

VOLUME II: TECHNICAL MEMOS

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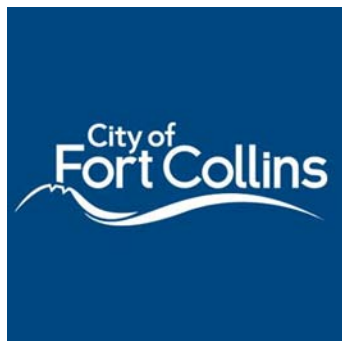
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Memo A

Task 3 – Emerging Technologies Technical Memorandum

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Task 3 –Emerging Technologies Technical Memorandum

*North Front Range Regional Wasteshed
Planning Study – Phase 2*

Prepared For:
Larimer County, CO
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1 Introduction & Purpose

The Technical Advisory Committee (TAC) for the North Front Range Coalition is researching relevant existing information used to form the basis for further evaluation of infrastructure related options to address current and future solid waste demands within Larimer County (County). This technical memorandum addresses Task 3, Emerging Technology for TAC review on emerging and alternative technologies that may affect waste generation rates, facility design and other factors within the County. This memorandum also summarizes additional infrastructure options that HDR recommends for consideration as part of the analysis to be completed for Task 6, Analysis of Infrastructure Options that are in addition to the previous seven (7) Infrastructure Options identified in the Planning Study.

General Description

Waste processing and conversion technology options can be grouped into the following main technology classes:

- Thermal Technologies
 - Direct Combustion (various forms of traditional waste-to-energy)
 - Gasification
 - Plasma Arc Gasification
 - Pyrolysis
- Biological Technologies
 - Aerobic Composting
 - Anaerobic Digestion with biogas production for electricity or fuel generation
- Chemical Technologies
 - Hydrolysis
 - Catalytic and Thermal Depolymerization
- Mechanical Technologies
 - Autoclave/Steam Classification
 - Advanced Materials Recovery
 - Refused Derived Fuel (RDF) Production

It's important to note that there are also waste conversion technologies that are a combination of two or more technology classes. For example, Mechanical Biological Treatment (MBT) technologies combine mechanical separation and treatment with biological processing, while Waste-to-Fuel Technologies combine mechanical pre-processing with thermal and chemical conversion processes.

2 Alternative and Emerging Technologies

Description of Process/ Methodology

Thermal Technologies

Thermal technologies are designed to either combust, gasify or pyrolyze the carbonaceous combustible materials in MSW feedstocks to recover the caloric energy contained in the waste to produce an energy product. Traditional thermal processes (such as traditional waste-to-energy (WTE) technologies) use a boiler to make steam by recovering the latent heat in the exhaust gas formed from combusting the waste. The steam produced is then sent to a turbine generator to generate electricity. Some thermal facilities may also sell the steam directly to a commercial/industrial user, or send it to a district energy system. Thermal processes that convert the waste to produce a fuel or synthesis gas (e.g. gasification, plasma arc gasification and pyrolysis) can either combust that gas directly in a boiler to make steam and electricity (similar to a traditional WTE technology), or the gas produced can be cleaned and refined to be combusted in an engine or gas turbine to make electricity. There are also technologies, such as waste-to-fuel, that use gasification to produce a gas that is cleaned and refined into a commercial grade product or liquid fuel. However, these technologies are highly complex and less commercially developed than traditional WTE or gasification technologies.

Regardless of the specific thermal process used, combustion or gasification of waste produces air emissions at certain levels that must be controlled or removed. In theory, the emissions from gasification and pyrolysis technologies are lower than traditional WTE technologies that directly combust the waste; however, modern emission control systems can reduce emissions from both types of technologies below any regulatory emission standards. Thermal technologies can yield gases such as CO₂, water vapor, nitrogen oxides (NO_x), sulfur dioxide (SO_x); particulates and particulate-related emissions such as heavy metals; as well as trace amounts of products of incomplete combustion, such as carbon monoxide (CO) and dioxins/furans. New thermal technologies are expected to utilize modern air pollution control (APC) devices for emissions clean-up, which include many new advances developed in Europe for air emissions control. The array of APC equipment available for use in minimizing air emissions are quite diverse and include but may not be limited to: selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR) for NO_x emissions reduction; spray dryer absorbers (SDA), scrubbers and sorbent injection for acid gas reduction; activated carbon injection (CI) for mercury and dioxins reduction; and a fabric filter baghouse (FB) for particulate and heavy metals removal. Depending on the thermal technology used and the desired end use of the gases produced by the process, the complexity of the APC and gas cleanup systems may vary.

Direct Combustion

Direct combustion of waste, referred to herein as traditional WTE or Energy from Waste (EfW), involves the complete oxidation of a fuel by combustion under controlled conditions utilizing more than stoichiometric levels of oxygen (also known as excess air combustion). The latent heat generated from the combustion process is recovered in a boiler to generate steam which can be used directly for heating/industrial purposes or passed through a steam turbine-generator to create

electricity. There are several types of direct combustion technologies used on a commercial scale in North America, Europe and Asia; the most common include: 1) mass burn grate systems; 2) refused derived fuel (RDF) fired boilers; 3) modular starved air systems; and 4) fluidized bed combustion.

The majority of the 80+ thermal waste conversion facilities operating in North America today utilize direct combustion technology. Significant construction of traditional WTE facilities stopped in the late 1990s, but there have been a number of recent expansions of existing WTE facilities in Minnesota, Florida and Hawaii. There has also been two new greenfield facilities constructed using modern WTE combustion technology; 1) a 3,000 ton per day (tpd) mass burn facility in West Palm Beach, Florida (2015), and 2) a 480-tpd mass burn facility in Clarington, Ontario, Canada.

Photo #1: Durham York Energy Centre (Ontario, Canada)



Gasification

Gasification has been used for over two hundred years starting with “coal gas” in the 1790’s used for factory lighting. During World War II in the 1940’s, gasification of various types of biomass (e.g. woody wastes) and coal was used to power vehicles and some stationary internal combustion engines. The gasification process involves the conversion of carbonaceous material in the MSW feedstock into a raw gas that is called producer gas that contains principally CO, hydrogen, methane, and other light hydrocarbons, as well as water, carbon dioxide (CO₂) and nitrogen (N₂). The conversion of the feedstock using gasification typically occurs in a reducing environment (i.e. in the presence of limited or substoichiometric amounts of oxygen) under high temperatures and in some cases steam is added to the process. The relative concentration of producer gas components depends upon the composition of the feedstock and process operating conditions. The latent heat in the raw producer gas can be recovered in a boiler to create steam that can be used to generate electricity through a steam condensing turbine (as in the traditional WTE technology described above). Synthesis gas (or “syngas”) can be derived from the producer gas by removing impurities

and contaminants through appropriate cleaning and reforming processes to produce a gas composed primarily of CO and H₂. The syngas can be used to generate electricity by direct firing in a combustion turbine, or fired in an internal combustion engine-generator (similar to a landfill gas-to-energy system). The syngas generated can also be used as a chemical building block in a catalytic process for the synthesis of liquid fuels (e.g. methanol, ethanol), but only after considerable gas cleanup.

There are a wide variety of technology designs that can be defined as gasification. The feedstock for most gasification technologies must be prepared from the incoming MSW through shredding and pre-sorting to pull out bulky materials, household hazardous waste, as well as recyclables and inert materials such as dirt, glass/grit, and metals. These materials must be separated and removed to prevent the formation of slags that can cause process upsets or potential operating issues. Some modular combustors use a two-stage combustion process in which the first chamber operates in a low-oxygen environment and the combustion is completed in the second chamber.

Photo #2: Homan Gasification Plant (Fukuoka, Japan)



Plasma Arc Gasification

Plasma Arc Gasification is a subset of thermal gasification. Plasma arc melting technology has been in operation in the metal industry since the late 19th century and modern Plasma Arc Gasification (PAG) technology has been used for a range of industrial and disposal applications (such as, the gasification of hazardous waste, auto shredder, and other types of homogeneous wastes and ash treatment, mostly overseas). It has only been within the last 15 to 20 years that this technology has been considered as a method to treat MSW feed stock at demonstration and pilot-scale level applications.

Plasma arc technology uses carbon electrodes to produce a very-high-temperature arc ranging between 5,000 to 12,000 degrees Fahrenheit that “vaporizes” the feedstock. The high-energy

electric arc that is struck between the two carbon electrodes creates a high temperature ionized gas (or “plasma”). The intense heat of the plasma breaks the MSW and the other organic materials fed to the reaction chamber into basic elemental compounds. As the feedstock gasifies, a low-Btu synthesis gas or syngas is generated that could be suitable for combustion and the heat recovered in a boiler, or the producer gas can theoretically be cleaned with its temperature reduced and combusted directly in an internal combustion engine or gas turbine to produce electricity and/or thermal energy (i.e. steam, hot water), or the gas can be cleaned and used for a chemical process. The inorganic fractions (glass, metals, etc.) of the MSW stream are melted to form a liquid slag material which when cooled and hardened to form an inert vitrified slag. Recyclable and contaminated materials can be recovered through a pre-processing system. Metals may be recovered from both feedstock pre-processing and from post-processing the solid slag material.

There have been some recent attempts at commercially applying PAG technology in North America and in the U.K., including the Plasco project in Ottawa, Ontario, Canada and the Tees Valley 1 and 2 projects in England. However, both of these projects ran into technical and financial issues that eventually resulted in Plasco being shut down and sold-off, and the Tees Valley project is currently looking for a buyer. Pyrogenesis, based out of Quebec, Canada, has had some success selling their PAG technology to commercial cruise ships and the U.S. Navy.

Photo #3: Alter NRG 1,000-TPD Plasma Gasification Reactor (Tees Valley, England, U.K.)



Pyrolysis

Pyrolysis technologies are closely related to gasification and some facilities could fall into either technology category depending on how they are operated. Pyrolysis is defined as the process of heating material to high temperatures (700° to 1500°F) in an oxygen-free environment to produce a combustible gas and a liquid product (i.e. pyrolytic oils) and a carbon-rich solid residue. This is similar to what is done to produce coke from coal or charcoal from wood. The feedstock used in pyrolysis technologies has typically been more homogeneous, such as coal, biomass (woody wastes) or even waste tires; however, mixed municipal waste has been used in some operations with pre- processing to obtain a refuse-derived fuel (or RDF) which is a relatively more homogeneous feedstock. Similar to gasification, the pyrolysis process can be designed to optimize

the production of gases or liquids. Syngas can be produced and used as fuel in boilers, or theoretically used in internal combustion units or gas turbines, provided that the gas is adequately cleaned. As discussed, the pyrolysis process is performed in an air- or oxygen-free environment, and therefore the system usually must have a complex design and control system to prevent air or oxygen from intruding into the process, or a provision must be incorporated into the design to purge air from the reaction chamber. However, some pyrolysis processes allow very small amounts of air/oxygen into the system. This allows the feedstock to partially combust to supplement the heating process.

Air emissions from pyrolysis systems are primarily those discharged from combustion of the producer gas or syngas (and possibly char). The treatment of syngas produced from pyrolytic processing of MSW for use in energy conversion equipment and emissions control of syngas constituents has little history but is similar to the process of Gasification described above. Facilities using the pyrolytic oil and other products as fuel could have some of the same air emissions issues as Direct Combustion. Less SO_x might be generated in the gas or oil, because most of the sulfur is expected to stay with the char. However, if the char is combusted, the sulfur could be released to form SO_x. Units that heat the feedstock in an oxygen-deficient environment would produce fewer emissions. Mercury would be expected to be largely driven off with the gas and would have to be dealt with from the exhaust of the gas combustion device. Other metals and particulate could remain with the char and could largely be separated from the char prior to combustion with a suitable processing system. These emissions can theoretically be controlled using modern air pollution control devices to meet local, state and national regulatory standards.

Biological Technologies

Aerobic Composting

Aerobic Composting has been successfully employed on source separated organics and yard/agricultural wastes and wastewater biosolids. Aerobic Composting can include a number of different processes, however the two most common are aerobic windrow composting and forced aerated static pile composting. Windrow style composting is usually conducted outdoors, while forced aerated static pile composting is usually employed indoors. However, some forced aerated static pile composting is conducted outdoors in areas that are isolated from odor receptors. Other outdoor operations use a bag system to contain the materials. In windrow composting the materials (generally green material) are placed in elongated piles called windrows that are aerated naturally through a “chimney effect” or by mechanically turning the piles with a machine or forced aeration to improve porosity. Frequent turning of the pile introduces oxygen, accelerates physical degradation of feedstocks and provides an opportunity to adjust the moisture content to the optimum level. This technology can be particularly odorous if food waste is included in the feedstock. The average time required for active composting is 8 to 12 weeks.

The aerated composting process refers to any of a number of systems used to biodegrade organic material without physical manipulation during primary composting. It may be in windrows, open or covered, or in closed containers (in-vessel). In an enclosed forced aerated static pile composting technology, fresh air is forced into the pile to speed up the process and to try to ensure that the system remains aerobic. This method is suited to producing large volumes of compost in relatively smaller areas. This technology can be particularly odorous if the composting pile is allowed to have

pockets of anaerobic activity. The blended mixture is usually placed on perforated piping or trenches, providing air circulation for controlled aeration.

In most facilities using the aerated compost process a series of perforated pipes draws air down through the windrows to an air collection manifold that runs under the windrows. The compost-air can be drawn through the compost using a blower system which then pushes the air through a biofilter that acts as an emission and odor control system. Alternatively, air can be injected into the windrows; however, this results in dispersing the potentially odorous air and therefore is not recommended.

In-vessel food waste aerobic composting can also take place in highly-controlled, automated equipment using a combination of agitation and temperature/moisture control to convert food scraps into compost in just a few days. Current models on the market have modest capacity with larger units being able to process up to 1.5 tons/day. This technology is most efficient for use with small food waste generators such as schools, hotels/conference centers, malls/food courts, cruise ships, hospitals, amusement parks and sports stadiums.

Photo #4: Example of a Windrow Aerobic Composting Facility



Anaerobic Digestion

Anaerobic digestion (AD) is commonly used to treat wastewater biosolids; however, it has also been used as a way of treating the organic fraction of the MSW waste stream, such as food wastes. The processes that mechanically separate the organic fraction of MSW for use in an AD process were first employed in the 1980's under the term Mechanical Biological Treatment (MBT). A few facilities were developed in the U.S. using these AD and MBT technologies; however, for the most part, these facilities ceased to operate years ago due to a variety of technical and financial issues. However, evolution of the technology in parts of Europe, particularly in Germany, Italy and the U.K., has renewed interest in this technology in North America. AD facilities using source separated organics and even in a few cases mixed MSW are successfully operating in Europe due to landfill

ban policies, high tipping fees and high prices paid for energy. In parts of California and in Canada, processing food and source separated organic waste streams with the use of AD in combination with aerobic composting to bio-stabilize the process residue has been developed on a commercial scale.

The AD process occurs when organic matter is decomposed using bacteria in the absence of oxygen. By consuming the organic materials, the bacteria produce a biogas (primarily methane and carbon dioxide). Feedstocks for AD vary according to the type of technology but in broad terms could include MSW-derived organics, manure, food waste, grass clippings, and for some technologies, yard waste, brush and wastewater treatment plant biosolids. Biologically inert materials that might be contained in the digestion feedstock, such as metals, glass, and plastics are undesirable and considered contamination and either must be removed prior to digestion (for wet type systems) or be screened-out during or after digestion (for dry type systems). Odors can be a significant issue for AD systems particularly when food waste is incorporated and even more so if a mixed MSW processing system is incorporated upfront of the AD process.

There are several factors that influence the design and performance of AD systems. Some of these factors include: the concentration and composition of nutrients in the feedstock, temperature of the digesting mass, and retention time of the material in the reactor, pH, acid concentration, and oxygen level.

The Drake Water Reclamation Facility (DWRF) in the City of Fort Collins currently utilizes AD to convert volatile organic solids from wastewater into biogas used to heat the facility. A multi-year pilot project experimented with introducing source separated organics directly into its biodigesters to increase biogas output. DWRF has designed and partially funded a cogeneration system that will allow the conversion of biogas into electricity – dependent upon increased throughput of food scraps as feedstock. There are other municipal Wastewater Treatment Plants in the county that may be a resource in the development of similar AD facilities converting diverted food waste organics to energy.

Photo #5: Zero Waste Energy Development Co. AD Plant, San Jose, California



Mechanical Biological Treatment (MBT)

As described above, Mechanical Biological Treatment (MBT) is a variation on composting and materials recovery that incorporates a two-stage process of mechanical and biological treatments.

The term commonly used for MBT in North America is *Mixed Waste Processing with Organics Recovery*, but the approach and desired end products are generally the same for both technologies. During the mechanical stage the entire feedstock is sorted to remove recyclables and contaminants and then shredding or grinding takes place for size reduction of the materials prior to the biological stage. The biological stage includes a digestion step in an enclosed vessel which generates a bio-gas that is used to produce energy in addition to heat to dry the feedstock thereby making it ready for processing into a refuse-derived fuel (RDF) product as described below. If no fuel markets are available, the product could be further composted to render the material inert for landfilling.

