercept surveys at the MRC.

2.5.1 Mailed Written Surveys

The City mailed out 1,200 surveys to randomly-selected City residents that covered both the City’s sanitation services and recycling services. Each of the households was first mailed a postcard explaining that they would be receiving a survey the following week. The survey packet included a cover letter from the mayor, the survey form, and a self-addressed-stamped envelope. Of the 1,200 surveys, 35 were returned non-delivered and 274 were completed and returned for a response rate of 24%. This response rate was reported by the City to provide a sufficient sample size to result in 95% confidence interval for most questions, making it statistically valid and representative of all citizens of Moscow. Twenty-four questions were included in the survey. Eight of the twenty-four questions were asked with five possible answers, resulting in a means to statistically measure the results on a Likert scale in a percentage format. The remaining questions were a mixture of “open-ended,” yes/no, or multiple choice.

The overall take-aways from the written survey pertaining to recycling services included:

- The overall majority (90%) of the respondents rated the City’s solid waste services as “good” or “excellent.”
- 41% of the respondents knew that free compost was available to the public at the SWPF.
- 74% of the respondents indicated that they participate in the single-stream curbside collection program; those that didn’t participate noted that they lived in apartment complexes³ dropped off their recyclables at the Moscow Recycling Center, lived on

³ Recycling at apartments in Moscow is available. Many of the multi-family units have recycling carts; however, at some multi-family complexes, recycling has been stopped because of past contamination issues. Property managers/owners have chosen not to provide the services for their tenants. All multi-family units pay a monthly “recycling base fee” in the City of Moscow whether they choose to participate or not. The City has rolled out two major “contamination education efforts” where LSI tags the contaminated carts and writes on the tag what the issues are. If not corrected after three consecutive stops, the carts are removed. It has been challenging for the City to provide recycling services to some multi-family units if the property managers are unwilling to pass on information to their tenants on how to properly recycle. The City continues educating the property managers/owners, and in some cases, the tenants are demanding recycling services from the property managers/owners.

the U of I campus, had no container, did not know about the program, or other similar reasons.

- When asked about the recycling collection service type, 72% of the respondents indicated they use a roll cart and 5% used a shared roll cart.
- Majority of respondents rated their level of satisfaction with the overall curbside collection program as Excellent & Good.
- When asked if they are interested in seasonal yard waste collection at the curb, over 60% of the respondents indicated that they were not interested. About 12% indicated that they would pay an extra \$4 per month for seasonal collection.
- Overall general comments about the curbside collection program mostly included remarks pertaining to not providing glass pick anymore, high cost for limited service, needing larger containers, more frequent collection (weekly rather than biweekly), providing seasonal fees/pay-per-use system, offering recycling at apartment complexes, and being happy with dropping off yard waste at the MRC.
- When asked about the types of materials that they drop-off at the MRC, the majority were glass (64%), corrugated cardboard (60%), yard waste (56%), aluminum cans (37%), magazines (35%), and mixed paper (32%).
- The survey included questions for rating virtually all services provided by the MRC. Over 80% of the respondents rated general satisfaction as Excellent & Good. Almost 80% of respondents rated wait times as low. Although still rated high, some of the other aspects of interaction with staff and equipment were rated lower relative to the other services.
- When asked about the most important consideration to them regarding relocation of the MRC, the majority of respondents wanted it kept within city limits (74%). They also wanted to keep yard waste drop-off (54%), provide better accessibility (46%), and continue to provide sorted material drop-off (30%).
- Other improvement suggestions for the recycling center included: accepting full-length fluorescent bulbs, providing battery recycling, providing better lighting and safer parking, providing larger containers, providing recycling at apartments (see footnote 3), and improving traffic flow.
- The survey asked about the level of satisfaction for the yard waste drop-off area at the MRC. The majority of respondents indicated their level of satisfaction with wait time and general satisfaction as “Good.” Adequate traffic flow, safe and convenient access, and space to maneuver rated in the “Fair” and “Poor” range.
- When asked about a new location for yard waste drop-off, respondents indicated that they prefer to have it within the city limits (55%), easy to access (53%), be safe and convenient (37%), and have a larger service area (31%).
- Other comments pertaining to the yard waste drop-off area include: accommodating more vehicles, better traffic flow, keeping it free, provide a drive-through, and enhance safety.
- Some notable general comments and suggestions about the City’s recycling services included: adding more recycling options downtown, better outreach to citizens about free compost, adding food composting, and consider changing program to a pay-per-use system.

2.5.2 Focus Group Survey

Following the written survey process, the City organized community focus groups with only moderate success. Initially, the City invited 100 randomly-selected utility payers to

participate. Only a few responded that they would attend, and so, the City turned to social media to request participation from City residents. Those that were interested were asked to come to the City Hall during one of three 1-hour time slots on May 31, 2018, at either 7 am, 12 pm, or 5:30 pm. All sessions had at least one participant with three participants at the 5:30 pm session. The City facilitated each of the sessions and topics included site accessibility, seasonal curbside yard waste collection, and use of the Moscow Recycling Center and Redemption Center. The following were take-aways from the focus group sessions:

- Moscow residents are eco-conscious and tend to over-utilize the recycling facility by sorting recycling materials themselves, even when single-stream (“no sort”) is available at the curb.
- When it comes to safety and accessibility, the participants are concerned with the size of the Moscow Recycling Center, especially pedestrian safety and navigating around the center.
- The primary barrier for proper recycling is a lack of knowledge and confusion as to what can and cannot be recycled, or the proper methods of recycling.
- The cost of recycling was also a major concern and the focus group participants viewed use of the facility by non-County residents as “theft of service.” Several recommendations included monitoring the MRC for non-residents and limiting access for non-paying members.
- Adding curbside collection for yard waste and glass would be good additional services that could increase the use of the single-stream collection program.

2.5.3 Intercept Surveys

As a final step in the community outreach, the City conducted intercept surveys at the MRC to better understand the residents’ actual practices at the center. The survey was designed to collect basic demographic information about individuals using the center and their recycling attitude, behavior, and knowledge, as well as awareness and participation in the single-stream recycling program. A total of 98 users were surveyed. The first survey was conducted on Friday, June 22nd and the second on Saturday, June 30th. The two days were purposely selected to cover a week day and a weekend day.

An intercept survey was conducted in 2016 by the Sanitation Division and included 485 respondents. The 2016 survey served as the general guideline for the approach and questions for this survey. Four questions were asked and are summarized below with the results:

- **Residency: Do you live in Moscow? If no, where do you live?** These questions were asked to determine what percentage of the users were from Moscow, residents from Latah County, or non-county residents. Of the respondents, 67% were from Moscow, 23% from Latah County, 9% from out of county, and 1% not provided. Only 4 respondents stated they were from Pullman. In comparison to the 2016 survey, 48% of the respondents were from Moscow, 39% from Latah County, and 13% from out of county.
- **Sorted Materials: What types of sorted materials did you bring today?** This question was asked to get a sense of the materials types that users are willing to drop-off at the center. Glass (20%) and cardboard (20%) were the two items that were brought the most respondents, making up 40% of the overall recyclables, followed by plastics

(16%), aluminum (15%), paper (14%), and newspaper (8%). In 2016, glass (45%) and cardboard (31%) were the majority again but a much higher combined percentage of 76% , followed by plastics (12%) and newspaper (8%). Aluminum was not included as an item in 2016.

- **Single-Stream Curbside Recycling: Do you participate in the curbside recycling program (only for residents of Moscow)? If no, why do you prefer to separate the material?** These questions were asked to determine if users were also participating in the curbside program and why they were choosing to drop off recyclables at the center. 60% of the respondents in 2018 did not participate in curbside recycling as compared to 45% in 2016. The reasons for not participating in single-stream and delivering materials to the recycling center included: living in apartment complexes, bringing glass anyway, curbside is not available where they live (live out of town), having large amounts of cardboard, and preferring drop-off to recycle everything.
- **Overall Quality: How do you rate the quality of the recycling at the Moscow Recycling Center (with list of multiple choices – a) Excellent, b) Very Good, c) Neutral, d) Poor, e) Very Poor, and f) Don't Know.** This question was asked to get a sense of the overall satisfaction of the recycling center. 94% of the respondents rated the quality as Excellent or Very Good. This question was not asked in 2016.
- **Other Sites: Do you use any other-off sites (yes or no)? If yes, please indicate which other site you use.** This question was also not asked in 2016. 51% of the respondents indicated that they use the yard waste drop-off area, 38% use the transfer station (SWPF), and 11% indicated they use out of town sites.

2.5.4 Survey Summary

Overall, the survey results indicated that the community is satisfied with the recycling services provided by the City including those at the MRC. The community wishes to have the recycling center remain within the City limits should the center need to move. The facility is used extensively by people that want to “do the right thing” and recycle as much as they can, even though they have, and may also participate in, the City’s curbside single-stream collection program. County and non-county people alike also use the facility, although there is some expressed concern from City residents of people using the facility that are not paying members.

The cost of recycling is a priority to the community and respondents want the City to consider a ‘pay-as-you-use fee’ while also continuing to provide free yard waste drop-off. Although the focus group identified both glass and yard waste for curbside collection, the written survey indicated that curbside collection for yard waste was not a priority, and residents didn’t want to pay the extra cost for its collection. Continuing to provide yard waste drop-off at the new convenience center is a top priority of users, but with better access and safety than is currently provided at the MRC.

Curbside glass collection was ceased with the adoption of the single-stream program in February 2016. It continues to be a large percentage of the recyclables dropped off at the MRC. Reinstating curbside glass collection was mentioned as a possible program improvement based on survey comments and the focus groups. However, collection of glass with comingled materials is fraught with issues. Glass is heavy and is notorious for breaking and contaminating other recyclables. Moscow’s quad-city neighbor, Whitman County, is eliminating glass from their single-stream collection program because of these very issues. Another option would be to collect glass in a separate curbside container. This would add an

additional pickup and increase cost to the program. Based on survey feedback, the community's priority is to keep the program inexpensive, so separate glass is probably not viable.

2.6 Sanitation Rates Comparison

As part of this assessment, sanitation services rates for residential customers in Moscow were compared to other communities of similar size in the Pacific Northwest, including Pullman, Walla Walla and Wenatchee, Washington and Lewiston and Rexburg, Idaho. A key element of the comparison is the availability of a local landfill in each the community. Pullman's waste is sent to the Whitman County Carothers Road Solid Waste Facility and transferred by truck to Spokane where it is put on a railcar and hauled to Republic Service's site in Roosevelt, Washington. Walla Walla, Washington owns and operates its own landfill – Sudbury Road Landfill. Wenatchee also has a nearby landfill, although it is operated by a private company. Lewiston uses the nearby Asotin County Regional Landfill in Clarkston, Washington, and Rexburg collects and transfers their waste to the Circular Butte Landfill in neighboring Jefferson County. **Table 2** provides a summary of the curbside collection rates.