This technology is designed to process a fully mixed MSW stream. Materials usually derived from the process include marketable metals, glass, and other recyclables. Limited composting is used to break the MSW down and dry the fuel. As for other composting and digestion systems the process must be designed to manage potential odor issues. The order of mechanical separating, shredding, and composting can vary. It is an effective waste-management method and can be built in various sizes. The RDF produced by an MBT process can either be landfilled or converted into energy via a thermal conversion process. In Europe, it is common for the RDF and residue produced by an MBT process to be fired directly in a boiler at a traditional WTE combustion facility, or sold directly to a third party (e.g. Cement Kiln). Consequently, similar to RDF, the MBT process produces compost and fuel products that are dependent on the sale of that product for economic viability.

Chemical Technologies

Hydrolysis

There is much interest and development in the area of cellulosic ethanol technology to move from corn based ethanol production to the use of more abundant cellulosic materials. Hydrolysis is part of that development. The Hydrolysis process involves the reaction of the water and cellulose fractions in a feedstock (e.g., paper, yard waste, etc.) with a strong acid (e.g., sulfuric acid) to produce sugars. In the next process step, these sugars are fermented to produce an organic alcohol. This alcohol is then distilled to produce a fuel-grade ethanol solution which can be burned in energy conversion devices such as heaters and engines.

Hydrolysis is a multi-step process that includes four major steps: Pre-treatment; Hydrolysis; Fermentation; and Distillation. For MSW the pre-treatment step would include separation of the feedstock stream as necessary to remove any inorganic/inert materials (glass, plastic, metal, etc.) from the organic materials (yard waste, paper, etc.). Feedstock materials that are appropriate for hydrolysis/fermentation of the cellulosic components of MSW include wood, green waste and paper. This process does not handle or convert mixed MSW directly and is best suited for clean source-separated cellulosic waste components. The organic material is shredded to reduce the size and to make the feedstock more homogenous. The hydrolysis step places the shredded organic material into a reactor where it is introduced to the acid catalyst, with the cellulose in the organic material converted into simple sugars as discussed above. The fermentation step utilizes these sugars to be fermented and converted into an organic alcohol. The distillation step takes the organic alcohol and distills it into fuel-grade ethanol. The by-products from this process are carbon dioxide (from the fermentation step), gypsum (from the hydrolysis step) and lignin (non-cellulose material from the hydrolysis step). Since the acid acts only as a catalyst, it can usually be extracted and recycled back into the process.

Catalytic and Thermal Depolymerization

The depolymerization, or cracking, process converts long-chain hydrocarbon polymers present in some waste materials into intermediate products that can be processed into fuels such as diesel and gasoline. Pressure and heat are used to decompose long-chain polymers composed of hydrogen, oxygen, and carbon into shorter chains of petroleum-like feedstock. This process is somewhat similar to that used at an oil refinery to convert crude oil into usable products, including the use of distillation to segregate the desired hydrocarbon liquids (such as diesel fuel). The typical feedstocks proposed for depolymerization are plastics, waste oils, grease, and offal (i.e., processed animal soft tissue), although the technology vendors are representing that this technology can theoretically use MSW and biomass as feedstocks. This has not been shown as feasible except at extremely small scale. There are two depolymerization methods that can be used to convert organic materials into fuel: thermal and catalytic.

Thermal depolymerization utilizes temperature (temperature ranges from 1,000° to 1,400° Fahrenheit) and pressure to crack the large hydrocarbon molecules within the feedstock. Once the hydrocarbon molecules are broken into shorter chains, additional refining steps are required to convert the molecules into oil. The high temperature and additional refining steps in the thermal process require the input of a significant amount of energy, as compared to the catalytic depolymerization approach. The energy balance data for thermal depolymerization of waste-derived organic materials are lacking with regard to commercial scale processing.

The Catalytic Depolymerization process uses lower temperatures (ranging from 500° to 700°F) and lower pressures than thermal depolymerization. In order to achieve adequate product yields and qualities at the lower temperatures and pressures, a catalyst is employed to aid in the process of breaking down or cracking the large molecules efficiently. Zeolite, silica-alumina, and bauxite are common types of catalysts used in the process. In a Catalytic Depolymerization process, the plastics, synthetic-fiber components and water in the feedstock react with a catalyst under pressure and temperatures to produce a crude oil. This crude oil can then be distilled to produce a synthetic gasoline or fuel-grade diesel.

Waste-to-Fuel Technologies

The generation of liquid fuels from wastes is an evolving technology. The use of biomass and organic wastes as a feedstock appears to be advancing in demonstration/pilot projects with a couple projects moving towards commercialization. However, the use of an MSW feedstock is still being tested in laboratories and demonstration/pilot projects. There is a commercial-scale waste-to-fuel facility being developed in Edmonton, Alberta, Canada by a technology developer called Enkern, but this facility is still in a commissioning phase.

There are several proposed methodologies to convert MSW into fuels. The first step in the most prevalent MSW-to-fuel technologies requires the use of a process to generate a syngas, typically a thermal conversion process such as gasification. The syngas is then cleaned to remove impurities (tars, hydrocarbons, contaminants, etc.). The next step involves a Fischer-Tropsch (FT)-type process, which is defined as a collection of chemical reactions that converts a mixture of carbon monoxide and hydrogen into liquid hydrocarbons. The FT process was first developed in Germany in 1925 as a process of converting gases to a synthetic liquid fuel. The chemical reactions produce a variety of hydrocarbon molecules with the more useful reactions producing alkanes. Most of the

alkanes produced tend to be straight-chain, suitable as diesel fuel. Use of the proper catalyst in the FT process is essential to garner the highest quality fuel while not deteriorating the catalyst. In this technical industry there are many forms of catalyst including cobalt and ferrous based. This is the area that syngas from MSW gasification is having the greatest issues because of the contaminants in the MSW syngas and low of ratios of H₂ to CO. This FT process is usually followed by a hydro-cracking process. Hydro-cracking is required as part of the FT process to break up the long-chained hydrocarbons. The very long-chained hydrocarbons are waxes, which are solid at room temperature. Therefore, for production of liquid transportation fuels it is usually necessary to crack some of the FT products.

Alternatives to the FT process include using a bio-catalytic process where biological organisms are used to breakdown the elemental components in the syngas produced by a thermal process into a biofuel. The Indian River Bioenergy Facility in Vero Beach, Florida employed this technology to convert mostly agricultural wastes into ethanol, but this facility is no longer operating.

Photo #6: Enkern Alberta Biofuels Facility, Edmonton, Alberta, Canada



Mechanical Technologies

Autoclave/Steam Classification

Autoclaving is classified as a “mechanical” process that uses heat and pressure in a mechanical rotating cylinder that can be used to separate the cellulosic and organic material from other portions of the municipal solid waste stream. The basic Autoclave technology has been in use for sterilization of hospital wastes and equipment and other related applications for many years.

Autoclaves are large rotating vessels that have steam injected and kept at a certain temperature and pressure over a 2 to 4 hour period to convert the MSW. Most Autoclaves are currently operating in batch mode accepting from approximately 1 to 25 tons per batch (2-3 hour). The Autoclave process has the potential for a 40% to 60% reduction in waste volume with the cellulose

recovery having the potential to be used as feedstock for: paper production; ethanol production feedstock; compost feedstock; or digester feedstock for methane production.

Like AD and MBT technologies, Autoclaving may be best applied when it addresses only a portion of the waste stream, namely the cellulose-fiber-containing portion, which is usually 40% to 60% of the total MSW input stream. However, this technology can accept mixed MSW which contains a large organic fraction (just not inerts from a C&D mix) to be used as a “front-end” separation system for many of the other emerging technologies such as Hydrolysis for production of a fuel product, Gasification or Pyrolysis for energy generation, Anaerobic Digestion for energy and compost production, or for fiber recovery for the pulp/paper industry. A trommel screen is usually utilized after the autoclave to separate the fibrous organic materials produced from Autoclaving and other materials (such as inorganic materials, plastics, and recyclables such as glass, metals). If the goal for the Autoclaving technology is recovery for paper production, because the fibers are a mixed grade, the main product that can be produced is a lower-grade cardboard.

Mixed Waste Processing and Advanced Materials Recovery

There are a number of types of materials recovery facilities (MRFs) in operation in the U.S. and around the world. Most can be classified into two groups; 1) those that accept and process source separated recyclables, sometimes referred to “clean” MRFs, and 2) those that take a mixed MSW stream, referred to as a “Mixed Waste Processing Facility” or sometimes as a “dirty” MRF. This purpose of this section is to describe Mixed Waste Processing facilities (MWPFs) and their potential commercial applications.

A MWPF begins with mixed solid waste from residential and/or commercial collection vehicles being off-loaded onto a tipping floor. Materials are first sorted on the floor using manual labor and mobile equipment to remove larger or bulky items such as appliances, dimensional wood, metal, or large pieces of plastics that might clog or interrupt operations of the processing system. Loaders or grapples then load a conveyor or surge hopper to convey the material to the sort lines and mechanical equipment for separation. In most cases either a mechanical device or manual labor is used to open bags and containers prior to screening and sorting.

Material is usually processed through multi-stage screens to separate fiber (cardboard, newspaper, and mixed paper), plastic, metal and glass containers, and small contaminants. This is usually accomplished through the use of mechanical, optical or pneumatic screening equipment and/or labor to separate materials into size classifications and/or light versus heavier materials. Fiber is usually hand sorted off elevated conveyor platforms into commodities and dropped into bunkers below. Containers are processed through ferrous magnets, eddy current magnets, air screens and hand sorting. The small contaminant stream (dirt, rocks, broken glass and ceramics, bottle caps, etc.) may be further processed by optical/pneumatic sorting. Sorted material is moved from bunkers and baled (fiber, plastic, metal) or loaded directly into roll-off trucks (glass, wood, scrap metal). Some MWPFs also isolate the organic fraction of the MSW stream to be used in a composting or AD process. The remaining residue material from a MWPF is shipped to a local landfill or another appropriate waste reduction application. The main purpose of this type of MWPF is to remove recyclable materials and even organics from the mixed MSW. These types of facilities usually recover about 10% to 25%, although some facilities have reported recovery of up to 50% or more. There is a wide range of MWPF capacities operating throughout the world. The optimal capacity is

between 200 tpd and 1,500 tpd using multiple sort lines and operating additional shifts. MWPFs can have a useful operating life of 20 to 30 years if proper maintenance is provided. Many MWPFs are retrofitted throughout their life with new processing equipment as applicable.

There has been a number of recent commercial scale MWPFs implemented in North America. The most notable examples are in Montgomery County, Alabama, San Jose, California, and in Edmonton, Alberta. It should be noted that the current downward trend in commodity pricing and acceptance of the processing approach has impacted the financial viability of some of these projects.

Photo #7: Newby Island Resource Recovery Park, California



Refuse Derived Fuel (RDF) Production

An RDF processing system prepares MSW by using separation, shredding, screening, air classifying and other equipment to produce a fuel product, such as coarse shred, fluff, or pellets, for either on-site thermal processing, off site thermal processing, or use in another conversion technology that requires a prepared feedstock. The goal of this technology is to derive a more homogeneous fuel product that can be used in specified thermal equipment or as a supplement to coal-fired power generating facilities, and even cement kilns in some cases. The fuel goes by various names but generally is categorized as a refuse-derived fuel (RDF).

Non-recovered discards can be processed by this technology. Facilities can range in size from several hundred tons per day to more than 3,000 tons per day. Recycling processes can also be built into an RDF facility such as in a MRF or MWPF, metals can usually be sorted and removed by magnets and eddy current separators. In some cases other recyclables such as cardboard or even plastic containers may be recycled. An RDF facility strives to develop a consistently sized fuel with a relatively constant heating value for thermal technologies. These facilities can employ multiple shredding stages, large trommel screens or other types of screens for sizing, several stages of

magnets, and possibly air separation and eddy current magnets. The product would typically have a nominal particle size of 3 to 4 inches (although the sizing of final product RDF can be controlled for a specific technology), have the grit and metals largely removed, and be ready to market.

EPA has encouraged processing to produce a Non-Hazardous Secondary Material (NHSM) for use in industrial boilers or other applications that are subject to Section 112 of the Clean Air Act as opposed to Section 129 which waste combustors must follow. The fuel must meet the requirements for a Non-Hazardous Secondary Materials (NHSM) as defined by the US EPA in 40 CFR Section 241.3 of the Clean Air Act. These processing facilities require more processing and ongoing sampling to meet strict requirements for residual chlorine content, chlorine to sulfur ratio, heating value, moisture and ash content in the resultant fuel than are required for combustion of waste in a waste boiler. Refer to Section 5 for additional discussion of the NHSM program.

Some RDF facilities can be classified as a “shred and burn” style, which shred the material and magnetically remove ferrous metals without removing fines. Fines usually consist of material two inches in diameter or smaller that include organic material such as paper, dirt and food particles as well as inorganics such as glass, plastics and metals. Some RDF facilities have converted to shred and burn through blanking the small holes in trommels. The purpose for this is to reduce the overall amount of residue (fines) landfilled. Many of the existing RDF combustion facilities in the U.S. (e.g. Miami-Dade, West Palm Beach, Detroit, Honolulu, Norfolk, VA, etc.) employ these practices to process the fuel.

There are also RDF technologies that form the remaining MSW stream, after removal of recyclable and bulky and inert materials, into a pellet or briquette. The intended use of these pellets or briquettes varies by technology developer and regulation, but some examples include use as a supplement to coal at a conventional fossil fuel power plant or cement kiln. Some technology providers also offer the pellets for use as a soil amendment in greenhouses. However, the quality and integrity of the pellets or briquettes produced and the willingness of the local market to accept this product factor significantly into the economic viability of the project. A recent commercial-scale MSW pelletizer facility in York Region, Ontario (just north of the City of Toronto) was shutdown due to operating issues and limited available markets for the pellets.

3 Comparisons of Technology Options

The following table presents a comparison of direct combustion, gasification and plasma arc gasification, showing criteria including commercial viability, capability of processing feedstock, technology capacity level, diversion potential, marketability of end products and bi-products, useful operating life, environmental benefits and drawbacks, local economic benefits, and range of operating and capital costs (high, medium, low).

	Criteria	Direct Combustion	Gasification	Plasma Arc Gasification
1. Commercial Viability (Development Stage)				
a	Status of technology in North America	Commercial	Demo/Pilot on MSW	Demo/Pilot on MSW
b	Years of commercial operating history in North America	30 plus years	Limited to none on MSW	Limited to none on MSW
c	Number of commercial continuously operating facilities in North America	80 plus facilities	None on MSW	None on MSW
d	Status of technology worldwide	Commercial	Commercial (mostly in Asia)	Limited Commercial on MSW in Asia
2. Capability of Processing Feedstock				
a	Type of MSW Processed	Handle Entire MSW Stream	Handle Entire MSW Stream	Ideal for hazardous and high carbon fraction (e.g. plastics) of MSW Stream
3. Technology Capacity Level				
a	Processing Unit Capacity (tpd)	500 to more than 3000 tpd Modular less than 500 tpd	Less than 500 tpd	Less than 500 tpd
4. Diversion Potential of Technology				
a	Potential Landfill diversion (weight percent)	70%-90%	Claimed greater than 90%	Claimed greater than 90%

	Criteria	Direct Combustion	Gasification	Plasma Arc Gasification
5. Marketability of End- and By-Products				
a	Availability and feasibility of markets for recovered materials	Good for metals and mixed ash for LF cover (as permitted)	Unknown for vitrified ash/slag for aggregate	Unknown for vitrified ash/slag for aggregate
b	Availability and feasibility of markets for energy produced	Good	Good	Good
c	Undesired By-Products	Fly ash if not mixed with bottom ash	Ash/Slag if not sold/given away as aggregate	Ash/Slag if not sold/given away as aggregate
6. Useful Operating Life				
a	Facility Life (yrs)	Greater than 25 years	Currently about 20 years	Currently about 10 to 15 years
7. Typical Environment Benefits/Drawbacks				
a	Benefits	Produces energy, metals for market and ash for cover (mixed)	Produces energy, possible aggregates from slag (need mkts)	Produces energy, possible aggregates from slag (need mkts)
b	Drawbacks	Air emissions to be mitigated by APC equipment	Air emissions to be mitigated by APC equipment	Air emissions to be mitigated by APC equipment
8. Local Economic Benefits				
a	Permanent Full-time Jobs	40 to 80 permanent jobs	40 to 80 permanent jobs	40 to 80 permanent jobs
9. Financial				
a	Range of Capital and Operating unit cost	Moderate to High	Moderate to High	High

The following table presents a comparison of pyrolysis, aerobic composting, and anaerobic digestion, showing criteria including commercial viability, capability of processing feedstock, technology capacity level, diversion potential, marketability of end products and bi-products, useful operating life, environmental benefits and drawbacks, local economic benefits, and range of operating and capital costs (high, medium, low).

	Criteria	Pyrolysis	Aerobic Composting	Anaerobic Digestion
1. Commercial Viability (Development Stage)				
a	Status of technology in North America	Demo/Pilot on MSW	Commercial (particularly for source separated organic streams)	Commercial (particularly for source separated organic streams)
b	Years of commercial operating history in North America	None on MSW	More than 30 years on green/yard waste feedstock	Less than ten years
c	Number of commercial operating facilities in North America	None on MSW	Thousands of operating facilities	About 5 (More under construction)
d	Status of technology worldwide	Demo/Pilot on MSW	Commercial	Commercial
2. Capability of Processing Feedstock				
a	Type of MSW Processed	Handle Entire MSW Stream	Ideally suited to process green/yard waste and food waste portions of MSW	Can treat only organic portion of MSW
3. Technology Capacity Level				
a	Processing Unit Capacity (tpd)	Under development; ~ 10 to 100 tpd	Usually 200 to 400 tpd, but can be larger	Wide range from 5-10 tpd to 300 tpd

	Criteria	Pyrolysis	Aerobic Composting	Anaerobic Digestion
4. Diversion Potential of Technology				
a	Potential Landfill diversion (weight percent)	Not known	Larimer County's total organics is about 40% according to Regional Wasteshed Planning Study (2016)	Larimer County's total organics is about 40% according to Regional Wasteshed Planning Study (2016)
5. Marketability of End- and By-Products				
a	Availability and feasibility of markets for recovered materials	Depends if gases, liquids and char can be used	Most materials can be cured into a marketable compost	Digestate after process can sometimes be turned to compost and it may be possible to convert biogas to pipeline grade natural gas
b	Availability and feasibility of markets for energy produced	Depends if gases, liquids and char can be combusted	N/A	Biogas can be used to create energy
c	Undesired By-Products	Liquids, tars, chars and other by-products	Screened overs, such as bottle caps, glass and other small objects	Digestate must be assessed if compostable
6. Useful Operating Life				
a	Facility Life (yrs)	One small facility operating in Germany since 80's	Life is 30+ years depending on equipment replacement	Operating internationally since the 80's
7. Typical Environment Benefits/Drawbacks				
a	Benefits	Potentially create energy and useful by-products	Create useable compost	Create energy and potentially useable compost

	Criteria	Pyrolysis	Aerobic Composting	Anaerobic Digestion
b	Drawbacks	Air emissions to be mitigated by APC equipment	Can create odor, noise and dust	Air emissions need mitigation & digestate may not be composted; can create odors
8. Local Economic Benefits				
a	Permanent Full-time Jobs	Not known	About 2 to 10 jobs, depending on the size of the operation	About 10 to 25 jobs, depending on the size of the operation. More jobs required if a MWPF is required for mixed MSW stream.
9. Financial				
a	Range of Capital and Operating unit cost	High	Low	Medium

The following table presents a comparison of mechanical biological treatment, hydrolysis, catalytic and thermal depolymerization, and waste-to-fuels, showing criteria including commercial viability, capability of processing feedstock, technology capacity level, diversion potential, marketability of end products and bi-products, useful operating life, environmental benefits and drawbacks, local economic benefits, and range of operating and capital costs (high, medium, low).

	Criteria	Mechanical Biological Treatment	Hydrolysis	Catalytic & Thermal Depolymerization	Waste-to-Fuels
1. Commercial Viability (Development Stage)					
a	Status of technology in North America	Demo/Pilot	Demo/Pilot	Demo/Pilot	Demo/Pilot on MSW
b	Years of commercial operating history in North America	None Commercialized	None Commercialized	None Commercialized	None Commercialized
c	Number of commercial operating facilities in North America	None Commercialized	None Commercialized	None Commercialized	One facility in hot startup and commissioning. One facility recently shutdown.
d	Status of technology worldwide	Commercial	Demo/Pilot	Demo/Pilot; one facility claimed in Spain	R&D/pilot on MSW

	Criteria	Mechanical Biological Treatment	Hydrolysis	Catalytic & Thermal Depolymerization	Waste-to-Fuels
2. Capability of Processing Feedstock					
a	Type of MSW Processed	Entire waste stream	Wood, green waste and paper	Plastics & oils	Entire or biomass portion of MSW
3. Technology Capacity Level					
a	Processing Unit Capacity (tpd)	Needs more research	Needs more research	Needs more research	Needs more research
4. Diversion Potential of Technology					
a	Potential Landfill diversion (weight percent)	This is a feedstock pre-process; recover recyclables	Estimated 25%-30%	Estimated 10%-12%	If gasification is used, can be up to 90%
5. Marketability of End- and By-Products					
a	Availability and feasibility of markets for recovered materials	Markets for recyclables and possibly fuel product	Markets for gypsum & lignin will need to be established	Needs more information on the bio-diesel created	Needs more information on the liquid fuel created
b	Availability and feasibility of markets for energy produced	There are markets for the potential biogas produced	There has not been a market for this fuel established	There has not been a market for this fuel established	There has not been a market for this fuel established
c	Undesired By-Products	None known if markets are available for fuel	Potentially the CO ₂ , gypsum & lignin	Needs more research	Needs more research
6. Useful Operating Life					
a	Facility Life (yrs)	Most probably 15 to 25 years	Needs more evaluation	Needs more research	Needs more research
7. Typical Environment Benefits/Drawbacks					
a	Benefits	Separates feedstock for recycling, digestion & thermal	May be able to produce a fuel with more evaluation	May be able to produce a fuel with more evaluation	May be able to produce a fuel with more evaluation

	Criteria	Mechanical Biological Treatment	Hydrolysis	Catalytic & Thermal Depolymerization	Waste-to-Fuels
b	Drawbacks	Odors, dust & noise	Methane emissions and possible chemical spills	Hydrocarbons could be emitted; catalysts or solvents needed	Hydrocarbons could be emitted; catalysts or solvents needed
8. Local Economic Benefits					
a	Permanent Full-time Jobs	20 to 40 jobs	Not known	Not known	Not known
9. Financial					
a	Range of Capital and Operating unit cost	Medium	Medium	Medium	Medium/High

The following table presents a comparison of autoclave, materials recovery, and RDF processing, showing criteria including commercial viability, capability of processing feedstock, technology capacity level, diversion potential, marketability of end products and bi-products, useful operating life, environmental benefits and drawbacks, local economic benefits, and range of operating and capital costs (high, medium, low).

	Criteria	Autoclave	Mixed Waste Processing	RDF Processing
1. Commercial Viability (Development Stage)				
a	Status of technology in North America	Demo/Pilot on MSW components	Commercial	Commercial
b	Years of commercial operating history in North America	None on MSW components	30 + years	30 + years under MWC EPA requirements; about 5 years under Boiler MACT EPA requirements ¹
c	Number of commercial operating facilities in North America	None on MSW components	Half dozen to a dozen	Approximately 20 to 30. One facility producing pellets in Ontario, Canada was shutdown due to financial issues (i.e. no market for pellets)

	Criteria	Autoclave	Mixed Waste Processing	RDF Processing
d	Status of technology worldwide	Demo/Pilot on MSW components	Commercial	Commercial
2. Capability of Processing Feedstock				
a	Type of MSW Processed	Handle only organics but can process entire MSW stream	Handle entire MSW stream	MWC handle entire MSW stream; NHSM cannot handle chlorine containing materials
3. Technology Capacity Level				
a	Processing Unit Capacity (tpd)	At this time only smaller 100-300 tpd available	~200 to 1,500 tpd	Up to about 1,000 tpd
4. Diversion Potential of Technology				
a	Potential Landfill diversion (weight percent)	~35-40% of the MSW possibly more if combined with other technologies	~10-25% of the MSW	~60-90% of the MSW depending on the process
5. Marketability of End- and By-Products				
a	Availability and feasibility of markets for recovered materials	Metals can be marketed; fiber product may only be used for low grade cardboard; market needs to be developed for plastics	Recyclables can be marketed	Recyclables can be marketed; Markets are project specific if pellets or briquettes are produced. Possible use as soil amendment but no clear markets available.
b	Availability and feasibility of markets for energy produced	Market needs to be developed for fuel	N/A	RDF can be converted to energy under either MWC or Boiler rules.
c	Undesired By-Products	Non-fiber unless a market can be developed for plastics	Grit/ fines, trash, low grade plastics and glass unless markets are available	Bulky items, grit/glass; for NHSM PVC and other chlorine containing materials

	Criteria	Autoclave	Mixed Waste Processing	RDF Processing
6. Useful Operating Life				
a	Facility Life (yrs)	Not known at this time	20 to 30 years with periodic equipment upgrades	20 to 30 years
7. Typical Environment Benefits/Drawbacks				
a	Benefits	Possibly create low grade fiber or fuel product; recover metals; output materials are sterilized	Recover recyclables	Preparation of feedstock for other processes; NHSM can be processed in Industrial Boilers
b	Drawbacks	Risks of Autoclaving are not known; fiber product is low quality	Odors, noise & dust to be mitigated	Odors, noise & dust to be mitigated; NHSM must meet strict fuel requirements and sampling
8. Local Economic Benefits				
a	Permanent Full-time Jobs	Not known at this time	20 to 60 jobs	20 to 100 jobs
9. Financial				
a	Range of Capital and Operating unit cost	Medium	Medium	Medium; NHSM produced for a boiler costs are higher than for RDF production for an MWC facility, however the boiler costs are lower

Footnotes

1. Solid Refuse Fuel (SRF) production as a Non-Hazardous Secondary Material (NHSM) where the fuel is combusted in an Industrial Boiler subject to 40 CFR Section 112 of the Clean Air Act has been completed commercially in the US only in the last five years. Refer to Section 5 for further discussion of SRF. Municipal Solid Waste (MWC) facilities combusting RDF are subject to 40 CFR Section 129.

4 Benefits and Obstacles

Thermal Technologies

Direct Combustion

Benefits of this technology are the production of local energy and potential uses of the byproducts of ferrous metals and ash as landfill cover or as an aggregate in the construction industry. In addition, direct combustion technologies have a long history of reliable commercial-scale operation and are flexible enough to handle a variety of feedstocks with little to no pre-processing requirements. Development of the technology can create a number of construction jobs over the one to three years of construction and 40 to 80 permanent jobs over the life of the project. In addition, although the technology recycles and re-uses water on-site, it also requires a moderate use of water. However, high capital and operating costs, particularly for smaller scale facilities, and strong opposition from environmental groups make implementing projects very difficult. The current low pricing for electricity and natural gas makes the energy produced from these technologies (steam and/or electricity) of low value.

Gasification

Gasification operators assert one of the benefits of many gasification technologies is that very high diversion levels (above 90%) can be achieved because the slag is not leachable. Other benefits include the production of energy and potential uses of the by-products of ferrous metals and ash as landfill cover or as an aggregate in the construction industry. Local benefits include the creation of construction jobs over the one to three years of construction and 25 to 75 permanent jobs over the life of the project. Theoretically the emissions should be lower than that from Direct Combustion and the vendors of this technology claim this is true. However, due to the limited operating history of this technology on mixed MSW in North America, actual emissions from operating facilities have been difficult to obtain or difficult to translate. In addition, the technology may only process a specific subset of waste materials (not just MSW as reviewed in this document) such as wood waste, tires, carpet, scrap plastic, or other waste streams. Some technologies may require extensive pre-processing increasing capital and operating costs. The current low pricing for electricity and natural gas makes the energy produced from these technologies (steam and/or electricity) of low value.

Plasma Arc Gasification

Similar to the Gasification and Pyrolysis processes, the MSW feedstock will need to be preprocessed to remove the larger, bulky waste and household hazardous waste as well as dirt, glass/grit, and metals to prevent these materials from forming slag and causing potential operating issues. Vendors of this technology claim efficiencies that are higher than Direct Combustion and Gasification technologies. These higher efficiencies may be possible if a combined cycle power system is proposed; however, little operating experience and no commercial experience in North America are available for this technology.

Vendors of this technology claim to achieve lower concentrations of emissions than more conventional technologies, like Direct Combustion. However, APC equipment similar to other thermal technologies would still be required for the clean-up from the combustion of the syngas as

these facilities generally have similar air emissions issues as other Gasification, Pyrolysis and Direct Combustion facilities. Mercury and some other more volatile metals are expected to be driven off with the gas and would have to be dealt with from the exhaust of the gas combustion device.

Pyrolysis

Pyrolysis of MSW has had limited operational history and no commercial success to date, therefore there is little information regarding long-term operating experience. As there are not many Pyrolysis units functioning at a high level of capacity using MSW as a feedstock, the industry needs more time developing this technology.

Benefits include a claim of over 90% diversion of waste from landfills, the production of energy and potential uses of the by-products, if marketable. Other local benefits include the creation of construction jobs over the one to three years of construction and a certain amount of permanent jobs over the life of the project. This figure cannot be estimated as the technology requires additional development.

Biological Technologies

Aerobic Composting

Benefits include diversion of waste from landfill and the local production of beneficial use compost and mulch which can be used in the community. In addition, local benefits include the creation of construction jobs over the short period of construction and about 2-10 permanent jobs over the life of the project, depending on the size and complexity of the facility. The main drawback is the potential for creating odors, noise and dust. This can be mitigated with proper operations and facility siting. Aerobic Composting also only addresses certain segments of the waste stream.

Anaerobic Digestion

Benefits of this technology include diversion of waste from landfill, the production of energy and potential uses of the by-products. In addition, other local benefits include the creation of construction jobs over the year or so of construction and about 10 to 25 permanent jobs over the life of the project, depending on the size and complexity of the facility. The biogas produced can also be cleaned and compressed into CNG for vehicles, or cleaned and sold directly to a natural gas pipeline. The drawbacks of AD technology include the limitation of the technology to process the limited feedstock appropriate for the technology (organics), as well as the potential for creating odors, noise and dust. The management of odors, noise and dust can be mitigated with proper operations and facility siting.

Mechanical Biological Treatment (MBT)

A benefit is the post-collection separation of feedstocks to divert material from landfill while preparing a feedstock for digestion and thermal consumption. Another benefit is the creation of construction jobs over the construction period and approximately 10 to 50 permanent jobs over the life of the project. The primary drawback is the necessity for the process to rely upon the sale of the fuel product for economic viability. As much as 40-50% of the incoming waste stream winds up as non-digestible residue that either requires processing from another thermal technology and/or

landfilling. Other operating drawbacks include the potential for creating odors, noise and dust. This can be mitigated with proper operations and facility siting.

Chemical Technologies

Hydrolysis

The process of chemical Hydrolysis is well established for some organic feedstocks, such as in the conversion of wood to paper pulp, but has only been applied to MSW-derived organics on a conceptual basis, or limited to laboratory- or pilot-scale. There has been no sustained commercial application of this technology using MSW as a feedstock in North America and little information from abroad.

Similarly, the environmental risks are not well defined. In addition to the environmental risks of any associated technology, there would be some emissions risks related to methane emissions or issues dealing with potential chemical spills. It is also expected that significant quantities of water and wastewater use would be required.

Benefits include the diversion of organic waste from landfill, the production of a cellulosic ethanol that can be used as a fuel product and the creation of construction jobs over the construction period and a certain amount of permanent jobs over the life of the project. This figure cannot be estimated as the technology requires additional development.

Catalytic and Thermal Depolymerization

Benefits include the diversion of plastic and oil waste from landfill, the production of an oil or fuel product that can be used as fuel and the creation of construction jobs over the construction period and a certain amount of permanent jobs over the life of the project. This figure cannot be estimated as the technology requires additional development. The drawback is that the environmental risks are not well defined. Catalytic cracking could emit some hydrocarbons from the process. There could also be some other risks resulting from the handling of the catalysts or solvents and related compounds that might be required for the process. Water and wastewater use is also not known.

Waste-to-Fuel Technologies

Given the emerging status of this technology with MSW, there is minimal information available on this technology. This is a two step process: 1) producer gas will need to be generated through gasification or another technology and 2) the producer gas will then need to be cleaned and conditioned with the proper chemical catalytic process used to synthesize the syngas into a liquid fuel.

Benefits include the potential production of an ethanol based fuel and the creation of construction jobs over the construction period and a certain amount of permanent jobs over the life of the project. Drawbacks include air emissions impacts associated with the thermal gasification and syngas conditioning process and the potential for only being able to produce fuel from a biomass only feedstock. In addition, there are solid and liquid wastes associated with this technology. The current low oil pricing in the U.S. also makes the sale of the liquid fuel less valuable and may impact the financial viability of the project.