Table 2 – Moscow's Waste Collection Fees Compared to Other Cities' Rates

City	35-Gallon	65-Gallon	95-Gallon
Moscow	\$20.50	\$26.30	\$32.30
Pullman, WA ¹	\$18.14	\$24.14	\$30.13
Lewiston, ID ²	\$13.23	\$20.11	\$24.81
Rexburg, ID ³	NA	NA	\$21.34
Walla Walla, WA ⁴	NA	NA	\$23.30
Wenatchee, WA ⁵	\$12.40	\$17.36	\$22.37

Notes:

1. Instead of the 35, 65, and 95-gallon bins, Pullman offers 32, 64, and 96 respectively. Also, they offer 10 and 20-gallon bins, as well as an option for two and three bins. Pullman garbage collection is every week, and recycling is bi-weekly.
2. Lewiston offers 32, 64, and 96 bins. Rates include solid waste, yard waste, and curbside recycling. Commercial rates are the same as residential rates. Garbage collection is every week and recycling is bi-weekly. Yard waste collection is once a week from the last week of March through November and once a month from December through the first week of March.
3. Rexburg only offers a 90-gallon bin. Weekly pickup of garbage costs \$21.34. Bi-weekly pickup of garbage is \$12.78, and monthly pickup is \$6.50. Recycling is collected bi-weekly. The first recycling bin is free and additional bins cost \$9.00 per month.
4. Walla Walla only offers a 96-gallon bin with weekly pickup. Recycling is also collected with a 96-gallon bin, is picked up every other week and costs an additional \$4.76 a month. Green waste is accepted in a 64-gallon container and will cost an additional \$17.80 a month.
5. Wenatchee offers 35, 64, and 96-gallon bins. Rates are for weekly pickup of garbage. Other options such as monthly pickup of the 35-gallon bin and weekly pickup of up to 6 cans are offered. Every other week recycling is \$8.40 and yard waste is \$9.90.

Although within a few dollars, Moscow's rates are slightly higher than the other cities' rates. The City of Moscow's long-haul of solid waste is one of the longest, if not the longest of all the communities that were compared. This is most likely the primary driver for the higher rate. The City also offers exceptional sanitation services based on the survey results and the

Sanitation Division's community outreach. Providing a centralized and convenient recycling center in the community comes with a price.

The City also recently issued a request for proposals for haul and transport services. This will result in lower fees for these services, which will provide an opportunity to reassess the fee structure while also continuing to provide convenient and excellent sanitation services for the community of Moscow.



Sanitation & Recycling Services Surveys

In support of the 2018 Sanitation Master Planning Process; a report of a three-pronged survey approach designed to collect community feedback on sanitation and recycling services in Moscow.

***Developed by: Shakie Doe-Williams, MPA Intern
July 31, 2018***

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Executive Summary

In early 2018, the City of Moscow began development of a Sanitation Master Plan. The Plan is intended to address the garbage and recycling needs, services, facilities and more for Moscow for many years to come. Additionally, as needs have been identified for facility relocation in the community, specifically the Moscow Recycling Center, citizen engagement in this planning process was deemed of the highest priority.

To that end, a series of community outreach and surveys were designed to gather the feedback from system users in order to better inform planning for the future. A three-pronged survey approach was adopted including a mailed written survey, designed to be statistically valid and representatives of all citizens of Moscow. Following the written survey, three opportunities were provided for citizens' engagement through focus groups. These groups provided an opportunity for additional information gathering and for citizens to share thoughts, ideas, and concerns that hadn't been captured in the written survey process. Finally, an intercept survey was conducted at the Moscow Recycling Center, a community-loved facility that for a variety of technical reasons including safety and operational capacity is scheduling to be relocated in the near future. This research into how the facility is actually used by patrons provided an update to similar information gathered in 2016.

The results from these three survey approaches are reported herein. This information will act as a resource for the Sanitation Master Planning Steering Committee, City Staff, and Great West Engineering, throughout the planning process and as a touchstone for sanitation and recycling opinions as documented in 2018.

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Written Survey Results

In 2018, the City of Moscow conducted a Sanitation and Recycling Service survey. The City of Moscow is currently undergoing a Sanitation Master Plan project to include review of our garbage and recycling services and facilities. The results from this survey will assist the City of Moscow as it collects input on current and future needs of the public in regards to recycling. The Sanitation and Recycling Survey follows a similar procedure as previously conducted City of Moscow Surveys, which gauges citizens' responses. The aggregate result of each survey question will be analyzed and evaluated as a resource to assist in the planning efforts of the Sanitation Master Plan as well as determining the most viable solution to the sanitation and recycling needs of the City of Moscow.

Methodology

The Sanitation and Recycling Services survey was sent out to 1,200 randomly selected local residents to participate, including dormitories and apartments. The City of Moscow is interested in the community opinions and feedbacks about the City's sanitation and recycling services. By asking 1,200 residents of Moscow to participate, the City will be able to determine how these survey results may apply to the entire community within a certain range. Residents' thoughtful responses will help guide decision-making and planning in regard to sanitation and recycling services in the community.

To determine the random sample of 1,200, an address list is obtained that includes all residential addresses within the City of Moscow, specifically those addresses that include the 83843-zip code. All addresses not within the Moscow City limits are then excluded. This allows for a more accurate account of Moscow residents when the results come in. Once there is a list of only Moscow residents, the random number is then assigned to the remaining addresses which are ultimately sorted by randomly assigned values. The first 1,200 are then selected for the sample. The survey includes only residential addresses and excludes those of businesses. This sample size of 1,200 provides the City of Moscow with the tools needed to capture the typical response of the overall population of the City, which is approximately 25,000 residents.

Each household was first mailed a postcard explaining that they would receive a Sanitation and Recycling Services Survey in the following week. The survey packet included a cover letter from Mayor Bill Lambert, the survey instrument, and a self-addressed-stamped envelope to return the completed survey.

Response Rate

The Sanitation and Recycling Services Written Survey response rate is 24% and account for 35 non-deliverable returned surveys. This survey is intended as a one-time survey to gauge the community's preferences for planning purposes. Since this is the first Sanitation and Recycling Services Survey of its kind there is no threshold to compare to. Of the 1,200 eligible households, 274 had returned the survey before this report was written, 35 non-deliverable/returned surveys were excluded, for a response rate of 24%. The 24% response rate for the 2018 Sanitation and Recycling Services survey provides a sufficiently large sample to result in a 95% confidence interval for most questions.

Some survey questions have some percentage of "don't know" responses and non-response rating. The statistics included in this report are given without including such non-response, as these are either questions that were simply not answered, or were not answered properly.

Understanding the Results

The questions in this survey are largely calculated to measure results on the 5-point Likert scale in a percentage format. This allows for easier and more meaningful measurement in survey questionnaires. For instance, a commonly used 5-point Likert scale format to measure satisfaction is: "Very Satisfied," "Satisfied," "Neutral," "Dissatisfied," and "Very Dissatisfied." The Likert scale allows a respondent to evaluate a specific item based upon their level of agreement or disagreement with that item. Survey questions 1,4,5,12,18, and 22-24, are based on this scale because its standardization and the ability to compare and provide a visual graph of the data. The remaining question in the survey are a mixture of open ended, yes/no questions, and multiple choice questions.

Open-Ended Comments

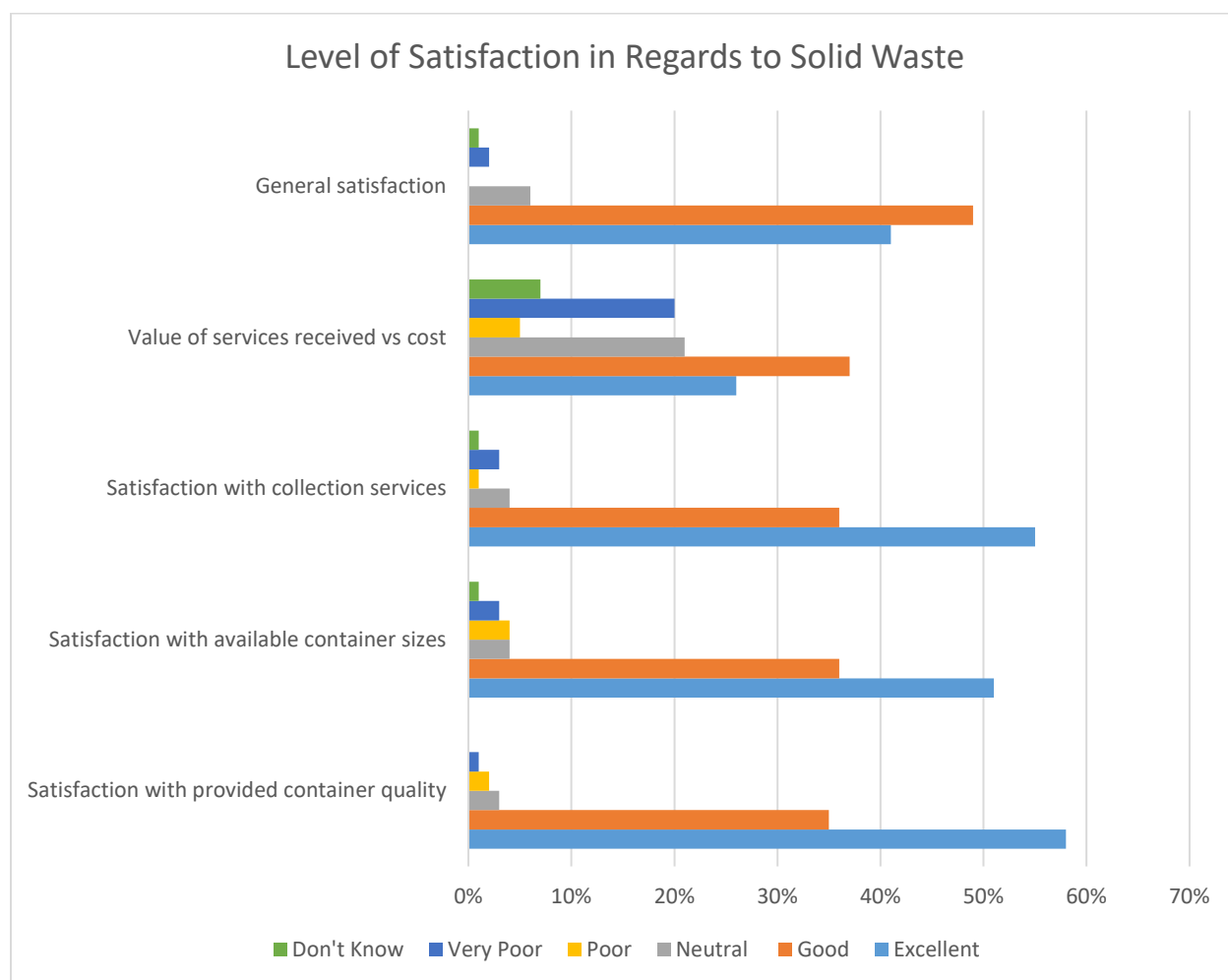
Several questions in the Sanitation and Recycling Services Written Survey were included to allow respondents to offer comments. These comments have been categorized for ease of comprehension. Respondents were asked to provide more information to better determine their preference or choice.

Solid Waste Services (Household Garbage) Collection Results

Level of Satisfaction (Q1)

The City of Moscow delivers an integrated solid waste management system consisting of diverse operations including waste collection. The City's solid waste management system provides for safe and reliable solid waste services at competitive prices for residential and commercial customers. Curbside Solid Waste services collection services are contracted through Latah Sanitation, Inc.