Mechanical Technologies

Autoclave/Steam Classification

Benefits include the potential diversion of materials from landfill, the production of a cellulose and plastic products that can be used as feedstock for many of the technologies as described above and the creation of construction jobs over the construction period and a certain amount of permanent jobs over the life of the project. This figure cannot be estimated as the technology requires additional development. A drawback is that the environmental risks of Autoclaving are not known. This technology could be used primarily as a front-end system to prepare materials for other processes such as fiber recovery, and thermal technologies and relies on the additive technology for most diversion potential. Water and wastewater use is also not known.

Mixed Waste Processing and Advanced Materials Recovery

Benefits include the diversion of recyclables from landfill, preparation of feedstock for thermal, chemical or biological processes and the creation of construction jobs over the one to two year construction period and approximately 20 to 60 permanent jobs, depending on the size and complexity of the project. A drawback is that certain environmental impacts must be mitigated such as noise, dust and odor. The diversion rate for this technology alone is lower unless coupled with another technology for management of the non-recyclable materials. In addition, some of the commodities recovered from a MRF of this type may be more contaminated than a “clean” MRF. Current commodity pricing also impacts the financial viability of these projects.

Refuse Derived Fuel (RDF) Production

Benefits include the preparation of the MSW into a feedstock that is acceptable by other processes allowing them to be more effective and efficient, removal of recyclable and reusable materials for beneficial use and the creation of construction jobs over the one to two year construction period and approximately 10 to 100 permanent jobs, depending on the size and complexity of the project. A drawback is that RDF facilities will have some air emissions directly from the processing (dust) as well as from the combustion of the RDF (this is discussed in the thermal technologies section). An economic drawback of RDF is that it produces a solid fuel similar to coal. So, production of the RDF product presumes a local appetite for a coal-substitute to be economically viable. For most plants looking for a coal substitute, the fuel produced must also achieve the requirements for a Non-Hazardous Secondary Material (NHSM) if the plant wants to be regulated under Section 112 of the Clean Air Act. To distinguish this application from RDF production, processing required for a boiler subject to Section 112 is called solid refuse fuel (SRF) in this report. Refer to Section 5 for further discussion. Fugitive particulates from the process must be controlled. In addition other environmental impacts must be mitigated such as noise and odor. Costs for this type of facility are greatly based on the amount of revenues garnered from sale of the RDF product.

5 Alternative Technologies Design and Implementation Considerations

A number of potential alternatives have previously been identified for future waste management. One of these alternatives is a Waste-to-Energy Facility or Alternative Technology Facility. HDR's findings from previous review and evaluation of the alternative technologies indicate that some technologies appear to be less attractive than others, mostly due to the level of commercial development with respect to being capable of processing MSW as the feedstock and in some cases due to economic feasibility or both. To meet the need of a solution after about 2025 for disposal for Larimer County, a developed technology is necessary. The technologies which are the least developed and therefore not recommended for further consideration include:

- Plasma Arc Gasification;
- Pyrolysis;
- Waste to Fuels
- Hydrolysis;
- Catalytic and Thermal Depolymerization; and
- Autoclaving.

Our previous findings also concluded that some of the remaining technologies are considered to have limitations with respect to the types of feedstock they can process. For example, biological technologies such as anaerobic digestion and composting can only affect the organic portion of the non-recyclable discards. These types of technologies achieve much less diversion unless they are coupled with another technology that addresses other parts of the waste stream. There are also a few technology categories where some suppliers may have developed a technology but the process is not viable due to the relatively high cost. For example gasification is used in a few facilities in Japan and other countries but have not be economically feasible in North America. As such, we find that while some technologies are not suited to process the entire spectrum of waste discards, the use of MWPF's, identified as another alternative, or Mechanical Biological Treatment in waste management systems raise the possibility to develop feedstock materials that are subsets of MSW which may create opportunities for alternative technologies that are otherwise not commercially viable (e.g. certain types of Gasification). The combination of technologies does however increase complexity of the solution as well as capital and operating costs. Technologies that are not recommended for further consideration for these reasons include:

- Gasification
- Anaerobic Digestion
- Mechanical Biological Treatment

In HDR's opinion, the best emerging and alternative technologies to meet Larimer's County's future needs include:

- Mixed Waste Processing;
- Aerobic Composting;
- RDF Processing; and
- Direct Combustion.

These technologies have the best promise of being developed having been successfully implemented elsewhere in North America, have the potential for significant solid waste diversion, and potentially provide a long-term financial solution, although all of these alternatives would likely be more expensive than sending waste to regional landfills or construction of a new landfill. A few key points to consider for each of these alternatives are addressed below. The capital and operating costs provided are considered typical and are highly dependent on the project specific. In all cases, a public private partnership could be arranged for the construction and operation of the facility. The County could also construct and operate, however special skills would be necessary for more complicated technologies and generally the construction and operation is contracted to a private firm.

Mixed Waste Processing – This should remain as an option that was previously identified to be included in the evaluation of Infrastructure Options. Mixed Waste Processing could be implemented as a starter technology designed to increase diversion. The facility can be used to recover traditional containers, metal, and paper commodities captured at a single stream MRF, however the quantity and quality of the recovered materials would not likely be cost effective. If the facility could focus on C&D wastes extracting wood, metal, film plastic sheeting, concrete and other construction related material. Recovery of these materials can significantly increase the waste tonnage diverted but these materials often are low value unless there are specific markets available. The metal and cardboard removed may have markets. Removal of these bulky materials however may allow for better recovery of fines and organics and improve access to single stream containers. A facility could be built with the ability to change the recovered material mix, adapting by season or identified markets.

Mixed waste processing facilities would require solid waste permitting similar to that required by other MRFs and transfer stations. Capital cost for a mixed waste MRF will vary based upon the size, type of processing, site constraints or other issues but would likely be in the \$20 million to \$40 million range.

Aerobic Composting - This should remain as an option that was previously identified to be included in the evaluation of Infrastructure Options, however at this time aerobic composting is the best alternative due to continued development of anaerobic digestion operating practices. This technology is best applied to mixed green waste and yard waste which can be a significant percentage of the waste stream, particularly at certain times of the year. If an effective food waste collection system is developed, diversion can be increased further although additional measures are needed for odor control.

Solid waste permits would be required for a composting operation. An aerobic composting operation may require about \$5 million to \$10 million set up and an operating fee of about \$50 to \$75 per ton processed.

RDF Processing – This is a potential additional infrastructure Option to Evaluate that was not previously identified. There may be Industrial Boilers that may be interested in using the fuel as a substitute for coal, oil, wood or biomass fuels used at the facility. These facilities are regulated under the CAA Section 112 and would most likely want to remain with that designation. Under the recently developed rules in Section 241 of the CAA, the EPA is encouraging the development of Non-Hazardous Secondary Materials (NHSM) that can be used as a fuel substitute for traditional

fuels. Under the NHSM provisions and certain management practices, certain materials usually considered to be wastes can be used as a traditional fuel substitute without causing the boiler to be subject to the provisions of Section 129 of the CAA and the unit would remain regulated under Section 112. If one or more local solid fuel fired facilities can be identified, it may be possible to produce a fuel meeting EPA requirements that can offset fossil fuel combustion. A cement kiln is ideal because these facilities may be able to incorporate the ash residuals into their products further increasing diversion.

Section 241.3 has several provisions that must be demonstrated. First, the process must go beyond the processing used to produce a refuse derived fuel (RDF). The rule will likely require removal of fines, glass, metal and other inert materials, as well as certain other undesirable components of the waste stream such as moisture and chlorine. These provisions will demonstrate a "legitimacy criteria" demonstrating that a viable solid fuel is produced and used and it no longer is a waste. The solid fuel must be managed as a valuable commodity. This can often be demonstrated through the existence of contract agreements for sale and use of the fuel. The fuel must have meaningful heating value and be used as a fuel to recover energy (or as a process input). Lastly the fuel must be comparable to the traditional fuel in regard to the contaminant levels contained in the fuel.

The processing system to generate the fuel could be incorporated with a mixed waste processing facility but it must be capable of achieving the fuel requirements consistently as demonstrated by daily composite sampling. Of the typical requirements, generally one of the most difficult to achieve is low chlorine content. This requirement may require the use of optical sorters or other screening measures to remove PVC plastics and other chlorine containing materials. Metals and inert fines such as glass and grit will need to be removed to reduce the ash content. Removal of some items such as fine organics will help reduce the moisture content and may also reduce the chlorine content of the SRF. Incorporation of the equipment necessary to make the SRF properties comparable or better than the traditional fuel displaced increases the complexity and cost of the processing system. Further analysis would be necessary to determine if a fuel could be produced at an acceptable cost if potential users are identified.

A RDF Processing facility will require solid waste permits and will have some other permitting requirements for wastewater and possibly air emissions control permitting if drying or certain other requirements are needed. These permits do not address the industrial boiler or cement kiln permitting requirements. Facility capital cost may be in the range of \$50 million to \$100 million. The operating cost may be in the range \$35 to \$100 per ton of MSW processed. These values could vary depending on the specific technologies used.

Direct Combustion - This should remain as an option that was previously identified to be included in the evaluation of Infrastructure Options. Direct combustion of much of the waste stream with mass burn waste-to-energy technology could be completed. Of these alternatives, this option would result in the largest diversion and could have the least pre-processing requirements for the waste stream. Economics are heavily driven by the recovered energy markets. Most facilities produce electricity but if a steam customer could be identified, usually steam sales offer better economics. For the combustible portions of the waste stream, about an eighty percent reduction in weight is possible with recovery of metal and required disposal of ash and residues.

A mass burn facility will require solid waste, Title V air emission permits and will have some other permitting requirements for wastewater and possibly certain other requirements. Facility capital cost may be in the range of \$300,000 to \$450,000 per ton per day of capacity. In other words a 750 tpd facility would likely have a capital cost between \$225 million and \$338 million. The operating cost may be in the range \$80 to \$120 per ton of MSW processed.

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Memo B

Task 3 – Solid Waste Management Practices Memo

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Memo

Date:	Thursday, May 25, 2017
Project:	North Front Range Regional Wasteshed Planning Study – Phase 2
To:	North Front Range Regional Wasteshed Planning Coalition TAC
From:	Doug DeCesare and Wendy Mifflin, HDR, Inc.
Subject:	Task 3 - Solid Waste Management Practices Memo

1. Introduction

The purpose of this memorandum is to provide the North Front Range Regional Wasteshed Planning Coalition Technical Advisory Committee (TAC) a brief summary of successful management practices that may be replicated in Larimer County to aid in solid waste diversion and long-term financial sustainability addressed in Task 3.

The following five jurisdictions were ultimately selected for their management practices:

- Simcoe County, Ontario, Canada
- Lancaster County Solid Waste Management Authority, Pennsylvania
- Monterey Regional Waste Management District, California
- Yakima County, Washington
- Wake County, North Carolina

These jurisdictions were selected based on a combination of factors including:

- Population
- Annual Tons of Waste generated
- Method of Disposal
- Diversion and Education Programs
- Waste Management Strategy including public/private partnerships
- Funding Model

Data Sources and Limitations

The data gathered from the benchmarked jurisdictions includes a general overview, operational and educational program descriptions and fee structure information. The information gathered includes publicly available information from agreements, internet searches and HDR project records. The full list of results is provided in the matrix in Section 3 of this memo.

2. Solid Waste Management Practices Municipality Overview

As shown in the following table, the populations of Simcoe County, Ontario, Canada and Yakima County, Washington are closest in size to the North Front Range Regional Wasteshed (Larimer County). At 0.50 tons of Municipal Solid Waste disposed per capita, Simcoe County, Ontario, Canada has a significantly lower tons disposed per capita rate than the other four municipalities outlined in the report. For

comparison purposes, the United States tons per capita disposed per year is estimated at 0.80. The Regional Wasteshed Planning Study completed by R3 Consulting Group, Inc. in July of 2016, estimates the Larimer County tons per capita disposed per year at 1.4.¹

Criteria	System Overview				
	Simcoe County, Ontario, Canada	Lancaster County Solid Waste Management Authority, Pennsylvania	Monterey Regional Waste Management District, California	Yakima County, Washington	Wake County, North Carolina
Population	304,172	533,320	435,232	249,800	907,314
Total Tons Disposed	153,249	325,000	370,376	239,272	910,034
Tons per Capita per Year	.50	.61	.85	.96	1.00

The following provides a brief overview of the structure and programs for the respective solid waste systems for each municipality.

Simcoe County, Ontario, Canada

Simcoe County (County) (County) is located in South-Central Ontario, and is comprised of 16 member municipalities including: Adjala-Tosorontio, Bradford West Gwillimbury, Clearview, Collingwood, Essa, Innisfil, Midland, New Tecumseth, Oro-Medonte, Penetanguishene, Ramara, Severn, Springwater, Tay, Tiny and Wasaga Beach. The majority of the population is located in settlement areas, with the remainder scattered through rural areas that make up the bulk of the land area within the County. The County is experiencing significant population growth, and as a result, increased demand for municipal services such as waste management.

Simcoe County is directly responsible for the management of all municipal solid waste generated by the residential sector in the County which includes all of the towns within the County. The County was allocated responsibility for management of MSW generated in the entire County under the Provincial Municipal Act. No agreements are required with the Towns and Townships that make up the County to address responsibility for managing solid waste. The only exception is that the Cities of Barrie and Orillia are separate incorporated cities under the Municipal Act, so while they are physically located within the County they are not part of the County government and are responsible for management of their own municipal solid waste. The County provides curbside collection services across the entire County, owns and operates a few small County landfills and leaf and yard waste composting areas, operates a series of residential drop-off facilities, contracts for the collection and diversion of HHW, contracts for external processing of recyclables and household organics, and is currently developing a new transfer facility coupled with new household organics processing capacity.

¹ The North Front Range Wasteshed per capita disposal rate is currently under review.

In 2010, Simcoe County Council approved a comprehensive, multi-staged Solid Waste Management Strategy (SWMS) designed to guide short and long-term diversion and waste disposal programs for the next 20 years. Since that time, more than 25 of the recommended initiatives in the SWMS have been implemented, allowing Simcoe County to achieve higher diversion rates, synergies and efficiencies in waste collection and innovations in waste management.

Simcoe County is one of the top-diverting communities in Ontario with residents making good use of a two-stream blue box recycling program, curbside diversion of source separated household organics (food scraps and compostable paper fiber) and diversion opportunities provided at waste facilities. Waste diversion rates have been relatively stagnant sitting at approximately 60% for a number of years (calculated based on the total quantity of waste diverted as a proportion of the overall waste stream that was diverted and disposed) and waste generation rates are increasing, and performance of the curbside organics diversion program requires improvement. As such, the 2010 SMWS was updated in 2016. The 2016 update outlines the results of implementation of the first five years of the Strategy recommended initiatives to increase diversion along with an implementation plan for the next 5 years. The primary focus of the new initiatives is to implement disincentives for curbside garbage like transitioning to a standard garbage container. The implementation of these options will assist in reaching the County Council approved targets of 71% diversion by 2020 and 77% diversion by 2030.

Lancaster County Solid Waste Management Authority, Pennsylvania

The Lancaster County Solid Waste Management Authority (Authority) has developed an Integrated Solid Waste System (System) that allows for the disposal of waste by combining the resources of a comprehensive recycling program, Transfer Station Facility, Waste-to-Energy (WTE) Facility, Household Hazardous Waste (HHW) Facility and a landfill. As a result, the volume of waste disposed at the landfill is significantly reduced. The consumption of natural resources is reduced by generating clean, renewable energy (electricity) from the waste and diverting a large portion of the waste for recycling or reuse. By wisely implementing this Integrated System, the Authority is taking a balanced approach to solid waste management that protects the land, air and water.

A corporate and political body organized under the Municipal Authorities Act of 1945 of the Commonwealth of Pennsylvania, the Authority manages the design, financing, construction and operation of the county's Integrated Solid Waste System (System).

Lancaster County's commissioners appoint a nine-member board of directors. Seven members of the Executive Team oversee the operations, finance, technical services, energy administration, capital projects and business development for the organization. The Authority holds no taxing powers and receives no government backing of its debt. The organization's primary source of revenue is waste disposal ("tipping") fees, as well as revenue from the sale of electricity generated by its renewable energy projects.

The System involves a combination of public and private participation. Collection services for recyclables and all types of waste are managed by the private sector. The Authority manages the processing and disposal of MSW from residences and businesses. Processing and recycling/disposal of C&D waste and white goods are shared between the Authority and the private sector. The Authority assists with the consolidation and shipping of mixed recyclables at its Transfer Station, and the private sector manages the processing and marketing of recyclables. Yard waste, biosolids and septage are managed by a

combination of private and municipal entities. Infectious and chemotherapeutic waste is managed privately.

To ensure the tipping fee revenues that are necessary to construct, operate and maintain the System, municipal waste generated in Lancaster County is directed to Authority facilities through a combination of waste flow ordinances and hauler agreements. This flow control system has continually been in effect, and has further evolved over the past 20 years (hauler agreements began in 1994).