Using a Likert scale ranging from "Excellent" to "Very Poor", respondents were asked to rate their level of satisfaction in regards to solid waste services in Moscow. Using five sub categories; general satisfaction, value of services received vs cost, satisfaction with collection services, satisfaction with available container sizes, and satisfaction with provided container quality. The survey results show that about 90% of residents rated their satisfaction in regarding to solid waste services at "Good" or "Excellent". The table below shows the full results:



Any other comments regarding Solid Waste Service (Household Garbage) Collection (Q2)

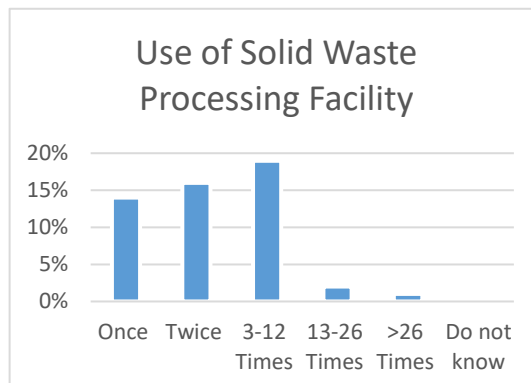
Listed below are the comments shared regarding Solid Waste Service in alphabetical order:

- 20 gallon garbage
- Clarification of recycling schedule
- Collection day in Spring
- Containers could be locked to prevent others from using them
- Cost is too high
- Discourage flagrant intrusions into alley right-of-ways
- Don't use service fee isn't fair
- Extra trash bags
- Fee is high
- Garbage bins fill up. Half of us recycle. Only my apartment composts.
- Garbage paid for by rental company
- Getting too expensive
- good minimum cost plan
- great customer service
- Home recycle
- I rent and garbage is included
- I rent at the Grove -- waste goes into dumpster there
- Insufficient container size
- Larger containers
- Live in apartment
- Live in apartment
- Miss closer glass collection site
- Need battery recycling service
- Not satisfied with any cost increase
- Pick up is always on time and containers are returned appropriately
- Prices are high
- Service good when collected
- Single Stream didn't lead to any savings
- Small container doesn't match the price
- Smaller roll chart should be reduced in price
- Surveys are a waste of paper
- System works great
- The drivers are very cautious and polite and very patient
- The fact that there is not curbside/house hold recycling
- Theft of service is a major problem. Being charged for overage because someone put trash in my container
- Very pleasant workers
- We sometimes get missed
- weekly recycling would be nice and green pick up
- When you pick up the trash pick it all up
- Why are on demand cans smaller than others?
- Wind has blown the container over and driver didn't pick up
- Wish there was recycling in apartment complex
- Working well
- Would love curbside glass recycling

Solid Waste Processing Facility (Transfer Station) Results

Utilization of Solid Waste Processing Facility (Q3)

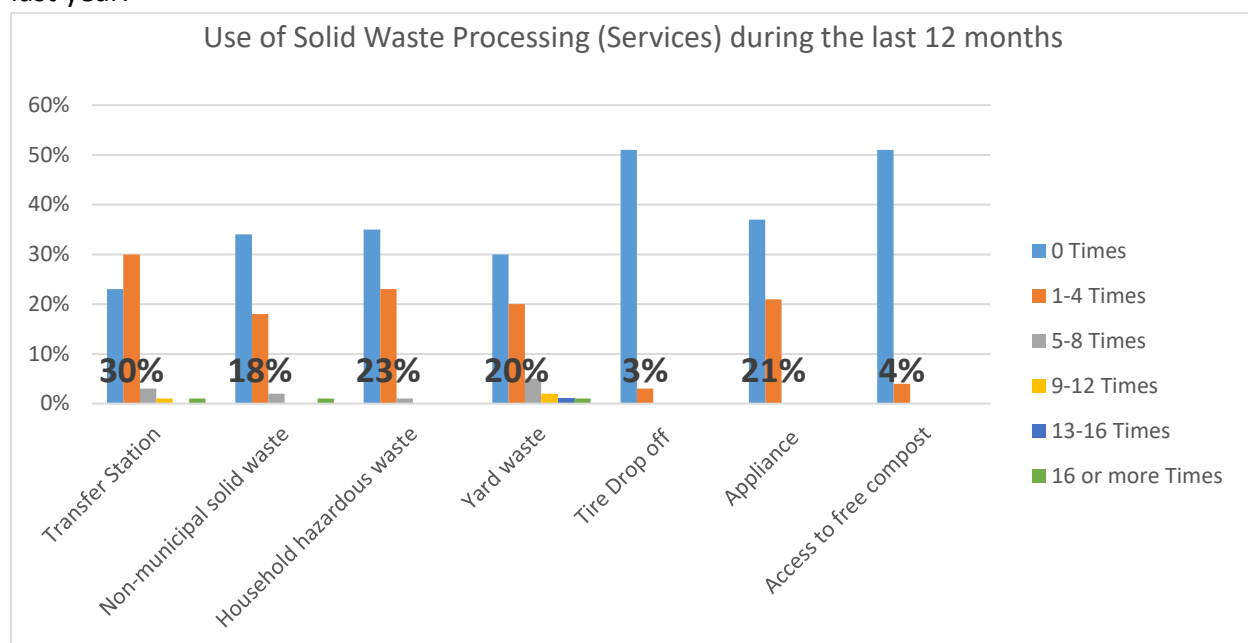
In this question respondents are asked to indicate how many times they have utilized the Solid Waste Processing Facility located on Highway 8 in the past twelve months. The results show that 51% of respondents used the Transfer Station within the last twelve months and that the majority of those residents also indicated that they used the facility at least 3-12 times.



Utilization of Solid Waste Processing Facility Services (Q4)

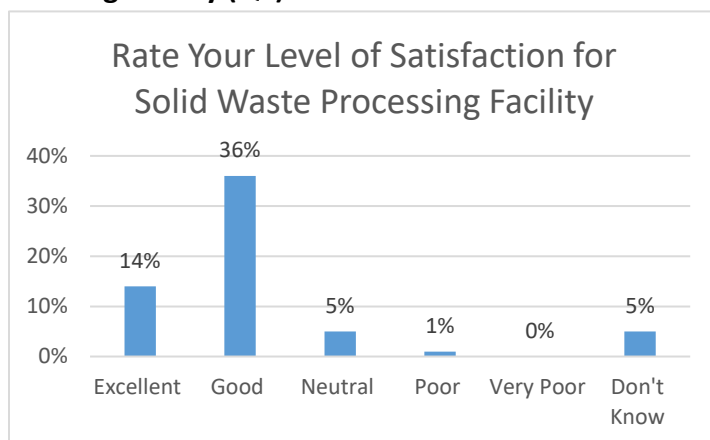
When asked to rate the frequency of which residents used the following services at the Solid Processing Facility within a 12-month period, respondents were given five options ranging from "Once" to ">26 times" and "Don't Know." Services in question include the Transfer Station, non-municipal solid waste (garbage) drop off, household hazardous waste drop off, yard-waste, tire drop off, appliance/scrap metal drop off, and access to free compost.

These results are varied and the question is more understandable by looking at percentages of respondents for each category. The chart below shows the percentage of usage as reported by respondents. The majority of the respondents noted they used the non-municipal solid waste, household hazardous waste, yard-waste, tire drop off, appliance, and used access to free compost "0 Times". The majority of respondents noted they used the facility "1-4 Times" in the last year.



Level of Satisfaction with Solid Waste Processing Facility (Q5)

Overall, level of satisfaction in regards to the Solid Waste Processing facility in Moscow was rated by respondents from “Excellent” to “Very Poor” and “Don’t Know”. Majority of respondents rated their level of satisfaction as either “Excellent” or “Good”. Only 6% of respondents rated their satisfaction as “Poor” or “Don’t Know”.



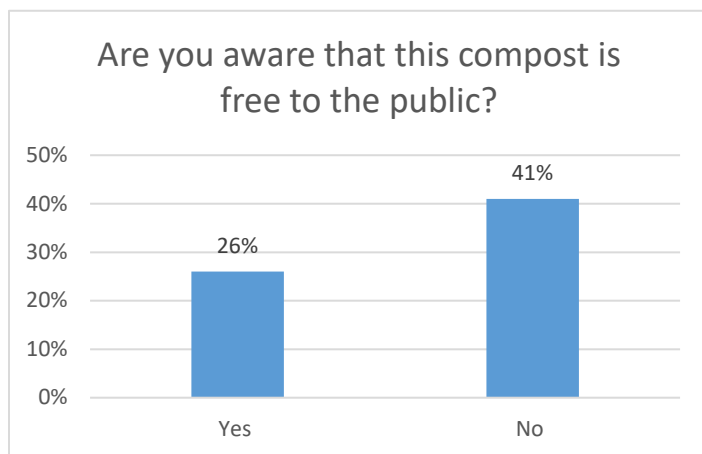
Awareness of Service (Q6)

Respondents were asked to indicate whether they are aware of the yard-waste hauling process in which yard-waste is hauled to the Solid Waste Processing Facility and then processed through a grinder, then mixed with biosolids produced at the City of Moscow Water Reclamation Facility and then composted.

The results in the chart shown here indicates that 40% of the respondents are not aware of this process while only 28% indicated that they knew about the service.

Free Compost Service (Q7)

Consistent with the previous question, respondents were asked if they knew that the compost at the Solid Waste Processing Facility is free to the public. The chart to the right shows that again respondents were unaware that compost is free with the majority 41% indicating “No” and 26% indicating “Yes”.



Value of Compost Service (Q8)

As a follow up question for those who answer the previous two question about composting, respondents were asked if they would use the City’s free composting service if they were aware of it, 51% of respondent indicated that they would use the service, while 15% of said they would not.

Any other comment regarding the Solid Waste Processing Facility (Q9)

Listed below are the comments shared regarding Solid Waste Service in alphabetical order:

- \$10 min fee is a little steep
- Basic garbage drop off is expensive
- Bio solids
- Compost delivery
- Concerned about herbicides
- Cost
- Don't have access to get the compost (no truck)
- free of contaminants
- I will now pick up compost
- Is the free compost chemical free
- Not charging locals for drop off
- Open hours at the end of the weekend would help
- Publish the rules and send with bill
- Used more often before \$10 fee
- Vacuum wouldn't fit container
- Very well kept place and friendly, helpful personnel
- We would be very interested in a curb-side compost pick-up service
- Worry about getting flat tire at solid waste processing center

Curbside Recycling Collection Results

Participate in Single-Stream Recycling (Q10)

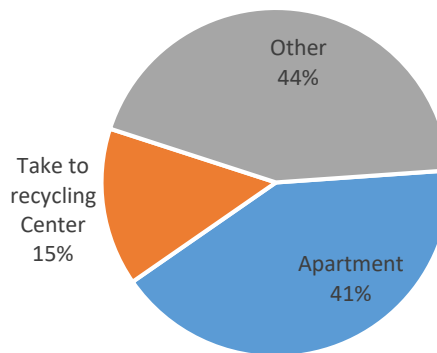
Per the survey it was noted that 74% of respondents participate in the single-stream recycling program.

Curbside Participation (Q11)

This questions asked those who did not participate in single-stream recycling what their reason was in an open-ended format. Of the 41 respondents who completed the question, 41% noted they did not recycle due to living in an apartment, 15% noted they deliver or haul their recycling in for drop off, and the remaining 44% noted the remaining issues:

- Because I live on Uldaho campus
- Bin never got delivered
- Container not delivered
- Cost prohibitive
- Didn't know about it
- Didn't know about it
- Don't have container
- Dumpster in back
- Live outside of town

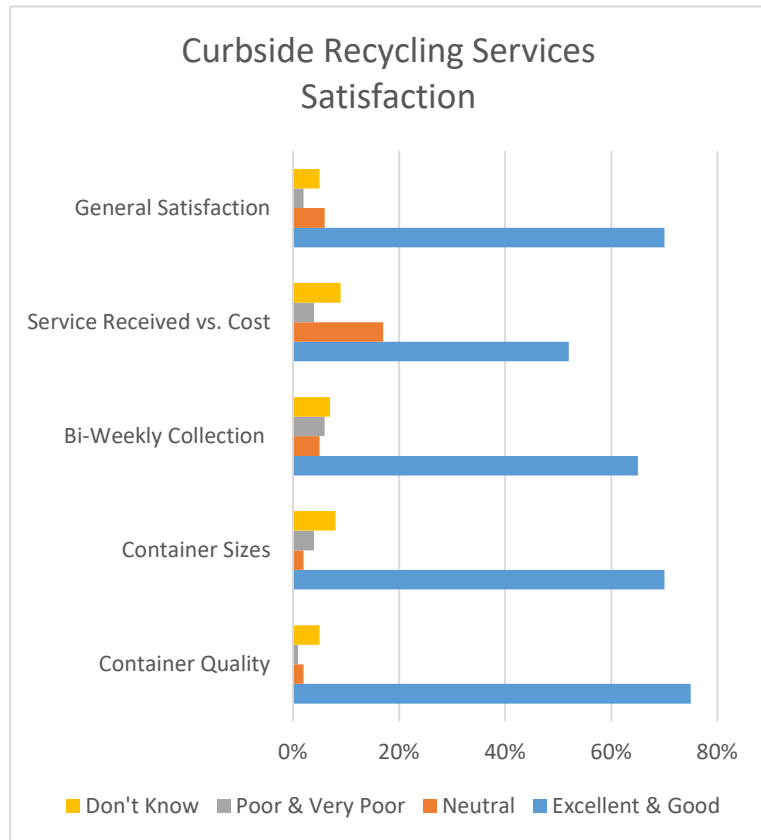
Reasons for Not Using Single-Stream Service



- Not everything gets collected
- Not offered on Moscow Mountain
- Not sure what this is
- Produce limited amount trash
- Recycling bin full at apartment complex
- Rural account
- Small amount of waste
- Waste of resources

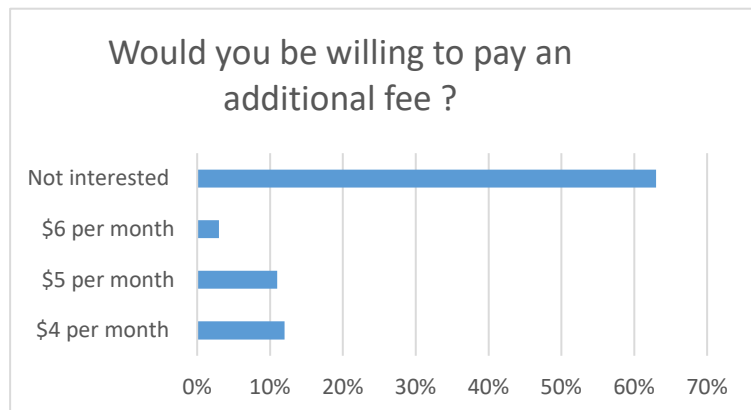
Level of Satisfaction with Curb-Side Recycling (Q12)

Survey participants were asked to rate their level of satisfaction in regards to curbside recycling collection in Moscow. Respondents were given five options ranging from “Excellent” to “Don’t Know.” Items surveyed included container quality, container sizes, bi-weekly collection, service received vs cost, and general satisfaction. The following chart shows the percentages of satisfaction as reported by respondents. The majority of respondents indicated their level of satisfaction with container quality, container sizes, bi-weekly collection, service received vs. cost, and general satisfaction as “Excellent” or “Good.”



Optional Seasonal Curbside Yard waste (Q13)

This question was asked to gauge respondents' level of interest of an additional curbside service for yard-waste collection. Respondents were given 4 selections to choose, “\$4 per months”, “\$5 per month”, “\$6 per month”, and “not interested”. A majority, 63% of respondents indicated “not interested”.



Other comments regarding Curbside Recycling Services (Q14)

Listed below are the comments shared regarding Curbside Recycling Service categorized by topic:

Glass pickup	11	Have enough roll carts	1
High cost for limited service	7	More room for roll cart	1
Need a larger container	6	Offer service outside of Moscow	1
More weekly collection	5	Haul yard-waste to the site by Rosauers	1
More seasonal fees/Pay-per-use	5	Drop off waste at Recycling center	1
Happy to take yard-waste to the yard-waste drop off	4	Move to single-stream	1
Offer at apartment complex	4	HOA provides	1
More marketing/transparency of service	3	Recycling bin frequently blows over	1
Make service free	2	Provide Magnetic calendars	1
Make available for Moscow Mountain	1	Love the one container collection	1

Moscow Recycling Center Results

Utilization of Moscow Recycling Center (Q15)

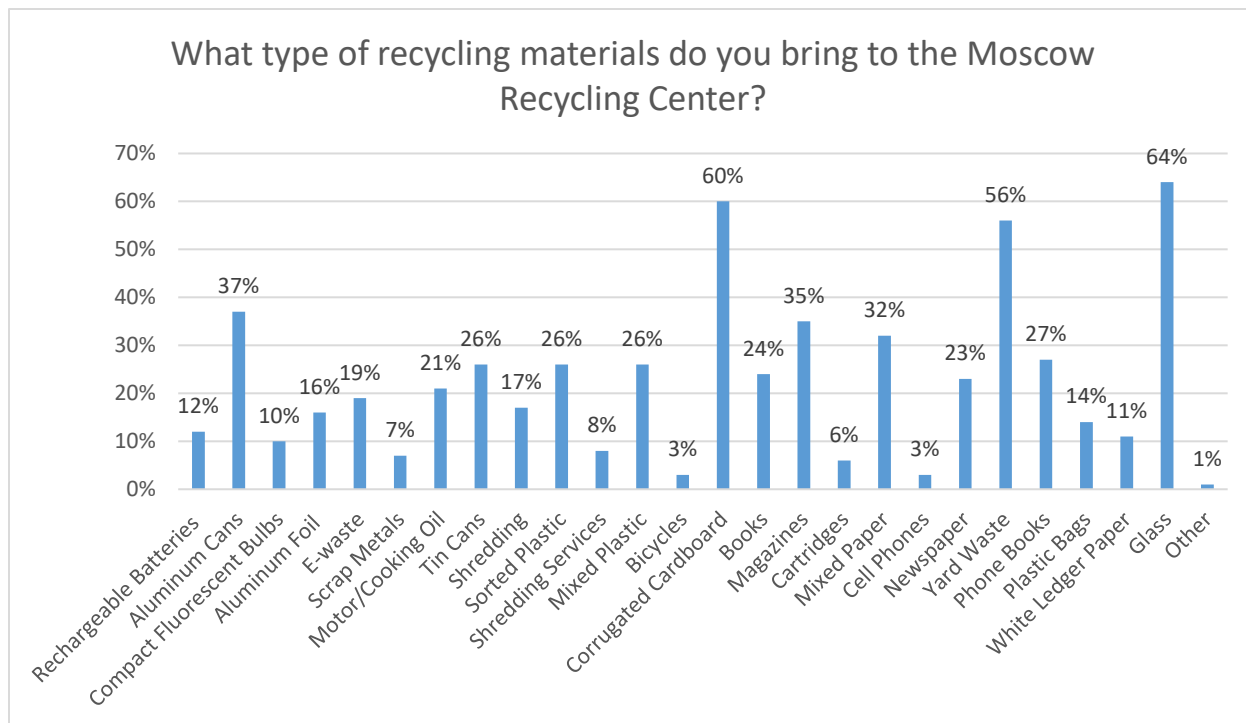
When asked if they have utilized the Moscow Recycling Center in the past twelve months. 86% of respondents noted “Yes”, while 10% indicated “No.”

Frequency of Visit (Q16)

Question 16 is a follow-up from question 15, which asked if respondents to indicate how often they use the center during a month and during the year. On average respondents visit once per month and just over 5 times per year.

Types of Recycling Material (Q17)

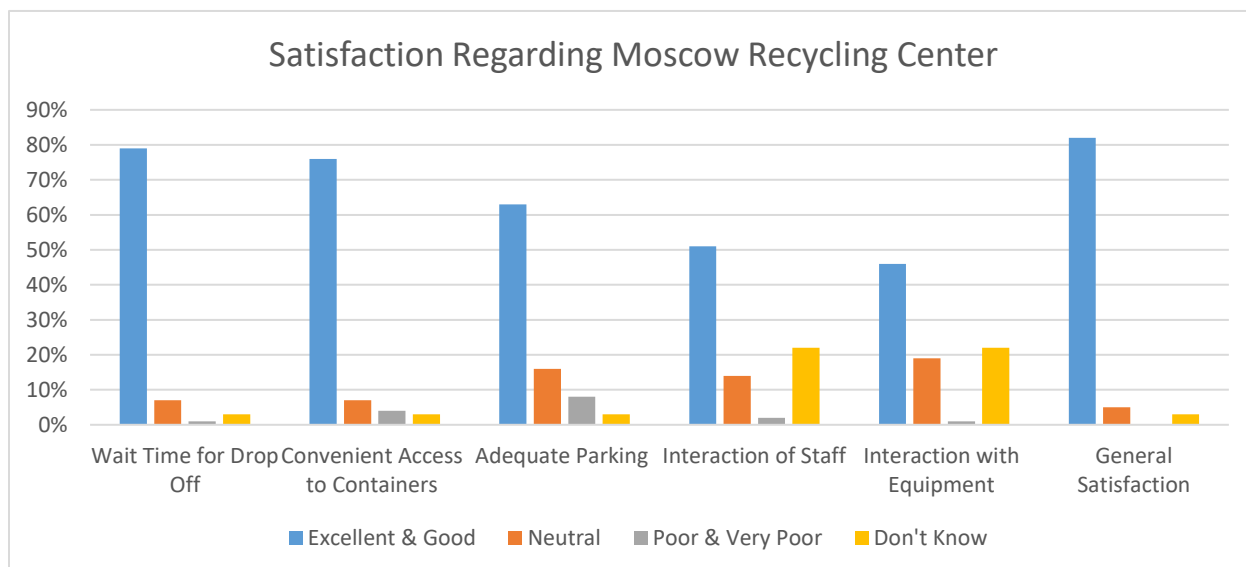
This question was asked to gauge the type of materials respondents bring to the Moscow Recycling Center. Respondents were given more than 26 different items to select from and were asked to check all that apply. Yard waste and corrugated cardboard were indicted as the two materials that were brought to the Recycling Center the most. The following chart lists all percentages for each item. Please note, percentages for each recyclable listed below notes the percentage of respondents who drop off that particular item amongst many other items.



Quality of Experience (Q18)

Survey participants were asked to rate virtually all aspect of services provided at the Recycling Center in Moscow. Services components surveyed included wait time for drop off, convenient access to containers, adequate parking, interaction of staff, interaction with equipment, and general satisfaction.

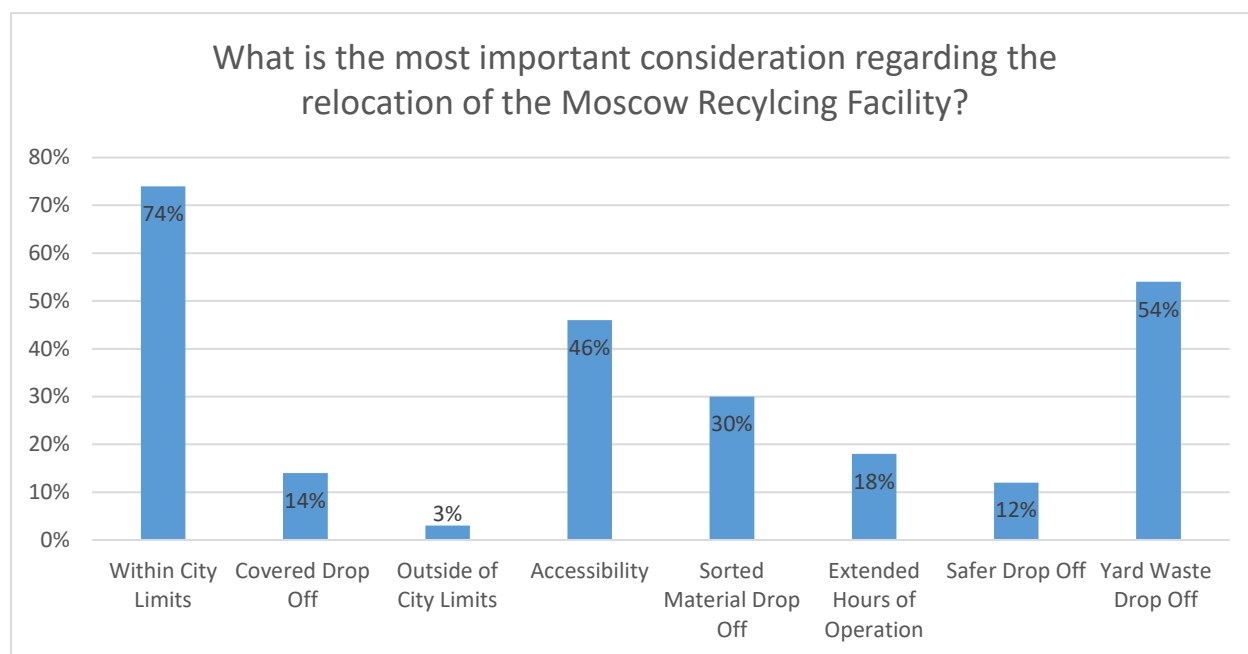
The following chart shows the percentages of respondents who noted their rate of experience in regard to satisfaction level. Of note, all services were rated very highly as “Excellent” or “Good.”