Monterey Regional Waste Management District, California

The Monterey Regional Waste Management District (District) was created in 1951 in response to illegal dumping and burning of waste on nearby sand dunes. The mission was to manage the Peninsula's waste by establishing a sanitary landfill to replace the old "dumps" then in operation. Since then, numerous new technologies, systems and strategies have been put in place to maximize efficiency and effective disposal and resource recovery for our local jurisdictions. Today, the District is recognized as one of the "Best Solid Waste Systems in North America". Member municipalities in the District include Carmel, Del Rey Oaks, Marina, Monterey, Pacific Grove, Pebble Beach, Sand City, Seaside and Monterey County.

The District operates the Monterey Peninsula Landfill which has a life expectancy, at current disposal rates, of 100 years. In 1983, the District developed one of the first landfill gas to electricity energy plants in the nation. Today, the landfill gas to energy project has four engine generators that provide approximately 5 megawatts of electricity powering the District's power needs and supplying surplus energy to power 4,000 homes.

The District Materials Recovery Facility (MRF) opened in April 1996. The \$9.6 million facility was designed to process construction and demolition debris, as well as to complement the recycling collected from homes and businesses. The MRF diverts 50% of the incoming mixed waste through reuse and recycling and receives green waste and wood scraps which are used as raw materials for making compost and wood chips for resale. The District is currently in the process of renovating the MRF to accept single stream and commercial recyclables.

The District operates two composting systems at the site. A yard/green and food waste composting program is operated to produce an organic compost market local agricultural demand. A separate composting operation is conducted to process biosolids from the adjacent WWTP. The biosolids compost is used as daily cover and landfill cover erosion control on the landfill for both landfill capacity enhancement and soil erosion control purposes.

The first dry fermentation anaerobic digester (AD) in California, and only the second in the US, became operational at the District in March 2013. The 5,000 ton per year pilot demonstration project, operating in partnership with Zero Waste Energy, is effectively processing a blend of commercially generated food scraps and mulch from yard waste to produce renewable energy and compost. The AD system processes 65-ton batches of food scraps, received from restaurants in Monterey and Santa Cruz Counties, mixed with mulch to provide carbon and porosity. The "digestate" (organic mass) that is removed from the digester is then composted for 90-120 days to complete the decomposition process. The resulting compost is screened to remove contaminants or large wood pieces. The finished compost is then sold to orchards and vineyards. The success of the AD project is helping staff plan for the future of organics management at the District. Keeping organics out of the landfill with anaerobic digestion allows the energy value of the food scraps to be rapidly captured in an enclosed system and reduces greenhouse gas emissions.

The District owns and operates The Last Chance Mercantile (LCM) which has a resale store with an eclectic and ever changing inventory, a convenient reusable goods drop-off area, a beverage container redemption center, electronic waste drop-off, and a bag-your-own landscape product area. In 2016, reuse was elevated to an art form with the establishment of the Artist in Residence program in partnership with the Visual & Public Art Department at California State University Monterey Bay. The LCM also houses a drop-off/buy-back (DO/BB) center. The DO/BB center accepts electronic wastes, household hazardous wastes and source separated recyclable commodities (beverage containers, rigid plastics, clean paper, cardboard, etc.).

Yakima County, Washington

Washington State law assigns primary responsibility for managing municipal solid waste (MSW) and moderate risk waste (MRW) to local governments and requires local government to maintain current solid waste and hazardous waste management plans. The Solid Waste and Moderate Risk Waste Management Plan (Plan) for Yakima County (County) recommends strategies to manage solid waste and moderate risk waste generated in the County. Solid waste handling includes management, storage, collection, diversion, transportation, treatment, use, processing, and final disposal. This Plan includes recommendations for MSW, MRW, diversion, recycling, education and promotion, construction and demolition (C&D) debris, organics, and special wastes.

The 14 incorporated communities in the County have signed an Interlocal Agreement that authorizes Yakima County to prepare a countywide solid waste and MRW management plan. Participating cities and towns have both the opportunity and responsibility to participate in Plan development, review and comment on the draft Plan, and to adopt the final Plan. The Interlocal Agreements also authorize Yakima County to manage, plan and operate the solid waste system including disposal, rate setting and development of educational materials. The incorporated communities have the responsibility to collect waste within their jurisdictions and guarantee delivery to Yakima County disposal facilities.

The County operates two municipal solid waste landfills, three transfer stations, three HHW facilities, three drop box recycling programs, septage lagoons, and a gravel pit. The Terrace Heights Landfill, located near the City of Yakima population center, has capacity until 2025 and the Cheyne Landfill, approximately 15 miles away, has permitted capacity until 2055 with area for expansion. In 2025, when the Terrace Heights Landfill closes, waste will be transferred from the Terrace Heights transfer station to the Cheyne Landfill facility for disposal.

The County has four public private partnerships for recyclables and organics handling. The County delivers all paper, cardboard and newspapers to a private facility that processes the commodities and manufactures food grade fruit packing trays. The County also partners for composting of yard waste with a privately owned and operating compost facility. The County grinds all source separated yard waste, the composting facility trucks it to their operations area, windrows materials into aerated static piles, monitors the process and markets all the composted end materials. In addition, the County works with private non-profit groups for recycling and provides a discounted disposal fee.

All incorporated jurisdictions within the County have mandatory collection of garbage, but not recycling or yard debris collection. Residents in unincorporated areas may choose whether to subscribe to waste collection services or self-haul to disposal facilities. There are four municipal collection programs and two private haulers currently providing collection services in Yakima County. The two private haulers that operate in the unincorporated areas of the County are franchised through the Washington Utilities and Transportation Commission and have the exclusive permit to collect curbside waste within the

County. Each of the cities within Yakima County is using automated (or semi-automated) cart collection. Curbside recycling and yard debris services are available to residents in three municipalities.

Wake County, North Carolina

In 2012, Wake County Solid Waste Management Division completed an update of its Ten Year Solid Waste Management Plan (Plan). The 2012 Plan Update was completed in cooperation with the local municipal governments. The Plan presents a progressive vision for managing solid waste in Wake County (County) through the development of intended actions within various solid waste planning elements. The 2012 Plan includes a waste diversion goal of 20% from the baseline waste per capita generation rate of 1.4 tons per person in 1989. The County has met this diversion goal since 2010, and plans to evaluate a revised goal and other diversion strategies in its 2017 Plan Update.

The Wake County Solid Waste Management Division provides various services to generators from both the municipalities and the unincorporated areas of the County and provides an array of solid waste services including disposal and recycling facilities and operations, litter and illegal dumping enforcement as well as outreach and education programs.

Through its Inter-local Agreement (South Wake Landfill Partnership), the County owns and contract operates the South Wake Landfill in Holly Springs, NC and the East Wake Transfer Station (which is owned by the City of Raleigh) for the collection and disposal of residential MSW from the participating municipalities and the unincorporated areas of the County. The South Wake Landfill has disposal capacity for over 25 more years, and is being designed, operated and constructed by Waste Industries, Inc. for the County. The South Wake Landfill also manages some commercial waste from within the County, but the great majority of privately collected waste material are disposed in out of County landfills.

The County also operates with contracted staff eleven solid waste convenience centers, two multi-material recycling facilities, and two household hazardous waste collection facilities. The County is in the process of upgrading some of its convenience center locations to provide additional drop off stations for construction and demolition debris, bulky waste, household hazardous waste and universal wastes, and food waste. The convenience centers primarily serve the approximate 200,000 residents in unincorporated areas of the County, who have not elected to contract for subscription solid waste and recycling collection from any of the private haulers serving the area. The multi-material recycling facility customers include residents from unincorporated and municipalities and provides an outlet for materials that are unable to be collected at the curb. All participating municipalities provide curbside collection of waste and recyclable materials and yard waste from its residents. Most of commercial, institutional, and multi-family waste is collected and managed by private haulers.

The Wake County Solid Waste Management Division is a public enterprise and does not operate on property tax dollars – all programs are supported by landfill tipping fees, \$20 annual household fees, grants and revenue generated from recyclables.

Public participation is strongly encouraged by Wake County Solid Waste Management Division. The South Wake Landfill Citizens Committee was established in 2006, prior to the opening of the South Wake Landfill. The purpose of the committee is to perform and following functions:

- Provide a forum for neighbors of the South Wake Landfill to have a voice in the continuing development of the landfill

- Assist the County with continued operations of the landfill
- Provide a conduit for information between Wake County Environmental Services staff and the neighboring public regarding activities at the landfill

The South Wake Landfill Citizens Committee brings together people who live in the surrounding areas of the landfill site. The Committee meets bi-annually, in the evening at the Holly Springs Cultural Center.

3. Comparison of Trends and Practices

The following table presents a comparison of solid waste management trends and practices, showing criteria including types of facilities, programs, partnerships, flow control practices and fee models.

Criteria		Simcoe County, Ontario Canada	Lancaster County SWMA, Pennsylvania	Monterey Regional Waste Management District, California	Yakima County, Washington	Wake County, North Carolina
Population		304,172	533,320	435,232	247,687	907,314
Tons Disposed		153,249	325,000	370,376	239,272	910,034
Tons Per Capita		.50	.61	.85	.96	1.00
1. Facilities						
a	Landfills	4	1	1 MSW	2 MSW 2 C&D (Private)	1 MSW 4 C&D (Private) 4 LCID (Private)
b	Transfer Stations	4	1	0	3	1 2 (Private)
c	Recycling/MRF	MMF/Organics - Under Construction 1 MRF 5 Composting	1 C&D 1 MRF/TS 8 Public Compost 3 Private Compost	1 MRF 2 Compost 1 Dry Fermentation AD for Organics Last Chance Mercantile	1 MRF (Private)	2 MRF (Private) 11 CCs 2 MMRF
d	HHW	4	1	1	3	2
e	Waste to Energy	0	1	0	0	0
f	Renewable Energy	Landfill Gas to Energy	0	LF Gas to Energy AD Biogas to Energy	0	Solar/Wind LF Gas to Energy

Criteria		Simcoe County, Ontario Canada	Lancaster County SWMA, Pennsylvania	Monterey Regional Waste Management District, California	Yakima County, Washington	Wake County, North Carolina
. Diversion Programs						
a	Types of Waste Diversion Programs	Yardwaste Household Organics (food waste) Recycling HHW Electronics Appliances/Metal Tires C&D Mattresses/Textiles	Recycling HHW Electronics Tires	Yardwaste Wood Waste Recycling Appliances/Metal HHW Electronics Tires Mattresses Last Chance Mercantile	Yardwaste Wood Waste Recycling Tires Appliances/Metal HHW Electronics Fluorescent Bulbs	Yardwaste Food Waste Recycling Tires Appliances/Metal HHW Electronics
3. Educational Programs						
a	Types of Educational Programs	Website Media School Recycling Mobile Education Unit Special Event Recycling Organics Education Waste Heroes Green Teams	Website Media Tours Newsletter Compost Workshops	Website Media School Education Organics Education Community Events Booth Artist in Residence	Website Media Tours Public Event Recycling School Recycling Business Recycling Organics Education Youth Environmental Summit Community Event Booths	Website Media Tours Anti-Litter Feed the Bin School Recycling Business Recycling Organics Education Reduce Waste at Home Community Event Booths Hotline
4. Public/Private Partnerships						
a	Types of Public/Private Partnerships	Non-Profit	Sales of Generated Electricity WTE Operations Hauler Agreements Composting	AD Facility CNG Facility	Composting Non-Profit	Landfill Operation/permit/design by Operator County owns land responsible for closure/post closure Non-Profit

Criteria		Simcoe County, Ontario Canada	Lancaster County SWMA, Pennsylvania	Monterey Regional Waste Management District, California	Yakima County, Washington	Wake County, North Carolina
5. Flow Control Practices						
a	Flow Control Model	Flow Control through the Provincial Municipal Act for residential. No Flow control for commercial/industrial	Flow Control through Solid Waste Management Authority Hauler Agreements and Ordinances	N/A	Flow Control through Interlocal Agreements with all 14 Municipalities	Interlocal Agreements with 11 of 12 Municipalities for acceptance of curbside waste Commercial waste disposal based on market conditions
6. Interlocal Agreements						
a	Type of Agreement	N/A	Solid Waste Management Authority with Board of Directors	N/A	Interlocal Agreements with all 14 Municipalities	Interlocal Agreements with 11 of 12 Municipalities
7. Funding Model						
a	Model	MSW \$155.00 per ton System funded through recovery of net costs (after revenue sources like the sale of recyclables) through municipal property taxes	MSW \$73.00 per ton YW \$30.00 per ton	MSW \$51.75 per ton YW \$30.00 per ton	MSW \$34.00 per ton YW \$17.00 per ton Grants and recyclable revenues	MSW \$32.00 LF MSW \$41.00 TS \$20.00 annual household fee, grants and recyclable revenues
b	Type of Fund	Enterprise	Enterprise	Enterprise	Enterprise	Enterprise

4. Considerations

The following are criteria for consideration of the TAC as potential solid waste management practices and initiatives:

- **Flow Control** – Flow control practices vary by jurisdictions based on the needs and objectives of each jurisdiction.
- **Public/Private Partnerships** – Successful public/private partnership were executed in all of the municipalities which included private non-profit agreements, recycling and other facility operations agreements.
- **Planning** – All municipalities had comprehensive waste planning strategies which were inclusive of other municipalities within their boundaries.

- **Funding** – The municipalities used Enterprise funds to account for revenues and expenditures. Tip fees were the most relied upon funding source with additional funds coming from sale of materials, household taxes, property taxes or grants.
- **Educational Programs** – Each of the municipalities reviewed takes the lead for developing and implementing educational programs within their jurisdictions in order to have a single comprehensive message to the system users.
- **Diversion Programs** – The municipalities had comprehensive diversion programs to eliminate waste from their landfills and WTE facilities. The more aggressive diversion programs saw a per capita reduction in waste flowing to landfills in particular for yard debris, construction debris and food waste.

Memo C

Task 5 – Solid Waste Volumes Memo (with attachments)

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Memo

Date: Friday, September 01, 2017

Project: North Front Range Regional Wasteshed Planning Study – Phase 2

To: North Front Range Regional Wasteshed Planning Coalition TAC

From: Doug DeCesare and Wendy Mifflin, HDR, Inc.

Subject: Task 5 - Solid Waste Volumes Memo

1. Introduction

The purpose of this memorandum is to assist the North Front Range Regional Wasteshed Planning Coalition Technical Advisory Committee (TAC) in quantifying the volume and types of waste currently managed in the Wasteshed, develop waste generation per capita rates for waste types and provide a basis to predict future waste handling infrastructure needs based on these waste types and volumes.

2. Phase 1 Planning Study - Summary of Solid Waste Volumes

In 2016, the Phase 1 Planning Study (Study) was completed for the North Front Range Regional Wasteshed Planning Coalition (Coalition). In regards to solid waste volumes, the Study had the specific objective to quantify the amount of solid waste currently managed, project the amount of each solid waste type that will need to be managed in the future, and identify gaps between how much waste will be generated in the future and how much waste current infrastructure can handle. The Coalition identified questions from the report regarding sources and tons of waste delivered to the Larimer County facilities. The Study was revised with additional waste volume information in March 2017.

As outlined in the Study, the Phase 1 Study – Tons of Waste Received Table below summarizes waste received at the Larimer County Landfill and Recycling Center and the Phase 1 Study – Tons of Waste Handled Table summarizes waste managed in the Wasteshed for the years 2013 to 2015.

Phase 1 Study - Tons of Waste Received

Larimer County Landfill and Recycling Center Tons of Waste Received 2013 to 2015					
Waste Stream		Year			3-Year Average
		2013	2014	2015	
Garbage ¹	Loveland	19,952	21,548	21,780	21,093
	Fort Collins	63,319	62,217	85,750	70,428
	All Other Sources	253,225	309,382	270,647	277,752
	Subtotal	336,496	393,146	378,177	369,273
Recyclables	Loveland	5,673	5,622	5,600	5,632
	Fort Collins	15,990	17,412	15,715	16,373
	All Other Sources	16,975	16,690	18,273	17,313
	Subtotal	38,638	39,724	39,589	39,317
Larimer County Total		375,135	432,870	417,766	408,590

¹ Includes MSW, C & D and Yardwaste.

Phase 1 Study - Tons of Waste Handled

North Front Range Regional Wasteshed				
Tons of Waste Handled				
Waste Stream	Year			3-Year Average
	2013	2014	2015	
Garbage (Larimer County Landfill) ¹	336,496	393,146	378,177	369,273
Garbage (Other landfills) ¹	76,281	76,199	63,715	72,065
Recyclables (Single-stream)	38,638	39,724	39,589	39,317
Recyclables (Other)	22,462	23,052	22,571	22,695
Organics ²	51,744	50,242	61,135	54,374
Wasteshed Total	525,622	582,363	565,187	557,724

¹ Includes MSW, C&D and Yardwaste

² Yardwaste

3. Phase 2 Planning Study - Detailed Solid Waste Volumes

The original Phase 1 Planning Study only provided an overall summary of amounts of waste managed and tracked in the Wasteshed. It was not a well-defined exercise and gaps in solid waste volume reporting were noted. In response, the TAC and the waste haulers have worked diligently to provide a summary of waste managed and tracked in the Wasteshed. The Table below summarizes detailed solid waste volumes received at the Larimer County facilities, by source and type, based on the additional information received from the TAC.