Relocation Preference (Q19)

Respondents were asked about what the most important consideration to them is regarding the relocation of the Moscow Recycling Facility. Participants were given the choices of preferred within City limits, covered drop off, preferred outside of the City limits, accessibility, sorted material drop off, extended hours of operation, safer drop off, and yard-waste drop off. Respondents were asked to check all that apply.

Shown in the following chart are the percentage of respondents who noted what their most important consideration is regarding the relocation of the facility. In short, most respondents would preferred the recycling facility to be relocated within City limits. Similarly, 54% of respondents feel it is important that the new facility has a yard-waste drop off.



As shown above, the top three most highly rated preferences for respondents is a facility that is in town that include yard-waste drop off and is accessible.

Other Improvement Suggestions to the to-be Relocated Recycling Center (Q20)

Listed below are the comments shared regarding preferences for a to-be relocated recycling center:

- Accept full length fluorescent bulbs
- Allow students to know this exist
- Battery recycling
- Battery recycling
- Better lighting and more parking
- Better lighting for night time

- Better management of weekly overflow of yard-waste especially during spring cleanup & fall
- Better Parking
- Better plastic bag recycling
- Better yard-waste area away from the street
- Better yard-waste disposal
- Bins shouldn't require sorting
- Close to city limits
- Don't move
- Don't move it
- Don't move it
- Drive through
- East side maybe by Mountain View Park
- Good to have this available
- I don't want it to move
- I like where it is now
- Improve smell
- Improve traffic flow
- Improved traffic flow for yard-waste drop off
- Incorporate glass recycling
- It works good
- Just not too far from the city limits
- Keep in city limits
- Keep it convenient and close
- Larger area & better access to yard-waste
- Larger parking area
- Larger yard-waste drop off area
- Like it close to my house
- Lots of parking and good traffic flow
- Make \$per pound price for aluminum can more reasonable
- Make it safe and easy for people to do the right thing.
- More cover
- More parking
- More parking
- More parking
- More parking
- More Parking
- More parking spaces
- More parking spaces for unloading
- More parking, large containers
- More traffic movement
- Must still be close to downtown and accessible 24hrs
- Need to be centrally located
- Needs more parking
- No need to back up vehicle
- Not far from downtown
- Open 24/7
- Other items like Styrofoam
- Parking
- Parking
- Parking
- Parking that flows better
- Pick up the parking lot - open containers allow for items to fall out and litter the parking lot
- Pleased with the current recycling center
- Recommend within city limits
- Shouldn't have to walk to the bins
- The experience is good
- The yard-waste area is right off the street
- Traffic flow
- Traffic Flow
- Unsafe parking lot
- Why move it?
- Why relocate? The location is great.
- Within city limits
- Yard waste and all other recyclables in one location
- Yard waste drop off in town
- Yard waste drop off unsafe

Other Comments Regarding the Moscow Recycling Center and/or its Location (Q21)

Given the importance of the recycling facility to the community an additional opportunity was given to share any additional feedback for consideration. Comments are listed alphabetically.

- Accept more types of material
- Accessibility
- Add glass to single stream if facility moves
- Back in parking
- Better communication about what can be recycled
- Better access
- Compost in town would be nice
- Convenient and easy to use
- Do it quickly and seamlessly please
- Easier way to recycle batteries?
- Educate public
- Empty lot next to Moscow building supply or old city shop
- Have a glass drop off on east side of town
- I like it where it is
- I think it's fine as is
- If not close, I'll stop recycling
- If out of city limits - not too far
- If yard-waste drop off leaves town, my yard-waste will end up in the trash can
- Improve access
- In city limits
- In town is more important than it being crowded
- Keep in city limits
- Keep in city limits
- Keep in city limits
- Keep it in town
- Keep it in town
- Keep prices low
- Keeping it in city limits
- Larger dump station
- Let u all vote online if possible
- Like it like it is
- Love the recycling center
- Make it easy to get to
- Make use of plastic bags
- More education about where recycled materials go
- More parking
- More staff interaction/better signage
- Prefer easy access from main road
- Rather city not move recycling center
- Recycle to save the planet
- Room for vehicles
- Should be located within city and "user" friendly
- Stay in city limits
- Yard waste disposal should remain free

Recycling Services – Yard Waste Drop Off Results

12-Month Use of Yard Waste Drop Off (Q22)

There was a typo in the question that asked respondents to rate the frequency of which they used the Moscow Recycling Center Yard Waste Drop off. The scale should have read, "Once,"

“Twice,” **“3 to 12 Times,” “13 to 27 Times,” “>26 Times,”** and Never. Instead the scale read “Once,” “Twice,” **“Times,” “3 to 27 Times,” “>26 Times,”** and “Never.” Respondents did note they used the yard-waste drop off “3 to 27 Times” per year.

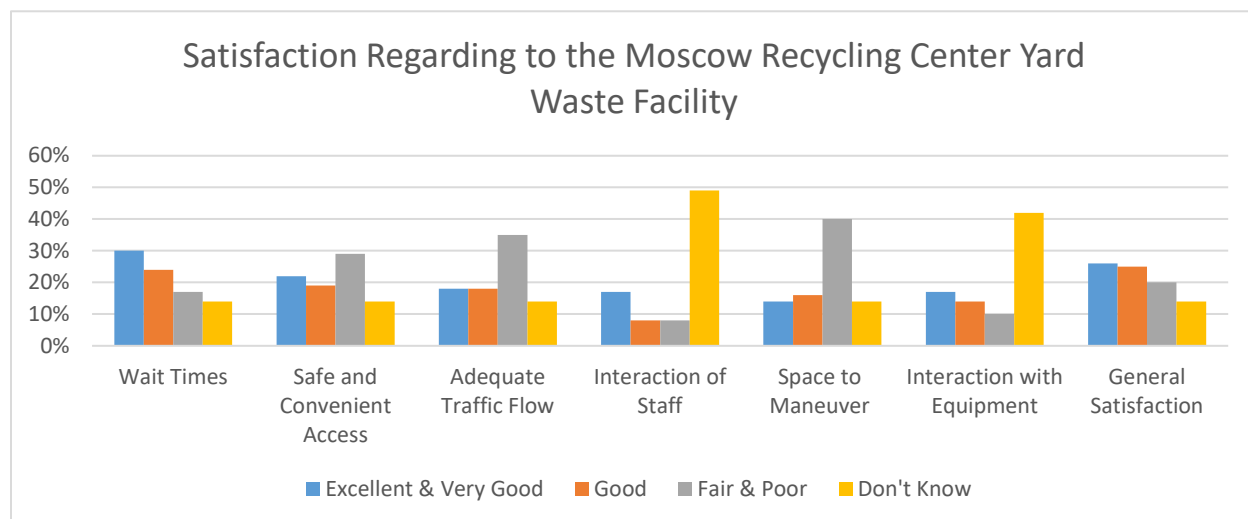
Seasonal Use of the Yard Waste Drop Off Facility (Q23)

The same error of scale was noted in questions 23 which read, “If you have visited the Moscow Recycling Yard Waste Drop Off area, how often do you visit?” The majority of respondents indicated they visited the yard-waste drop in the spring, summer, and fall “3-27 Times.” Most respondents also noted that they “Never” visit the Recycling Center Yard Waste in the winter. Unfortunately due to this error, this information is not as enlightening as it could have been, but with other data collected shows the yard-waste drop off is regularly and somewhat heavily used, especially in the warmer months.

Level of Satisfaction in Regarding to the Moscow Recycling Center Yard Waste Facility (Q24)

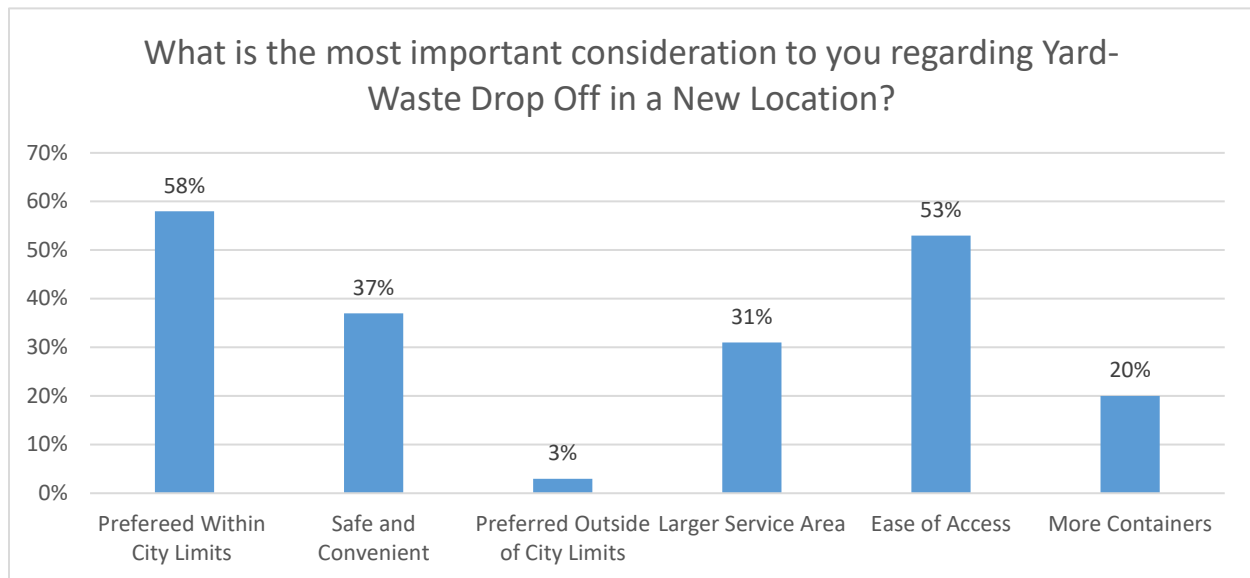
Survey participants were asked to rate their level of satisfaction in regards to the Moscow Recycling Center and Yard-Waste Facility in Moscow. Respondents were given five options ranging from “Excellent” to “Poor” and “Don’t Know”. Items surveyed included wait times for drop off, safe and convenient access, adequate traffic flow, interaction of staff, adequate space to maneuver vehicles, interaction with equipment, and general satisfaction.

The chart below shows the percentages of respondent’s satisfaction levels with each item. As shown, the majority of survey participants noted their level of satisfaction with wait time for drop off, safe and convenient access and general satisfaction as “Good” or better, with adequate traffic flow and space to maneuver rated more negatively in the “Fair” and “Poor” range. Of particular note are the “Don’t Know” responses for interaction of staff and equipment highlighting that many facility visitors do not interact with staff or equipment.



New Location Yard Waste Preferences (Q25)

The following chart shows what respondents indicated as the most important considerations in regards to a relocated yard-waste drop off facility. The majority of survey participants noted that they “preferred within City limits” followed by 53% who stated “ease of access,” followed by “safe and convenient” to be the most important considerations regarding yard-waste in the new location.



Other Improvement Suggestions to the to-be Yard-Waste Drop off Area (Q26)

Listed below are the comments shared regarding preferences for a to-be relocated recycling center:

- Accept longer than 2" branches
- Accommodate more vehicles
- Better accessibility that is safe
- Better Traffic Flow
- Circular lane to reduce need to back up
- Clearly marked or coned parking
- Congestion is the problem
- Drive through
- Ease of access
- Easy in/out
- Enlarge/elongate the space to make it easier to back several vehicles at a time into the drop area
- Free
- In town
- Keep it free
- Keep the one on Almon St
- Make it convenient
- Make people clean up after themselves
- More for waiting
- More space for vehicles
- Open 24 hours

- Pedestrian access
- Place for people to leave old trash bags
- Recycling within city limits
- Relocating yard waste and expanding recycling center
- Sections for types of yard waste (e.g. Grass, leaves, branches)
- Trees/limbs aren't cut down to requirements
- Turnaround area for utility trailer
- What to do with rock?

Other Comments Regarding the Yard Waste Drop Off Area (Q27)

Given the importance of the yard-waste drop off area to the community an additional opportunity was given to share any additional feedback for consideration. Comments are listed alphabetically.

- A space for donating/recycling usable
- Better signs/monitoring - some people make a mess!
- Crowded
- Ease of access
- Hard for old people like me to lift tubs over to dump
- Hard to lift container
- Keep in city
- Larger area for vehicles
- We appreciate the service

Household Question Results

This survey uses several demographic questions to get a clearer understanding and representation of the City of Moscow residents. The survey asked questions on residents dwelling type, solid waste collection services type as well as recycling collection services type.

Housing Type (Q28)

Respondents were asked to indicate the type of building they live in. of the survey participants, 65% noted they live in a one family house detached from any other house, 10% noted living in a duplex or townhouse, 18% noted living in an apartment or condominiums, 2% noted living in a mobile home.

Household Members (Q29)

Respondents were also asked to indicate how many people live within their household, with 23% nothing they lived alone, 40% noting two people, 12% noting three people, 8% nothing four people, 8% noting five people, and 3% noting more than five people.

Solid Waste Collection (Q30)

When asked to indicate their solid waste collection service type, 78% of respondents noted using a roll cart, 14% used dumpster, and 1% used other.

Recycling Collection Service Type (Q31)

When asked to indicate their recycling collection service type, 72% of respondents noted they use a roll cart, 5% used shared roll cart, and 8 used other.

Additional Comments (Q32)

Question 32 asked respondents to make comments and suggestions that they would like the City of Moscow to consider in regards to sanitation and recycling services. All responses are categorized below.

- Add more recycling options downtown
- Better advise citizens of peaks like free compost
- Consider a yard waste pick-up service
- Curbside pick-up of yard waste twice a year
- Food compost
- How to get magnet with recycling info
- I love the curb-recycling
- Keep cost down
- Locate on a street
- Love the curbside recycling
- Make curbside available to people living outside city limits
- Pay per use system
- Please bring recycling bins to apartment complexes
- Rentals need adequate roll carts for the number of people living in the unit(s)
- Solid waste roll cart size and fee
- We see lots of trash left on the streets when trash day
- Would like to see pricing based on amount of waste disposed of

Following is the original survey tool with percentages noted for each question as appropriate.

Written Survey Tool with Percentages Responses

City of Moscow Sanitation & Recycling Services Survey



Please complete this questionnaire if you are the adult (age 18 or older) in the household who most recently had a birthday. The adult's year of birth does not matter. Your responses are anonymous and will be reported in group form only.

Solid Waste Services (Household Garbage) Collection

1. How would you rate your level of satisfaction in regards to Solid Waste Services (Household Garbage) Collection?

	Excellent	Good	Neutral	Poor	Very Poor	Don't Know
a. Satisfaction with provided container quality	58%	35%	3%	2%	0%	0%
b. Satisfaction with available container sizes	51%	36%	4%	4%	1%	1%
c. Satisfaction with collection services	55%	36%	4%	1%	1%	5%
d. Value of services received vs cost	26%	37%	21%	5%	0%	7%
e. General satisfaction	41%	49%	6%	0%	0%	1%

2. Any other comments regarding Solid Waste Service (Household Garbage) Collection:

Solid Waste Processing Facility (Transfer Station)

3. a. Have you utilized the Solid Waste Processing Facility located on Highway 8 in the past twelve months?
If no, skip to question 10...

51%	Yes	44%	No
-----	-----	-----	----

- b. If yes, please indicate how many times:

Once	Twice	3-12 Times	13-26 Times	>26 Times	Do not know
14%	16%	19%	2%	1%	0%

4. How often have you used the following services at the Solid Waste Processing Facility during the last 12 months?

	0	1 – 4	5 – 8	9 – 12	13 – 16	16+
a. Transfer station – trash drop off	23%	30%	3%	1%	0%	1%
b. Non-municipal solid waste (garbage) drop off	34%	18%	2%	0%	0%	1%
c. Household hazardous waste drop off	35%	23%	1%	0%	0%	0%

4. continued... How often have you used the following services at the Solid Waste Processing Facility during the last 12 months?

	0	1 – 4	5 – 8	9 – 12	13 – 16	16+
d. Yard waste/clean wood waste drop off	30%	20%	5%	2%	1%	1%
e. Tire drop off	51%	3%	0%	0%	0%	0%
f. Appliance/scrap metal drop off	37%	21%	0%	0%	0%	0%
g. Access to free compost	51%	4%	0%	0%	0%	0%

Other: _____

5. How would you rate your level of satisfaction in regards to the Solid Waste Processing Facility?

Excellent	Good	Neutral	Poor	Very Poor	Don't Know
14%	36%	5%	1%	0%	5%

6. Are you aware that yard waste is hauled to the Solid Waste Processing Facility processed through a grinder, then mixed with biosolids produced at the City of Moscow Water Reclamation Facility and composted?

28% Yes 40% No

7. Are you aware that this compost is free to the public?

26% Yes 41% No

8. If this free compost is available at a facility like the Moscow Recycling Center, would you be more likely to use/access this material?

51% Yes 15% No

9. Any other comments regarding the Solid Waste Processing Facility:

Curbside Recycling Collection

10. Do you participate in the single-stream curbside recycling program?

74% Yes 22% No

11. If no, why not? _____ Skip to question 13...

12. How would you rate your level of satisfaction in regards to Curbside Recycling Collection?

	Excellent	Good	Neutral	Poor	Very Poor	Don't Know
a. Provided container quality	48%	27%	2%	1%	0%	5%
b. Available container sizes	44%	26%	2%	3%	1%	8%

12. continued... How would you rate your level of satisfaction in regards to Curbside Recycling Collection?

	Excellent	Good	Neutral	Poor	Very Poor	Don't Know
c. Adequacy of bi-weekly collection schedule	36%	29%	5%	4%	2%	7%
d. Value of services received versus cost	25%	27%	17%	4%	0%	9%
e. General satisfaction	32%	38%	6%	1%	1%	5%

13. If an optional, seasonal curbside yard waste collection service using roll carts was offered, would you be willing to pay an additional fee for this type of service?

12%	\$4 per month	11%	\$5 per month
3%	\$6 per month	63%	Not Interested

14. Any other comments regarding Curbside Recycling Service:

Moscow Recycling Center

15. Have you utilized the Moscow Recycling Center in the past twelve months?

86% Yes 10% No

16. If you have visited the Moscow Recycling Center, how often do you visit the facility?

_____ Times per month _____ Times per year

17. What types of recycling materials do you bring to the Moscow Recycling Center? (check all that apply)

Rechargeable batteries	12%	Aluminum cans	37%
Compact fluorescent bulbs	10%	Aluminum foil	16%
E-waste	19%	Scrap metals	7%
Motor/cooking oil	21%	Tin (steel) cans	26%
Shredding	17%	Sorted plastic	26%
Shredding services	8%	Mixed plastic	26%
Bicycles	3%	Corrugated cardboard	60%
Books	24%	Magazines	35%
Cartridges (inkjet & toner)	6%	Mixed paper	32%
Cell phones	3%	Newspaper	23%
Yard waste	56%	Phone books	27%
Plastic bags	14%	White ledger	11%
Glass	64%	Other:	1%

18. How would you rate your recent experiences at the Moscow Recycling Center in regard to the following?

	Excellent	Good	Neutral	Poor	Very Poor	Don't Know
a. Wait times for drop off	43%	36%	7%	1%	0%	3%
b. Safe and convenient access to containers	39%	37%	7%	4%	0%	3%
c. Adequate parking and traffic flow	29%	34%	16%	7%	1%	3%
d. Interaction of staff	25%	26%	14%	1%	1%	22%
e. Interaction with equipment	19%	27%	19%	1%	0%	22%
f. General satisfaction	35%	47%	5%	0%	0%	3%

19. The City of Moscow will be relocating the Moscow Recycling Center. What is the most important consideration to you regarding the relocation of the facility?

Preferred within city limits	74%	Covered drop off	14%
Preferred outside of city limits	3%	Accessibility	46%
Sorted material drop off	30%	Extended hours of operation	18%
Safer drop off	12%	Yard Waste drop off	54%

Other: _____

20. What other improvements or changes would you recommend for the to-be relocated Recycling Center to improve the overall experience?

21. Any other comments regarding the Moscow Recycling Center and/or it's relocation:

Recycling Services - Yard Waste Drop Off

22. In the last 12 months, about how many times have you or a member of your household used the Moscow Recycling Center Yard Waste Drop Off area?

Once	Twice	Times	3-27 Times	>26 Times	Never
5%	9%	3%	51%	4%	22%

23. If you have visited the Moscow Recycling Center Yard Waste Drop Off area, how often do you visit?

	Once	Twice	Times	3-27 Times	>26 Times	Never
Winter	15%	9%	1%	7%	0%	31%
Spring	7%	13%	9%	34%	0%	16%
Summer	8%	8%	6%	37%	0%	16%
Fall	10%	11%	7%	38%	0%	14%

24. How would you rate your level of satisfaction in regards to the Moscow Recycling Center Yard Waste Drop Off area?

	Excellent	Very Good	Good	Fair	Poor	Don't Know
a. Wait times for drop off	14%	16%	24%	13%	4%	14%
b. Safe and convenient access	11%	11%	19%	18%	11%	14%
c. Adequate traffic flow	8%	10%	18%	20%	15%	14%
d. Interaction of staff	9%	8%	8%	6%	2%	49%
e. Adequate space to maneuver vehicles	6%	8%	16%	20%	20%	14%
f. Interaction with equipment	9%	8%	14%	7%	3%	42%
g. General satisfaction	12%	14%	25%	16%	4%	14%

25. The City of Moscow will be relocating the Moscow Recycling Center including Yard Waste Drop Off area. What is the most important consideration to you regarding Yard Waste Drop Off in a new location?

Preferred within city limits	58%	Safe and convenient	37%
Preferred outside of city limits	3%	Larger service area	31%
Ease of access	53%	More containers	20%

Other: _____

26. What other improvements or changes would you recommend for the to-be relocated Moscow Recycling Center Yard Waste Drop Off area to improve the overall experience?