Phase 2 Study - Detailed Solid Waste Volumes – Larimer County Facilities

Larimer County Facilities Waste Stream (In Tons)		Year		
		2014	2015	2016
Solid Waste	Loveland	33,780	32,896	35,105
	Fort Collins	39,157	50,586	57,198
	Estes Park	10,267	12,161	14,483
	Berthoud ¹	301	338	317
	Red Feather ¹	45	52	51
	Wellington ¹	199	188	158
	Walden ¹ (Jackson County)	870	891	1,045
	Out of County	10,042	12,800	10,158
	Self-Haul	22,055	26,026	27,554
	Other ²	31,547	23,721	14,213
	All Other Sources	62,806	62,560	56,029
	Subtotal	211,069	222,219	216,311

Larimer County Facilities Waste Stream (In Tons)		Year		
		2014	2015	2016
C & D	Loveland	12,631	14,632	14,676
	Fort Collins	23,130	33,886	38,850
	Construction Fill	13,421	17,324	16,301
	All Other Sources ³	105,822	72,331	49,341
	Subtotal	155,004	138,173	119,168
Yard Waste	Larimer County Landfill	16,053	14,646	15,257
	Subtotal	16,053	14,646	15,257
	Total Disposed – Larimer County Landfill	382,126	375,038	350,736
Single Stream/Drop Box Recyclables	Loveland	12,293	11,006	10,786
	Fort Collins	17,412	15,715	16,189
	Estes Park	489	941	887
	Larimer Convenience Centers ¹	673	682	791
	All Other Sources	8,857	11,244	10,342
	Subtotal	39,724	39,588	38,995
	Total Recycled – Larimer County Recycling Center	39,724	39,588	38,995
	Total Materials to Larimer County Facilities	421,850	414,626	389,731

¹Denotes Convenience Center.

² Includes animal carcasses, tires, non-friable asbestos and WWTP Grit.

³ 2014 Includes Flood Disaster Debris, 2014 and 2015 Includes Mall Demolition Debris.

The Phase 2 Study – Waste to Other Facilities Table below summarizes waste sent to other facilities for recycling and disposal by source and type based on additional information received from the TAC and waste haulers.

Phase 2 Study – Waste to Other Facilities

Other Facilities Waste Stream (In Tons)		Year		
		2014	2015	2016
Solid Waste	Loveland	4,506	4,748	5,605
	Fort Collins	47,859	39,747	35,058
	Subtotal	52,365	44,495	40,663
C & D	Loveland	3,390	3,390	4,243
	Fort Collins	28,270	26,609	23,812
	Subtotal	31,660	29,999	28,055
	Total Disposed to Other	84,025	74,494	68,718

Other Facilities Waste Stream (In Tons)		Year		
		2014	2015	2016
Yard Waste	Loveland	18,960	26,374	26,275
	Fort Collins	15,429	16,198	16,601
	Subtotal	34,389	42,572	42,876
Recycled/ Recovered Materials	Loveland ¹ (Scrap Metal/E-Waste)	784	783	969
	Fort Collins ² (Scrap Metal/Other)	32,853	30,343	29,563
	Loveland ³ (Inert Debris)	10,970	11,480	11,975
	Fort Collins ³ (Inert Debris)	164,703	104,348	68,567
	Subtotal	209,310	146,954	111,074
Total Recycling to Other		243,699	189,526	153,950
Total Materials to Other Facilities		327,724	264,020	222,668

¹Includes scrap metal, and e-waste.

²Includes scrap metal, and other recyclables. Does not include reclaimed soils.

³Includes concrete and asphalt recycled.

The Table below summarizes total Wasteshed tons managed for recycling and disposal by type based on additional information received from the TAC.

Phase 2 Study – Total Wasteshed Tons Managed

North Front Range Regional Wasteshed Total Waste Stream (In Tons)		Year		
		2014	2015	2016
Solid Waste	Larimer County Landfill	211,069	222,219	216,311
	Other Landfills	52,365	44,495	40,663
	Subtotal	263,434	266,714	256,974
C & D	Larimer County Landfill	155,004	138,173	119,168
	Other Facilities	31,660	29,999	28,055
	Subtotal	186,664	168,172	147,223
Yard Waste	Larimer County Landfill	16,053	14,646	15,257
	Other Facilities-Recycled	34,389	42,572	42,876
	Subtotal	50,442	57,218	58,133
Recycled/ Recovered Materials	Larimer County Recycling Facility (Single Stream/Drop Box Recyclables) ¹	39,724	39,588	38,995
	Other Facilities (Recovered Materials) ²	209,310	146,954	111,074
	Subtotal	249,034	186,542	150,069
Total Disposed & Recycled		749,574	678,646	612,399

¹Traditional curbside recyclables.

²Includes asphalt, concrete, scrap metal, e-waste and other recoverable materials.

4. Phase 2 Planning Study - Per Capita Waste Generation Rates

In the North Front Range Regional Wasteshed, the per capita disposal and recycling measurement is not easily calculated as waste streams are going to multiple landfills and recycling facilities with some waste tracking done by others. The primary purpose of the per-capita waste generation measurement is to forecast future waste generation volumes for evaluating future programs and infrastructure development options. The following Table below, Phase 2 – Per Capita Waste Generation Rates, summarizes the per capita generation rate, in tons, based on population by waste stream. Per capita waste generation rates for the State of Colorado and the United States are shown for illustrative purposes only.

Phase 2 Study – Annual Per Capita Waste Generation (In Tons Per Person Per Year)

North Front Range Regional Wasteshed Annual Per Capita Waste Generation Rates (In Tons)						
	2014	2015	2016	3 Year Average	State of Washington	State of Colorado
Population	324,657	333,577	339,993	332,742	6,968,170	5,541,000
Material Disposed:						
Solid Waste	0.81	0.80	0.76	0.79	1.01	1.42
C & D	0.56	0.51	0.43	0.50	0.37	N/A
Yard Waste	0.05	0.04	0.04	0.04	N/A	N/A
Materials Recycled/Recovered:						
Yard Waste	0.12	0.13	0.14	0.13	0.08	N/A
Single Stream/Drop Box	0.12	0.12	0.11	0.12	0.54	0.33
Scrap Metal/E-Waste	0.11	0.09	0.09	0.10	0.15	N/A
Concrete/Asphalt	0.54	0.35	0.24	0.38	0.38	N/A
Total Annual Per Capita Generation Rate (In Tons)	2.31	2.04	1.81	2.06	2.49	1.75
Total Annual Per Capita Disposal Rate (In Tons)	1.42	1.35	1.23	1.33	1.38	1.42

The table above was utilized to determine the individual per capita rates for waste disposal and recycling. As such the waste disposal per capita three year average rate for the Wasteshed was calculated to be 1.33 tons while the recycling per capita three year average rate is 0.73 tons. The overall diversion rate, within the Wasteshed, for the same three year period is 35%.

5. Considerations

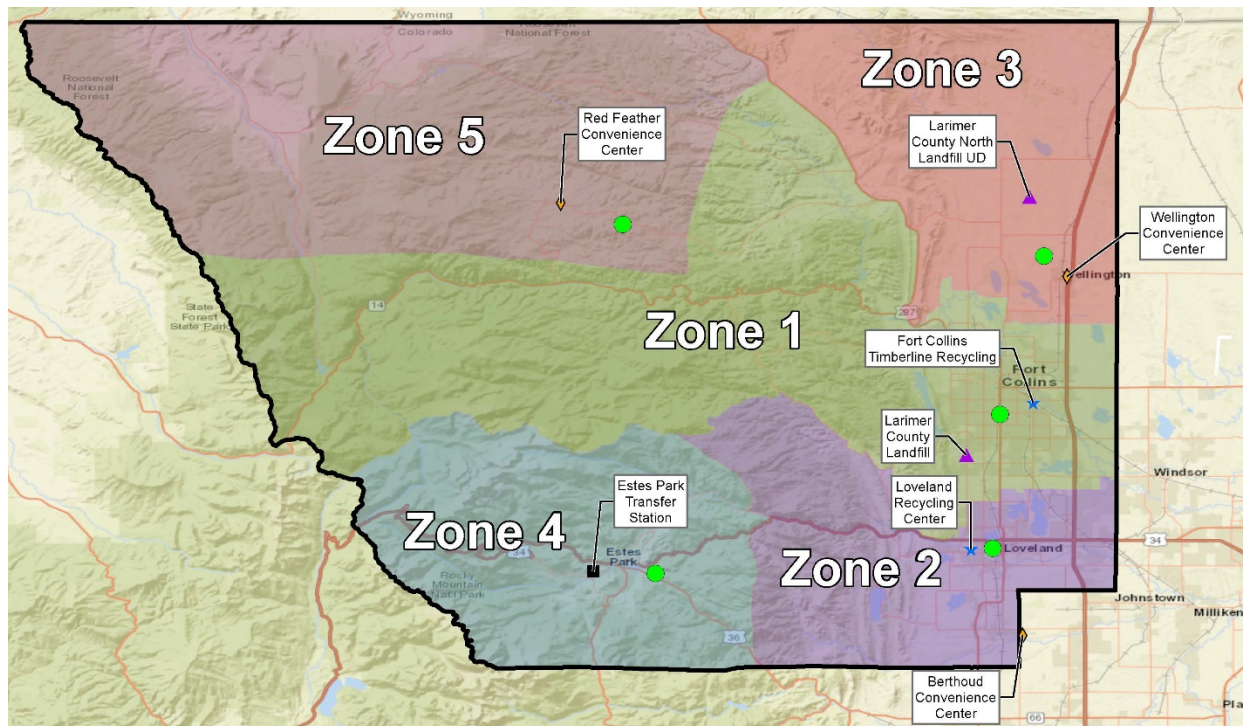
The following are items for consideration of the TAC to assist with quantifying solid waste volumes in the Wasteshed:

- **Data Tracking** – There are differences in data tracking between jurisdictions. Developing methods for measuring waste managed in the Wasteshed would assist in collecting and maintaining consistent data.
- **Waste Export** – Reporting for waste exported to facilities outside Larimer County is performed through self-reporting by private haulers. Establishing a method for tracking waste exported outside of Larimer County would also assist in maintaining consistent data.

Population Zone Materials Per Capita, Zones 1 and 2 (in Tons) Based on Status Quo

Population Zone	Material	Year				
		2014	2020 ¹	2030	2040	2050
Zone 1	Zone 1 Population	198,827	222,957	265,085	302,020	339,030
	Materials Landfilled:					
	Solid Waste	161,050	176,136	209,417	238,596	267,834
	C&D	111,343	111,478	132,542	151,010	169,515
	Yard Waste	9,941	8,918	10,603	12,081	13,561
	Subtotal Materials Landfilled	282,334	296,532	352,562	401,687	450,910
	Materials Recycled/Recovered:					
	Yard Waste	23,859	28,984	34,461	39,263	44,074
	Single Stream/Drop Box	23,859	26,755	31,810	36,242	40,684
	Scrap Metal/E-Waste	21,871	22,296	26,508	30,202	33,903
	Concrete/Asphalt	107,367	84,724	100,732	114,768	128,821
	Total Zone 1	459,290	459,291	546,073	622,162	698,392
Zone 2	Zone 2 Population	100,859	112,348	130,269	146,540	162,843
	Materials Landfilled:					
	Solid Waste	81,696	88,755	102,913	115,767	128,646
	C&D	56,481	56,174	65,134	73,270	81,421
	Yard Waste	5,043	4,494	5,211	5,862	6,514
	Subtotal Materials Landfilled	143,220	149,423	173,258	194,899	216,581
	Materials Recycled/Recovered:					
	Yard Waste	12,103	14,605	16,935	19,050	21,170
	Single Stream/Drop Box	12,103	13,482	15,632	17,585	19,541
	Scrap Metal/E-Waste	11,094	11,235	13,027	14,654	16,284
	Concrete/Asphalt	54,464	42,692	49,502	55,685	61,880
	Total Zone 2	232,984	231,437	268,354	301,873	335,456

¹ The 3-year average annual per capita waste generation rate in tons is used for years 2020, 2030, 2040, and 2050.

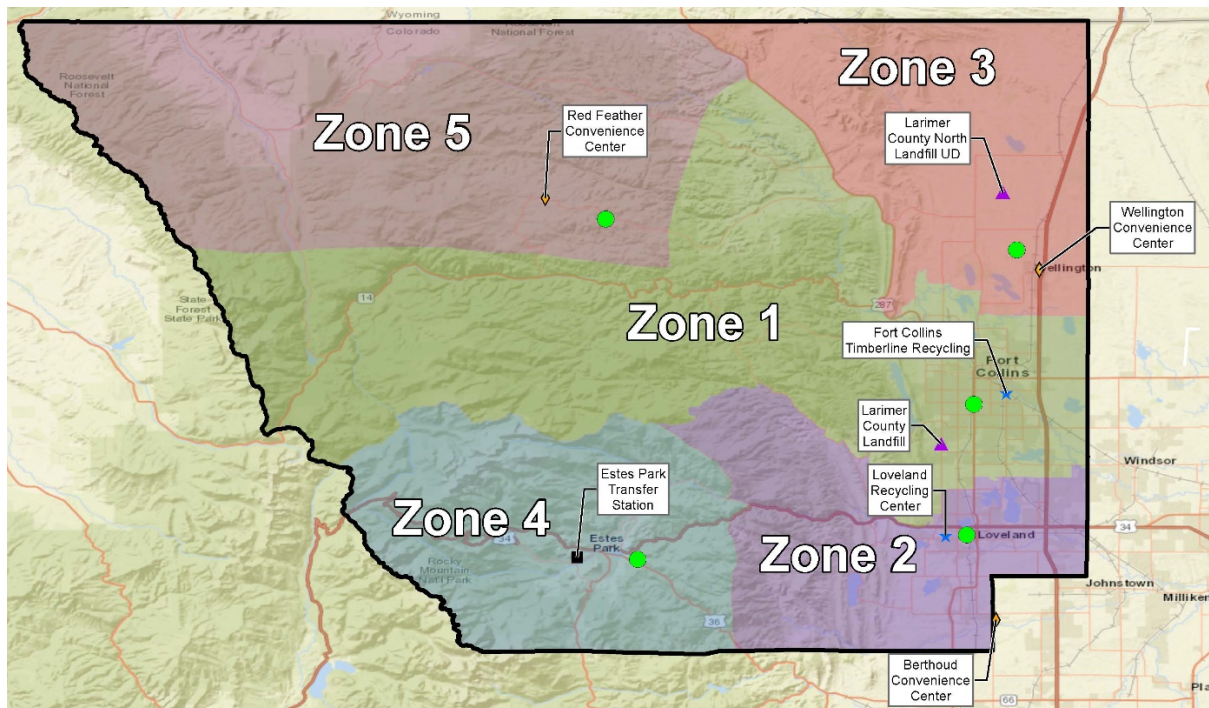


Population Zone Materials Per Capita, Zones 3 and 4 (in Tons) Based on Status Quo

Population Zone	Material	Year				
		2014	2020 ¹	2030	2040	2050
Zone 3	Zone 3 Population	12,285	13,684	15,867	17,849	19,835
	Materials Landfilled:					
	Solid Waste	9,951	10,810	12,535	14,101	15,670
	C&D	6,880	6,842	7,933	8,924	9,917
	Yard Waste	614	547	635	714	793
	Subtotal Materials Landfilled	17,445	18,199	21,103	23,739	26,380
	Materials Recycled/Recovered:					
	Yard Waste	1,474	1,779	2,063	2,320	2,579
	Single Stream/Drop Box	1,474	1,642	1,904	2,142	2,381
	Scrap Metal/E-Waste	1,351	1,368	1,587	1,785	1,984
	Concrete/Asphalt	6,634	5,200	6,029	6,783	7,537
	Total Zone 3	28,378	28,188	32,686	36,769	40,861
Zone 4 ²	Zone 4 Population	10,837	12,071	13,004	13,004	13,004
	Materials Landfilled:					
	Solid Waste	8,778	9,536	10,273	10,273	10,273
	C&D	6,069	6,035	6,502	6,502	6,502
	Yard Waste	542	483	520	520	520
	Subtotal Materials Landfilled	15,389	16,054	17,295	17,295	17,295
	Materials Recycled/Recovered:					
	Yard Waste	1,300	1,569	1,691	1,691	1,691
	Single Stream/Drop Box	1,300	1,449	1,560	1,560	1,560
	Scrap Metal/E-Waste	1,192	1,207	1,300	1,300	1,300
	Concrete/Asphalt	5,852	4,587	4,942	4,942	4,942
	Total Zone 4	25,033	24,866	26,788	26,788	26,788

¹ The 3-year average annual per capita waste generation rate in tons is used for years 2020, 2030, 2040, and 2050.