27. Any other comments regarding the Moscow Recycling Center Yard Waste Drop Off area:

Household Questions

28. Which best describes the building you live in?

65%	One family house detached from any other houses
10%	One family house attached to one or more houses e.g. duplex or townhouse
18%	Building with two or more apartments or condominiums
2%	Mobile home
	Other:

29. How many people live in your household?

23%	1	12%	3	8%	5
40%	2	8%	4	3%	>5

30. Solid waste collection service type:

78%	Roll Cart	14%	Dumpster	1%	Other
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31. Recycling collection service type:

72%	Roll Cart	5%	Shared Roll Cart	8%	Other
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Additional Comments:

32. Please use the following space (attach additional pages if necessary) to make comments and suggestions you would like the City of Moscow to consider in regards to sanitation and recycling services.

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Focus Group Survey Results

Following the Written Survey process, the City organized community focus groups for Moscow residents. A focus group process was designed to consist of six to ten individuals brought together to discuss issues raised by a facilitator. The purpose of the focus group was to gain further information in regards to Written Survey results that could benefit from further research. On May 31, 2018, the City of Moscow conducted three focus groups to gather additional information on the recycling and sanitation preferences of citizens.

Initially, the City of Moscow invited 100 randomly selected Moscow utility rate payers to partake in the focus group. Few response to attend were received from those invitees, and as a result, the City turned to its social media platform to request residents' participation. Interested participants were asked to come to Moscow City Hall where over the course of one day, three focus groups were conducted. Three hour-long focus groups were held on May 31, at 7 a.m. 12 p.m. and 5:30 p.m. All sessions had at least one participant, with three participants at 5:30 p.m. Each participant was given a copy of the draft Sanitation and Recycling Center Survey results. Assistant City Supervisor Jen Pfiffner was the lead facilitator of the group with assistance from M.P.A. Interns Shakie Doe-Williams and Trevor Memmott. Topics discussed included accessibility, Seasonal Curbside Yard-Waste Collection, Moscow Recycling Facility Use, and Redemption Center.

Focus Groups Comments

The City kicked-off each focus group session with a brief intro of the Moscow Sanitation Master Plan, detailing the City's desire to relocate the Moscow Recycling Center. From there, we dived into an engaging ice breaker activity by asking participants to express their thoughts and feelings on the subject of recycling. The ice breaker helped everyone get comfortable with each other and set the stage for a group discussions. As part of the planning process, the City prepared for the focus group by developing a focus group questionnaire, which outlined the session's flow and listed out the questions used to guide the discussion. By the end of the evening and after a good four hours of total focus group activity, the following themes were determined:

- Residents are eco-conscious and have a tendency to over utilize recycling facility through sorting materials themselves, even when they have single stream curb-side recycling.
- Safety and accessibility – Participants are concern with the size of the recycling center, specifically our focus group found that residents are concern with pedestrian safety when navigating the recycling center.

- The focus group also revealed that a primary barrier to proper recycling was a lack of knowledge and confusion as to what could not be recycled or the proper methods of recycling.
- Another major concern of the focus group participants is the cost of the recycling. Focus group participants view non-county residents using the recycling center as a “theft of service”. Focus group participants recommended several suggestions including mentoring recycling center for non-residents of Moscow and limiting access to recycling center for non-paying members.
- Focus Group participants believe that adding yard-waste and glass pick-up to curbside services is a good additional service and could help increase the use of single stream curbside.

Sanitation Master Plan Focus Group Questionnaire

Accessibility

What are the preferred hours of operation you think would work well?

- Staffed?
- Drop Off?

Parking at the current facility, what works, what doesn't work?

Disability access?

Seasonal Curbside Yard-Waste Collection

If not interested, why not?

Leaves? Lawn clippings? Christmas trees?

If interested, what fee sounds appropriate?

Experience at Yard-Waste?

Moscow Recycling Facility Use

Out of City use of the Moscow facility.

(Latah County, Pullman WA)

(Hours of operation?)

Redemption Center

Thoughts on location at Transfer Station?

Hours of operation?

Shred, batteries, etc.?

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Intercept Survey Results

In 2016, the City conducted intercept surveys at the Recycling Center with 485 users of the Moscow Recycling Center. The results of the 2016 intercept survey set the stage for the development of the most recent recycling center intercept surveys. There are several similarities between the two intercept surveys.

As a final step in the research and information gathering process for the Plan, the City of Moscow conducted intercept surveys to better understand residents' actual practices at the Moscow Recycling Center. The intercept interview survey questions were designed to collect basic demographic information about individuals and their recycling attitude, behavior and knowledge, as well as awareness and use of the single stream recycling program. A total of 98 users were surveyed. In 2016, similar intercept surveys were conducted and included 485 responses. A comparison between 2016 and 2018 data is noted where applicable below.

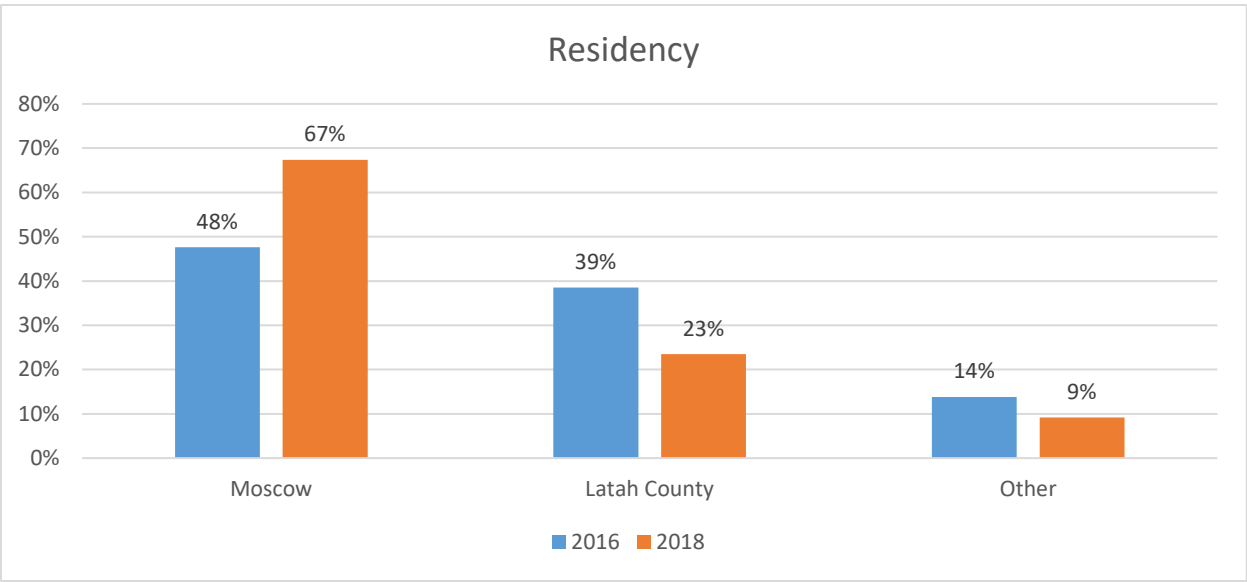
The City of Moscow conducted two intercept surveys to reach a total of 98 users of the Moscow Recycling Center. The first intercept survey was on June 22, 2018 and the second on June 30, 2018. The first intercept survey was administered on a weekday to self-haulers with sorted materials waiting in line at the facility. The second survey was conducted on a weekend which is when the facility receives increased traffic. The results were higher traffic and higher survey participation than the weekday intercept survey as generally, weekends have higher recycling rates than weekdays.

The intercept interview form inquired whether an individual subscribes to curbside recycling. To do this, the intercept survey first asked respondents, "Do you live in Moscow?", if an individual responded no, then the survey follows up with inquiries on where the respondent lives. This allows for better analysis of City of Moscow residents using the facility vs non-residents.

A majority of the questions in this survey were dedicated to gauging citizen perceptions regarding the quality of recycling services provided within the City of Moscow.

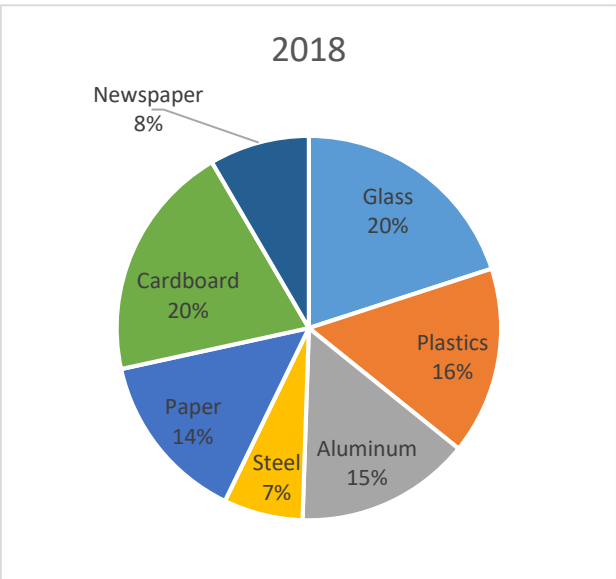
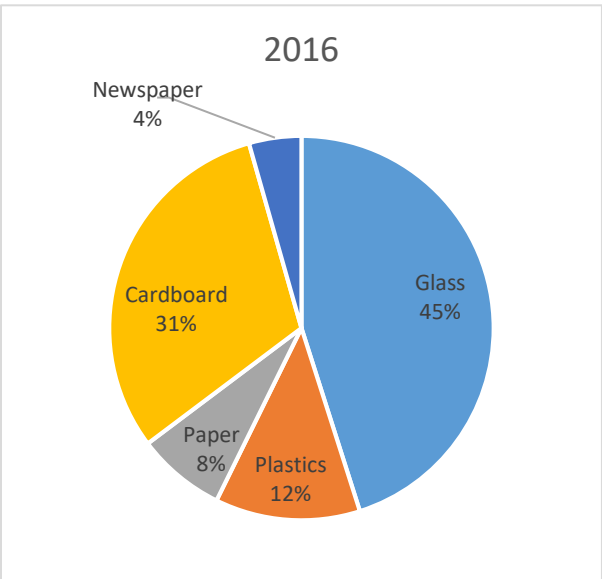
Residency (Q1)

This question was asked to determine residents of Moscow in relation to non-county residents. Of the participants who noted where they live, 67% stated they are residents of Moscow, 23% were residents in Latah County, but outside of Moscow and other residents outside of Latah County made up 9%. In the 2018 study, only 4 respondents noted they were from Pullman. When the above results are compared to the 2016 Intercept Survey Results the numbers show that only 48% of respondents noted they live in Moscow, 39% lived within Latah County and 14% of respondents indicated they live outside of Latah County.