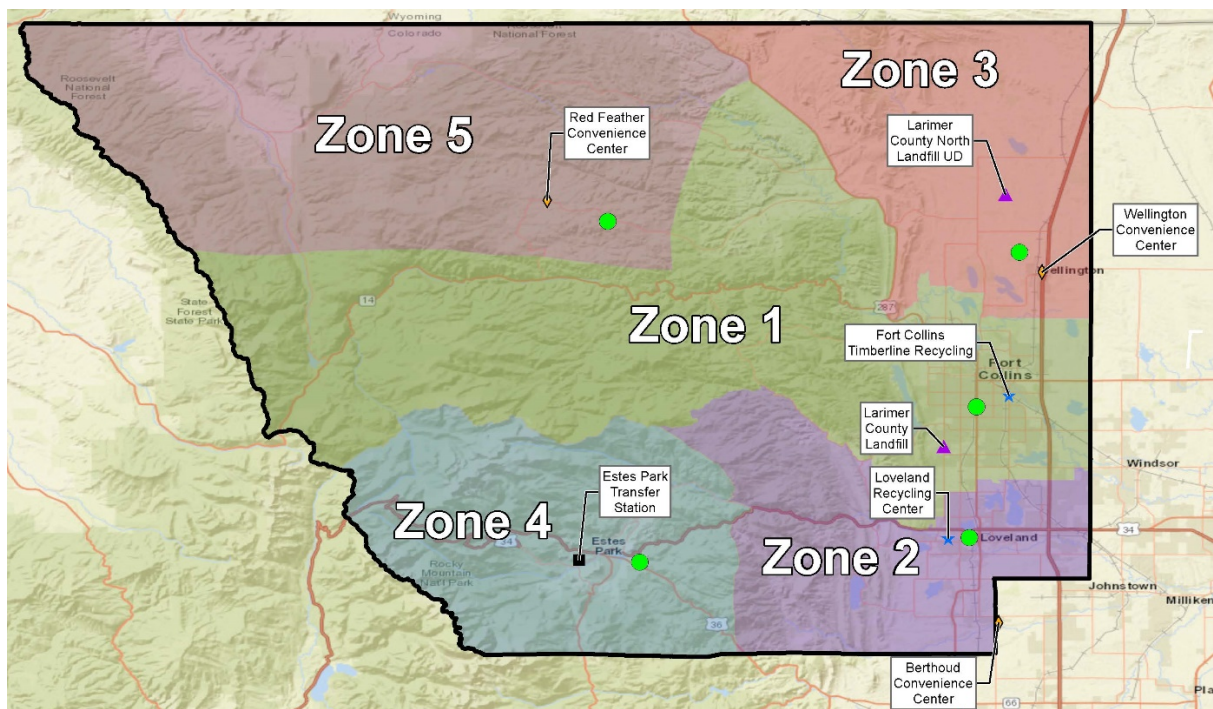
² It is anticipated that Zone 4 will reach population capacity in approximately 2025.



Population Zone Materials Per Capita, Zone 5 and Total (in Tons) Based on Status Quo

Population Zone	Material	Year				
		2014	2020 ¹	2030	2040	2050
Zone 5	Zone 5 Population	1,850	2,061	2,389	2,688	2,987
	Materials Landfilled:					
	Solid Waste	1,498	1,628	1,887	2,124	2,360
	C&D	1,036	1,030	1,194	1,344	1,493
	Yard Waste	92	82	96	108	119
	Subtotal Materials Landfilled	2,626	2,740	3,177	3,576	3,972
	Materials Recycled/Recovered:					
	Yard Waste	222	268	311	349	388
	Single Stream/Drop Box	222	247	287	323	358
	Scrap Metal/E-Waste	204	206	239	269	298
	Concrete/Asphalt	999	783	908	1,021	1,135
	Total Zone 5	4,273	4,244	4,922	5,538	6,151
Total All Zones	Total Population All Zones	324,658	363,121	426,614	482,101	537,699
	Total Materials Landfilled:					
	Solid Waste	262,973	286,865	337,025	380,861	424,783
	C&D	181,809	181,559	213,305	241,050	268,848
	Yard Waste	16,232	14,524	17,065	19,285	21,507
	Subtotal Total Materials Landfilled	461,014	482,948	567,395	641,196	715,138
	Total Materials Recycled/Recovered:					
	Yard Waste	38,958	47,205	55,461	62,673	69,902
	Single Stream/Drop Box	38,958	43,575	51,193	57,852	64,524
	Scrap Metal/E-Waste	35,712	36,312	42,661	48,210	53,769
	Concrete/Asphalt	175,316	137,986	162,113	183,199	204,315
	Total All Zones	749,958	748,026	878,823	993,130	1,107,648

¹ The 3-year average annual per capita waste generation rate in tons is used for years 2020, 2030, 2040, and 2050.

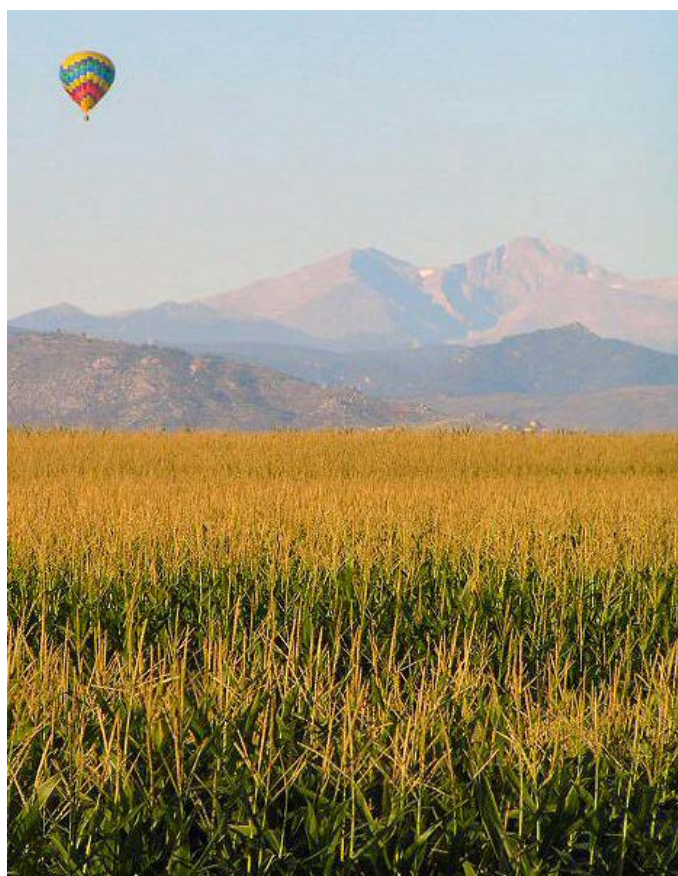


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Memo D

Analysis of Infrastructure Options (with attachments)

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Analysis of Infrastructure Options

Regional Wasteshed Planning Study – Phase 2

North Front Range Regional Wasteshed Coalition

December 29, 2017



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Acronyms and Abbreviations

AD	Anaerobic Digestion
ASP	Aerated Static Pile
AUF	Airspace Utilization Factor
BCR	Benefit-Cost Ratio
C&D	Construction and Demolition
CCR	Code of Colorado Regulation
CD	Certificate of Designation
CDPHE	State of Colorado, Department of Public Health & Environment
CFR	Code of Federal Regulations
CM	Construction Management
CNG	Compressed Natural Gas
Coalition	North Front Range Regional Wasteshed Coalition
CQA	Construction Quality Assurance
CRS	Colorado Revised Statutes
CY	Cubic Yards
DWRF	Drake Water Reclamation Facility
EBS	Engineered Bio Slurry
EPA	U.S. Environmental Protection Agency
FOG	Fats, Oils, and Grease
FTE	Full-Time Employee
HAP	Hazardous Air Pollutants
HHW	Household Hazardous Waste
Lbs	Pounds
MACT	Maximum Achievable Control Technology
MP	Mixed Paper
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
MWMRF	Mixed Waste MRF
NSPS	New Source Performance Standards



O&M	Operations and Maintenance
OCC	Old Corrugated Cardboard
ONP	Old Newspaper
PAC	Policy Advisory Committee
PPA	Power Purchase Agreement
RCRA	Resource Conservation and Recovery Act
RDF	Refuse-Derived Fuel
RNG	Renewable Natural Gas
SF	Square Foot
SROI	Sustainable Return on Investment
TAC	Technical Advisory Committee
TPD	Tons Per Day
TPH	Tons Per Hour
TPY	Tons Per Year
VMT	Vehicle Miles Traveled
WM	Waste Management
WTE	Waste-To-Energy
WWTP	Wastewater Treatment Plant

Executive Summary

ES.1 Background

Responsible solid waste management has been a shared goal of the governing agencies within Larimer County. The cities of Fort Collins and Loveland and Larimer County collaborated in 1972 to open a jointly owned landfill to ensure that environmental regulations and citizen needs could be met for waste disposal within the North Front Range Region. With the inevitable upcoming closure of the Larimer County landfill (expected around 2025) and predictions of continued regional population growth, these partners, plus the neighboring community of Estes Park, are working together to evaluate waste management needs and develop guidance plans to manage waste for the region into the future. In 2015, the North Front Range Regional Wasteshed Coalition (Coalition) was formed including Larimer County, the cities of Fort Collins and Loveland, and Estes Park, to address the future of solid waste management.

To begin planning activities the Coalition initiated the first phase by commissioning R3 Consulting Group, Inc. to prepare a high level study focused on describing current solid waste handling conditions, quantifying the amount of solid waste currently handled, gap analyses, feasible solid waste handling options, and various funding approaches. In 2017, the Coalition initiated the second phase of its multi-year Regional Wasteshed Planning Study to further identify and analyze options for developing a future regional solid waste infrastructure system. The Phase 2 Planning Study, also referred to as the North Front Range Coalition Solid Waste Infrastructure Master Plan (Plan), refines potential infrastructure options through established goals and objectives, population and waste projections, resource needs, capital and operational costs, and a sustainable return on investment analyses.

ES.2 Stakeholder Engagement

As part of development of the Plan, the Coalition has been actively engaging and soliciting input and feedback from stakeholders and community members through a series of stakeholder meetings, as follows:

- Stakeholder Meeting #1 – May 31, 2017 – Orientation and Goals and Objectives
- Stakeholder Meeting #2 – June 28, 2017 – Emerging Technologies and Management
- Stakeholder Meeting #3 – August 2, 2017 – Solid Waste Volumes
- Stakeholder Meeting #4 – October 25, 2017 – Sustainable Return on Investment
- Stakeholder Meeting #5 – date to be determined – Economic and Market Analysis

Separate meetings have also been held with local haulers to present information and solicit input.

ES.3 Goals and Objectives

Through active collaboration and feedback from stakeholders and community members, the Coalition has developed goals and objectives to help determine a sustainable and

achievable future regional solid waste infrastructure system. This report’s evaluation considers whether each option meets the goals and objectives that were developed, in order to determine if the option is economically viable, environmentally sound, socially acceptable, and achievable. For ease of reference, the goals and objectives are shown below in Table ES-1.

Table ES-1. Goals and Objectives

Goal	Objectives
Goal #1: Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	A. Upon completion of the Phase 2 Planning Study in 2018, the Coalition has identified and documented specific options for programs and facilities, taking into consideration the balance between economic, environmental and social costs and benefits.
	B. The proposed solid waste system addresses future customer service demands in the region over the next 40 years or more, and provides long-term funding to address capital and operating costs.
	C. Coalition members are prepared to begin implementing programs and constructing facilities by January 2020.
Goal #2: Create a comprehensive solid waste materials management plan and implement programs and facilities that reflect the needs and desires of users.	A. The development of programs and facilities shall take a comprehensive, systems-based approach for materials management to conserve resources, manage costs, and minimize environmental impacts.
	B. The next generation of materials management programs and facilities provides services at competitive rates that are in alignment with the solid waste industry in the U.S.
	C. New programs and facilities result in the increasing application of proven, innovative technologies for reuse, recycling, and disposal to substantially reduce the amount of material being landfilled.
	D. New programs and facilities are convenient and accessible for citizens, customers, businesses, and waste haulers in the Wasteshed.
Goal #3: Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	A. The Coalition establishes consistent definitions and methods for measuring solid waste diversion/reduction within the Wasteshed by the year 2019 that are supported by streamlined and consistent data.
	B. Solid waste diversion/reduction measurements will be evaluated on a three-year recurring cycle beginning in 2020 to identify potential program adjustments.
	C. Jurisdictions implement policy and regulatory measures to support waste reduction, reuse and recycling efforts, by the year 2024.

Table ES-1. Goals and Objectives

Goal	Objectives
Goal #4: Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	A. Public education and outreach programs convey a clear, consistent message and effectively influence the behavior of citizens regarding the reduction, reuse and recycling of materials that would otherwise be destined for disposal.
	B. Public education materials convey shared guidelines for recycling and other information on reuse and reduction within all jurisdictions.
	C. Municipal and solid waste representatives meet on a routine basis to coordinate solid waste educational programs and outreach efforts and to resolve any questions about recycling guidelines.

ES.4 Infrastructure Options

Eleven potential infrastructure options were selected through a collaborative effort with the Coalition's Technical Advisory Committee (TAC) and the stakeholders. The options selected for further evaluation included:

- Status Quo
- Central Transfer Station
- New County Landfill
- Material Recovery Facility (Clean MRF)
- Yard Waste Organic Processing Facility
- Construction and Demolition Debris Processing Facility
- Energy From Waste Facility – Direct Combustion
- Mixed Waste Processing (Dirty MRF)
- Aerobic Composting including Food Waste
- Anaerobic Digestion
- Refuse Derived Fuel Processing

The criteria to which each option was evaluated included each facility's needs (sizing), financial impacts (capital costs, operations and maintenance costs), programmatic impacts, regulatory and permitting requirements, and risks/barriers. Additional information evaluated included implementation schedules and public-private partnership opportunities.

ES.5 Sustainable Return on Investment Process

Sustainable Return on Investment (SROI) is a proven, Cost-Benefit Analysis based approach used to assist in making planning and budgeting decisions, which provides a full range of possible outcomes using state-of-the-art risk analysis techniques. It further includes a sustainable value method developed to provide a thorough, transparent alternatives' analysis that considers a wide range of goals and incorporates triple bottom line (TBL) aspects and outcomes that are more difficult to quantify. The SROI approach assigns dollar values to benefit categories that are difficult to monetize and compares value directly with cost. Results of this analysis include monetized benefits and costs, net present value and benefit-cost ratio (BCR).

SROI Net Present Value

In the analysis, the net present value reflects the time value of money, calculated using undiscounted benefits and costs and a discount rate of four percent. The benefit-cost ratio indicates what a \$1 investment in a particular facility may generate in terms of societal benefits. For example, a BCR of 1.5 means that a \$1 investment in a facility is expected to generate \$1.50 in public benefits. This information, combined with financial and other considerations, can be used as an additional tool in decision making by providing an estimate of which facility or facilities is most likely to generate a positive environmental and social return to the public.

ES.6 Summary of Infrastructure Options for Consideration

The following Table outlines the eleven (11) infrastructure options being considered by the Coalition and includes estimated capital costs, estimated cost per ton for waste handling and the benefit cost ratio as calculated through the SROI process.

Table ES-2. Infrastructure Options for Consideration

Infrastructure Option	Estimated Capital Costs	Estimated Cost Per Ton	Benefit Cost Ratio
Status Quo	N/A	\$22.00/Ton	N/A
Central Transfer Station	\$14.3M	\$41/Ton	1.11
New County Landfill	\$13.6M (1 st Phase)	\$22/Ton	2.13
Materials Recovery Facility – Clean	\$23.7M	(\$6)/Ton – (\$12)/Ton	2.25
Yard Waste Organic Processing Facility	\$10.6M	\$31/Ton - \$35/Ton	5.89
C&D Processing Facility	\$13.7M	\$35/Ton	2.05
Energy From Waste – Direct Combustion	\$313.8M	\$110/Ton	0.47
Mixed Waste Processing – Dirty MRF	\$47.2M	\$57/Ton - \$61/Ton	0.75
Aerobic Composting Including Food Waste	\$10.6M	\$36/Ton - \$43/Ton	3.94
Anaerobic Digestion	\$11.9M	\$77/Ton - \$82/Ton	8.48
RDF Processing	\$322.9M	\$126 / Ton	0.42

1 Introduction

1.1 Background

Responsible solid waste management has been a shared goal of the governing agencies within Larimer County. The cities of Fort Collins and Loveland and Larimer County collaborated in 1972 to open a jointly owned landfill to ensure that environmental regulations and citizen needs could be met for waste disposal in the Wasteshed. With the inevitable upcoming closure of the Larimer County landfill (expected around 2025) and predictions of continued regional population growth, these partners, plus the neighboring community of Estes Park, are working together to evaluate waste management needs and develop guidance plans to manage waste for the region into the future.