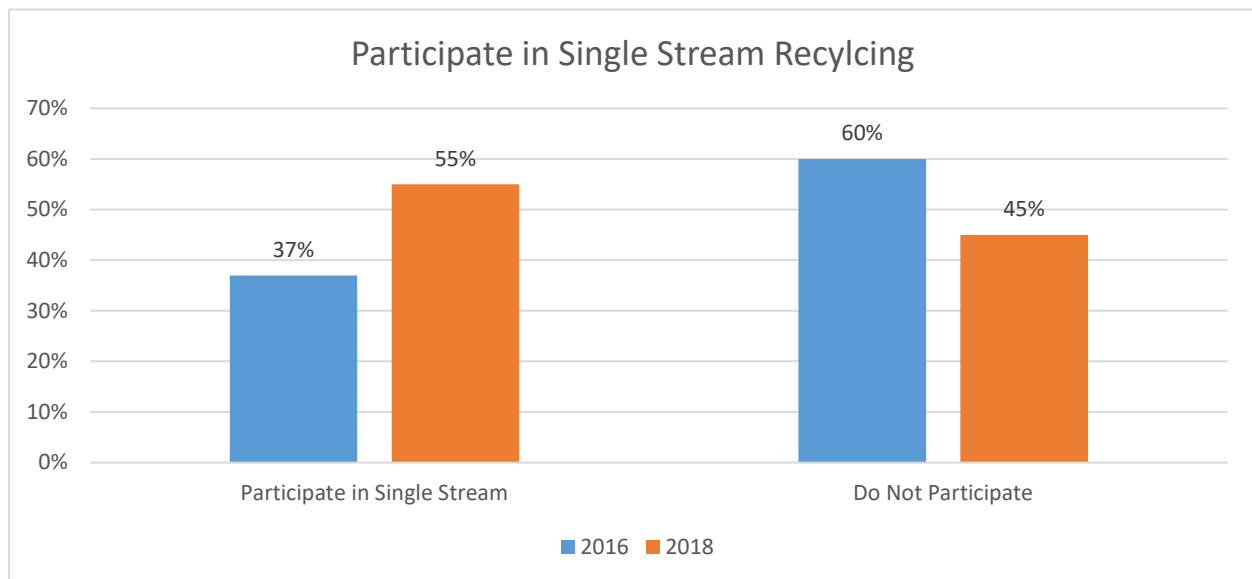
Sorted Materials (Q2)

Glass and cardboard were the two items that intercept survey respondents indicated they brought to the Recycling Center the most. In comparison to the 2016 intercept survey, respondents indicated glass and cardboard as the two materials most often brought to Moscow Recycling Center. The two pie charts on the following page show the differences in items brought to the facility. It is important to note that in 2016 the items aluminum and steel were not included in the options for respondents. While not asked, some residents noted they go to recycling center to pick up items i.e. books from the book bin.



Single Stream Curbside (Q3)

Respondents were asked to indicate if they participate in the single stream curbside recycling program. Single stream curbside program is only available to residents of City of Moscow. The survey results shown in the chart notes that 60% of respondents surveyed at the Moscow Recycling Center during this Intercept Survey do not participate in the single-stream curbside recycling program.



2018 respondents also listed the following reasons as to why they prefer to separate the materials rather than use the single stream curbside program (noted in alphabetical order):

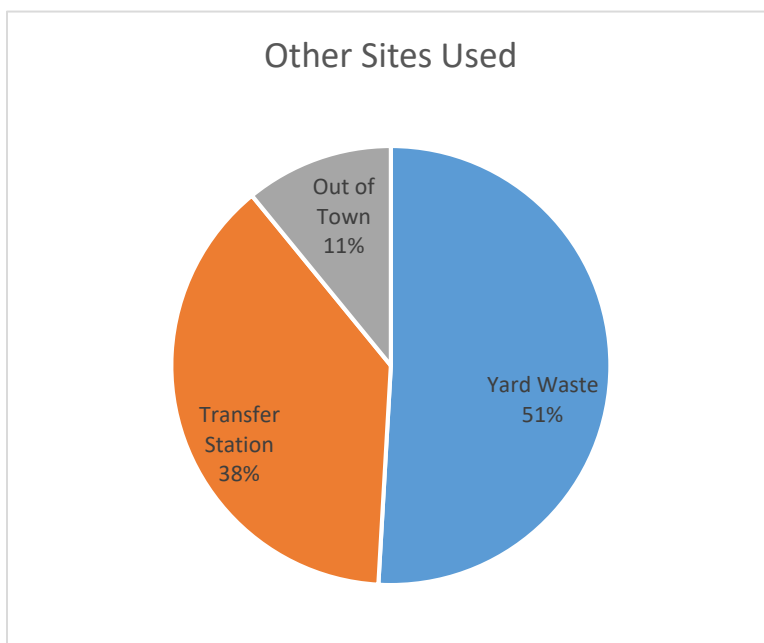
- Apartment complex
- Apartment complex
- Bring glass anyway
- County
- Curbside not available
- Like to recycle
- Likes to recycle
- Live close to recycling center
- Live in apartment
- Live in apartment
- Live in apartment
- Live in apartment
- Live in county
- Live in rental
- Live out of town
- Live out of town
- Live out of town
- Live outside city
- Lot of cardboard
- Makes a better product/lazy people make mess
- Outside city limits
- Outside city limits
- Prefer to recycle everything
- Residence
- Save the environment
- Want to recycle everything

Overall Quality (Q4)

In 2018, visitors surveyed for this intercept Survey were also asked to rate the overall quality of the Moscow Recycling Center, 94% said they would rate the quality as being “Excellent” or “Very Good.” This question was not asked in the 2016 Intercept Survey.

Other Sites (Q5)

The final questions of the Intercept Survey, also not asked in 2016, asked respondents if they use any other sites including the yard-waste drop off, Transfer Station or other out of town sites. 48% of intercept respondents indicated they do use other sites. Of the 48% who indicated the use of other facilities, 58% noted they use the Recycling Center Yard-Waste Drop Off, 44% noted they use the Latah County Transfer Station and 13% noted they use out of town sites.



Intercept Survey Tool 2018

City of Moscow

Recycling Center Intercept Survey



1. Do you live in Moscow? ☐ Yes ☐ No

B. If no, where do you live? _____

2. What type (s) of recyclable materials did you bring today? (Circle all that apply)

a)	Glass
b)	Plastics
c)	Aluminum
d)	Steel
e)	Paper
f)	Cardboard
g)	Newspaper

3. Do you participate in the single stream curbside recycling program? (Only for residents of Moscow)

a) ☐ Yes ☐ No

b) If no, please indicate why you prefer to separate the materials?

4. How would you rate the quality of recycling at the Moscow Recycling Center? (Please circle only one)

a) Excellent	b) Very Good
c) Neutral	d) Poor
e) Very poor	f) Don't know

5. Do you use any other-off sites? ☐ Yes ☐ No

b. If yes, please indicate which other site you use _____

Thank you for helping us today!

Intercept Survey Tool 2016

Recycling Center Survey September 26 - October 7, 2016

Total Customers Surveyed		485	
Do you live in Moscow?		231	48%
If not, where do you live?	Latah County	187	39%
	Other	67	14%

Latah Co. = Kendrick, Troy, Genesee, Rural County, Viola, Potlatch, Deary, Juliaetta,

Other = Garfield, Palouse, Pullman, Colton, Coeur d Alene, Rural Whitman Co, Albion, Oakesdale, Princeton, Elk River, Colfax, Worely

If from Moscow, do you participate in the SS Ry program?

YES	128
NO	103

How often do you use Moscow Recycling public sorting area?

	Daily	Weekly	Monthly	Other
Moscow SS participants	0	52	37	39
Moscow non-SS participants	3	73	16	11
Latah County customers	14	117	34	22
Other customers	0	42	17	8

What types of materials do you commonly bring to Moscow Recycling?

	Glass	OCC	Plastic	M/paper	News	All
Moscow SS participants	92	59	16	12	2	12
Moscow non-SS participants	29	24	16	5	5	64
Latah County customers	12	5	4	2	4	169
Other customers		3		3	2	63

Comments:

Love single stream

We like to come down and sort it ourselves

Love single stream

Doesn't like that people who don't use single stream have to pay for it

Nice to have a way to look through books and magazines

Would like a single stream cart (*outside city limits*)

I like to recycle myself

Recycling Facility & Program Matrix Summary Table
City of Moscow
Comprehensive Sanitation System Master Plan



Date: May 22, 2018

Prepared By: Travis Pyle, PE / Great West

Checked by: Chris Bell / Bell & Associates

Component/System	Current Issues/Deficiencies	Suggestions for Improvements / Considerations
Recycling Center		
Public Drop-Off Area	Crowding/Traffic Co-Mingling/Safety Issues:	(as it pertains to a new convenience drop-off site and relocating the processing/baling at the SWPF)
	-Small queue-in area	Enlarge area for more traffic staging access and drop-off space; provide an adequate number of containers and space to reduce congestion and wait times; possibly 5-6 total roll-off containers in a z-wall arrangement - 2 for cardboard, 2 for single stream and 1 for glass.
	-Pedestrians crossing pull-through traffic zones	Design parking area next to the bins/containers with the traffic lane outside so pedestrians and vehicles do not cross
	-Operations/forklifts working in pedestrian drop-off zone	Design area with front access for public and rear access for operations to load and unload bins; consider replacing the small bin setup with z-wall type drop-off and roll-off containers; consider a cardboard compactor at the new convenience center; move small (repurpose) bins out to the new processing center?
	-Redemption Center	Is a permanent redemption center necessary? Considering hosting a couple redemption events per year using existing buildings/infrastructure.
	-Co-mingling of operations, haul trucks, and collection trucks at exit area	Design public access so that it is separate from operations; collection trucks are not anticipated at the new site - they would direct haul to the new processing center at the SWPF.
Processing Building/ Site Storage	Inadequate Size/Lack of Covered Storage/Arrangement for Traffic Flow	
	-Processing floor space may need to be increased especially if the new facility has a sorting component	Current floor space is crowded and will only become more congested with increased recycling processing / baling needs. Increase the floor space (building area) as required to handle future needs.
	-Loading ramp is cumbersome and safety issue	Consider adding a loading dock to the new processing building for semi-truck trailer back-in and loading off the staging/storage floor level.
	-Drop-off area(s) / containers for new processing facility.	Consider repurposing the Moscow Recycling Center's containers for use at the new processing facility - see recommendations above for access and drive-through compatibility.
	-Lack of dry storage awaiting loadout and haul-off for commodity sales	Enlarge the covered storage areas both inside of the building for load-out and/or an provide a large exterior covered storage shed
	-Collection trucks and operations co-mingle in the front of the building causing congestion and safety concerns	Access to the unloading for collection drop-off should be on the front side of the building with operations and truck load-out on the rear to keep the traffic separated.
	Single location for recyclables drop-off within the city/near-city limits	-Consider adding recycling drop-off stations at the new processing facility in addition to yard waste drop-off at the SWPF.
	-Redemption Center is located in a crowded area next to operations	If a new redemption center is decided to be needed at the convenience drop-off facility, it needs to be located in the area where the public is dropping off recyclables and does not required pedestrians to co-mingle with vehicles and operations.
Yard Waste Drop-off Area	Inadequate Size/Lack of Queuing Space/Stacking of Traffic on Surface Street/Lack of Direct Sight for Monitoring	
	-Lack of drop-off space for vehicles unloading	Consider adding another one or two z-wall container spaces for yard waste at the new convenience center.
	-No finished compost pick-up area	Consider adding a finished compost load-out area at the new convenience site.
	-Lack of space for vehicle maneuvering, and queuing causing back-up onto Almon St.	Design a pull-in area where vehicles with trailers can maneuver without interacting with traffic; design the maneuvering space on the property and outside of access lanes.
Traffic Flow / Site Arrangement	General Site Traffic Flow/Scale Location(s)	
	-Main processing building and site arrangement and site traffic flow requires co-mingling of operations, collection trucks and load-out haul trucks	Design the new site with the recommendations noted above for the main processing building and provide adequate space for the collection trucks to access separate of the public.
	-Scale location for load-out haul trucks requires double-back (or triple-back) for inbound and outbound scaling	Locate the scale along the separate operations access so that it is accessible and safe for both inbound and outbound load-out haul trucks.
	-No scale for commercial collection trucks	Consider adding a designated commercial scale at the new processing center such as an automated scale for the commercial collection trucks to weigh inbound with tared truck weights (no outbound scaling).
Recycling Program		
Curbside Collection Program for Yard Waste Continue to Increase Diversion Rate and Participation	-No curbside yard and/or food waste collection	Consider implementation of a seasonal yard waste collection program.
	-Diversion rate is approximately 16% for general curbside-type recyclables in the City without accounting for recycling of biosolids, non-municipal solid waste, and yard waste. With these included, diversion is historically around 50%.	Evaluate more opportunities to increase the diversion rate of general curbside-type recyclables and increase participation by community outreach programs. Possibility a yield-related campaign such as "just 2 more lbs per household each year," should be considered.