The North Front Range Regional Wasteshed Coalition (Coalition) was formed in 2015 to address the future of solid waste management. The Coalition includes a Policy Advisory Committee (PAC) made up of elected officials from Fort Collins, Loveland, Estes Park, and Larimer County, and a Technical Advisory Committee (TAC) made up of staff members from the same entities. The charter of the Coalition is to responsibly address the current solid waste management and resource recovery needs of the region, while considering infrastructure and policy that will meet community needs in the future.

In 2016, the Coalition initiated the first phase of the process. Through public engagement that included four public forums in September 2016 focused on the issues of resource recovery of materials management, a Regional Wasteshed Report was developed. This report formed the basis for further evaluation of infrastructure options developed to address current and future solid waste demands within the Wasteshed.

The Coalition initiated the second phase of its multi-year Regional Wasteshed Planning Study in 2017 to further identify and analyze options for developing a future regional solid waste infrastructure system, taking into consideration information provided in the 2016 Phase I Wasteshed Planning Study. The Phase 2 Planning Study, also referred to as the North Front Range Coalition Solid Waste Infrastructure Master Plan, further refines the Phase I information and infrastructure options through established goals and objectives, population and waste projections, resource needs, capital costs, and a sustainable return on investment analyses.

1.2 Stakeholder Engagement

As part of the Phase 2 Planning Study, the Coalition has been actively engaging and soliciting input and feedback from stakeholders and community members through a series of stakeholder meetings, as follows:

- Stakeholder Meeting #1 – May 31, 2017 – Orientation and Goals and Objectives
- Stakeholder Meeting #2 – June 28, 2017 – Emerging Technologies and Management
- Stakeholder Meeting #3 – August 2, 2017 – Solid Waste Volumes
- Stakeholder Meeting #4 – October 25, 2017 – Sustainable Return on Investment

- Stakeholder Meeting #5 – date to be determined – Economic and Market Analysis

1.3 Goals and Objectives

Through active collaboration and feedback from stakeholders and community members, the Coalition has developed goals and objectives to help determine a sustainable and achievable future regional solid waste infrastructure system. This report's evaluation considers whether each option meets the goals and objectives that were developed, in order to determine if the option is economically viable, environmentally sound, socially acceptable, and achievable. For ease of reference, the goals and objectives are shown below in Table 1-1.

Table 1-1. Goals and Objectives

Goal	Objectives
Goal #1: Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner	D. Upon completion of the Phase 2 Planning Study in 2018, the Coalition has identified and documented specific options for programs and facilities, taking into consideration the balance between economic, environmental and social costs and benefits.
	E. The proposed solid waste system addresses future customer service demands in the region over the next 40 years or more, and provides long-term funding to address capital and operating costs.
	F. Coalition members are prepared to begin implementing programs and constructing facilities by January 2020.
Goal #2: Create a comprehensive solid waste materials management plan and implement programs and facilities that reflect the needs and desires of users	E. The development of programs and facilities shall take a comprehensive, systems-based approach for materials management to conserve resources, manage costs, and minimize environmental impacts.
	F. The next generation of materials management programs and facilities provides services at competitive rates that are in alignment with the solid waste industry in the U.S.
	G. New programs and facilities result in the increasing application of proven, innovative technologies for reuse, recycling, and disposal to substantially reduce the amount of material being landfilled.
	H. New programs and facilities are convenient and accessible for citizens, customers, businesses, and waste haulers in the Wasteshed.
Goal #3: Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	D. The Coalition establishes consistent definitions and methods for measuring solid waste diversion/reduction within the Wasteshed by the year 2019 that are supported by streamlined and consistent data.
	E. Solid waste diversion/reduction measurements will be evaluated on a three-year recurring cycle beginning in 2020 to identify potential program adjustments.

Table 1-1. Goals and Objectives

Goal	Objectives
	F. Jurisdictions implement policy and regulatory measures to support waste reduction, reuse and recycling efforts, by the year 2024.
Goal #4: Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	D. Public education and outreach programs convey a clear, consistent message and effectively influence the behavior of citizens regarding the reduction, reuse and recycling of materials that would otherwise be destined for disposal.
	E. Public education materials convey shared guidelines for recycling and other information on reuse and reduction within all jurisdictions.
	F. Municipal and solid waste representatives meet on a routine basis to coordinate solid waste educational programs and outreach efforts and to resolve any questions about recycling guidelines.

1.4 Infrastructure Options

This report further evaluates the 7 infrastructure options identified by the Phase 1 Planning Study, and adds four additional options for consideration. The final 11 options were chosen through a collaborative effort with the Coalition’s TAC and the stakeholders. The options chosen for further evaluation include:

- Status Quo
- Central Transfer Station
- New County Landfill
- Material Recovery Facility (Clean)
- Yard Waste Organic Processing Facility
- Construction and Demolition Debris Processing Facility
- Energy From Waste Facility – Direct Combustion
- Mixed Waste Processing (Dirty Material Recovery Facility [MRF])
- Aerobic Composting including Food Waste
- Anaerobic Digestion
- Refuse Derived Fuel Processing

In support of the report’s evaluation related to the goals and objectives as outlined in Section 1.3, overviews are provided for each infrastructure option, including spatial requirements, capacity, facility components and quantity, and personnel requirements. A summary of the regulatory and permitting requirements for each option identifies the potential pitfalls that could derail an option. Other general risks or barriers associated with each infrastructure option are also provided.

The data used in this report for the Financial Impact Sections, for each Infrastructure Option, are derived from current and projected Larimer County landfill tonnages, current waste diversion and recycling goals and population estimates. In the future, if tonnages change due to the adoption of more stringent waste recycling and diversion goals, markets change due to commodity pricing and product acceptability, or population growth increases or decreases substantially different from the projections, costs for each Infrastructure Option may increase or decrease and need to be adjusted accordingly.

Section 13 provides an overview and comparison of the expected implementation schedule of each infrastructure option.

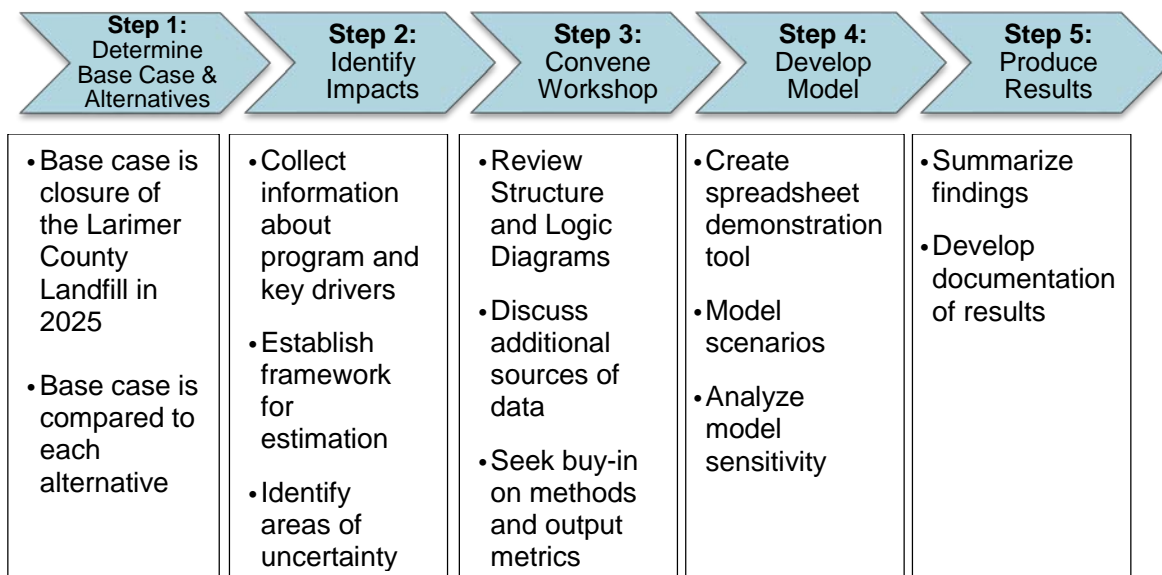
Section 14 identifies potential public-private partnerships working elsewhere that could be viable options for the Coalition. Also discussed are models that have not been successful elsewhere and the lessons that can be learned from their examples.

1.5 Sustainable Return on Investment

Sustainable Return on Investment (SROI) is a proven, Cost-Benefit Analysis based approach used to assist in making planning and budgeting decisions, which provides a full range of possible outcomes using state-of-the-art risk analysis techniques. It further includes a sustainable value method developed to provide a thorough, transparent alternatives' analysis that considers a wide range of goals and incorporates triple bottom line (TBL) aspects and outcomes that are more difficult to quantify. The SROI approach assigns dollar values to benefit categories that are difficult to monetize and compares value directly with cost. Results of this analysis include monetized benefits and costs, net present value and benefit-cost ratio (BCR).

SROI Process

The SROI process can be broken down into five distinct steps as follows:



SROI Net Present Value

In the analysis, the net present value reflects the time value of money, calculated using undiscounted benefits and costs and a discount rate of four percent. The benefit-cost ratio indicates what a \$1 investment in a particular facility may generate in terms of societal benefits. For example, a BCR of 1.5 means that a \$1 investment in a facility is expected to generate \$1.50 in public benefits. This information, combined with financial and other considerations, can be used as a tool in decision making by providing an estimate of which facility or facilities is most likely to generate a positive environmental and social return to the public.

Sustainability Benefit Factors

Potential benefits captured in the SROI model are grouped into environmental, economic and social impacts and are represented in the Figure below.

Figure 1-1. Sustainability Benefit Indicators



- Pavement maintenance cost, safety benefits, accident reduction, congestion reduction and environmental impact were all calculated based on the change in vehicle miles traveled (VMT) with the different facility alternatives. The estimation of these impacts is consistent with United States Department of Transportation and other federal guidance related to the estimation and monetization of these benefits.

- Facility emissions impact was calculated based on the change in energy demand (in kilowatt-hour per ton) between the base scenario and each alternative and the Emissions & Generation Resource Integrated Database (eGRID), provided by the Environmental Protection Agency (EPA). This database provides annual total output emissions rates by state for various pollutants.
- Health impact benefits were estimated by running the facility emissions impact in tons through the EPA's co-benefit risk analysis (COBRA) tool. This tool provides a low and high estimate of total health benefit (\$) as a present value, using a 7 percent discount rate. For this analysis, an average of the low and high estimates was used.
- Following the closure of the Larimer County Landfill (the base case), the overall user cost for waste disposal is expected to increase. For this analysis, we assume the increase is \$2 per ton. This is primarily due to the reduction in the supply of landfills that are proximate to the existing landfill and likely to serve existing Larimer County Landfill customers. Under both the Central Transfer Station and New County Landfill alternatives, it is assumed that the user cost would return to the pre-closure landfill cost once operational. The total impact of user cost savings associated with this alternative is captured by comparing the difference between the base case and the New Landfill and Transfer Station alternatives. Specifically, total tonnage is multiplied by the reduction in cost of \$2 per ton from the base scenario.
- The period of analysis is 25 years, starting in 2025 and following the existing landfill's closure. The study analysis period ends in 2050.
- The benefits and costs are presented in their present values using a discount rate of 4 percent, which is considered equal to the bonding rate.

1.6 Geographic Location Considerations

Approximate geographic locations for new waste management infrastructure have been considered, with the intent that they will be socially acceptable, maximize efficiencies, and minimize costs for haulers and customers.

Figure 1-2 includes the population zones with populations projected out to 2050. Figure 1-3 is a Population Hot Spot Map, which shows areas where population is growing the fastest. This information is the basis for determining approximate areas where new facilities would be most appropriate. The recommended area may vary according to the infrastructure option.

For example, a new county landfill would likely be sited on property located in Zone 3 on the Population Zone Map (Figure 1-2). A new Clean MRF would likely be most effective in the population hot spot near Fort Collins, with ready access to Interstate 25 and other major roadways for transport of collected materials to the MRF and the transport of commodities from the MRF to markets.

1.6.1 Nonattainment Zones

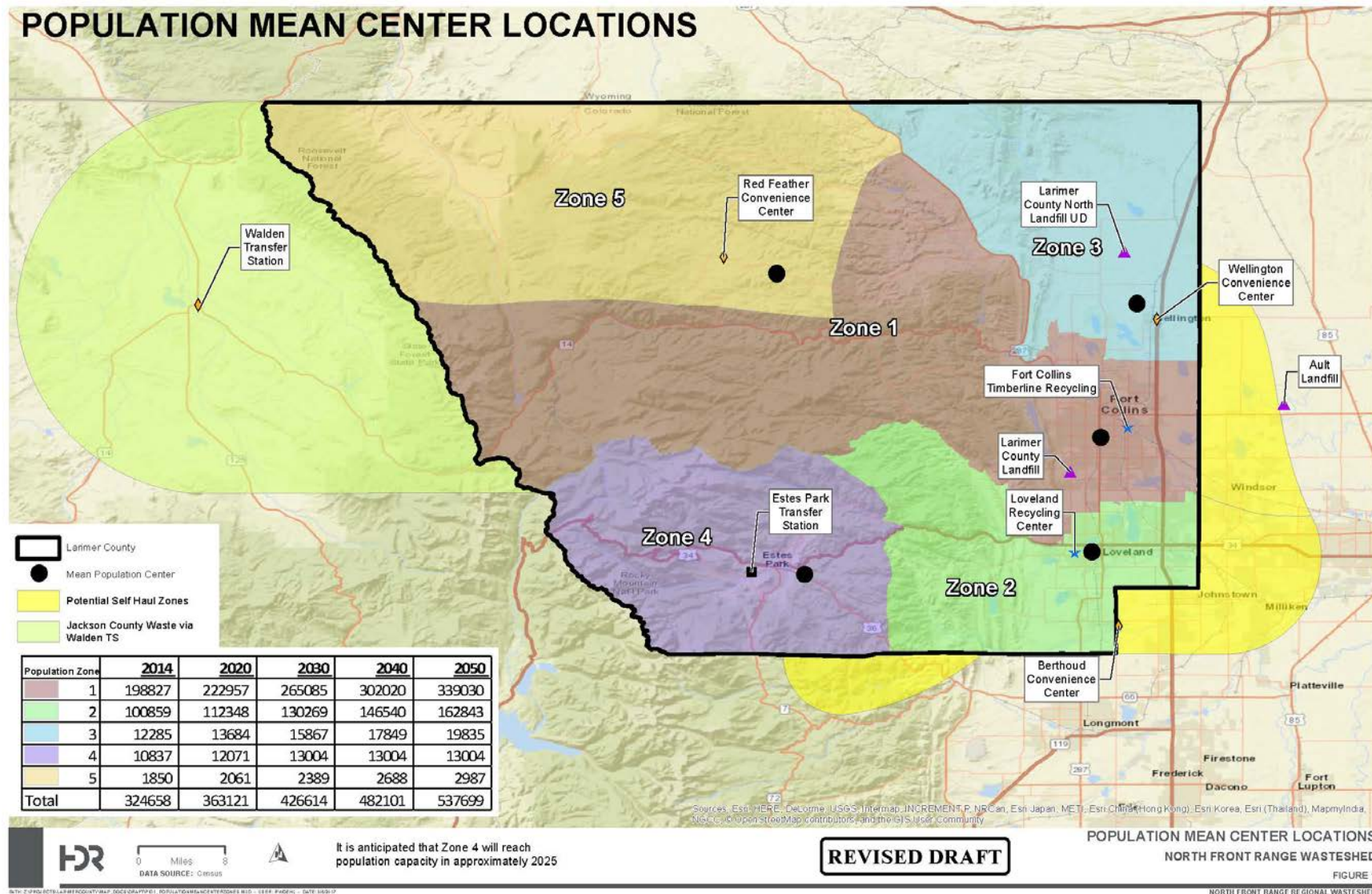
Ozone pollution has re-emerged as a problem for the Front Range. In 2007, some areas, including portions of Larimer County, violated the federal 8-hour ozone standard and were designated "nonattainment." This report identifies the infrastructure options that would consider locations in nonattainment zones.

The U.S. Environmental Protection Agency (EPA) designates which facilities, as major sources, must obtain a Title V Air Operating Permit based on the following criteria:

- A major source has actual or potential emissions at or above the major source threshold for any “air pollutant.”
- The major source threshold for any air pollutant is 100 tons per year (this is the “default value”).
- Lower thresholds apply in non-attainment areas, but only for the pollutants that are in non-attainment.
- Major source thresholds for “hazardous air pollutants” (HAPs) are 10 tons per year for a single HAP or 25 tons per year for any combination of HAPs.
- Municipal solid waste landfills (design capacity \geq 2.5 million mega-grams and 2.5 million cubic meters).

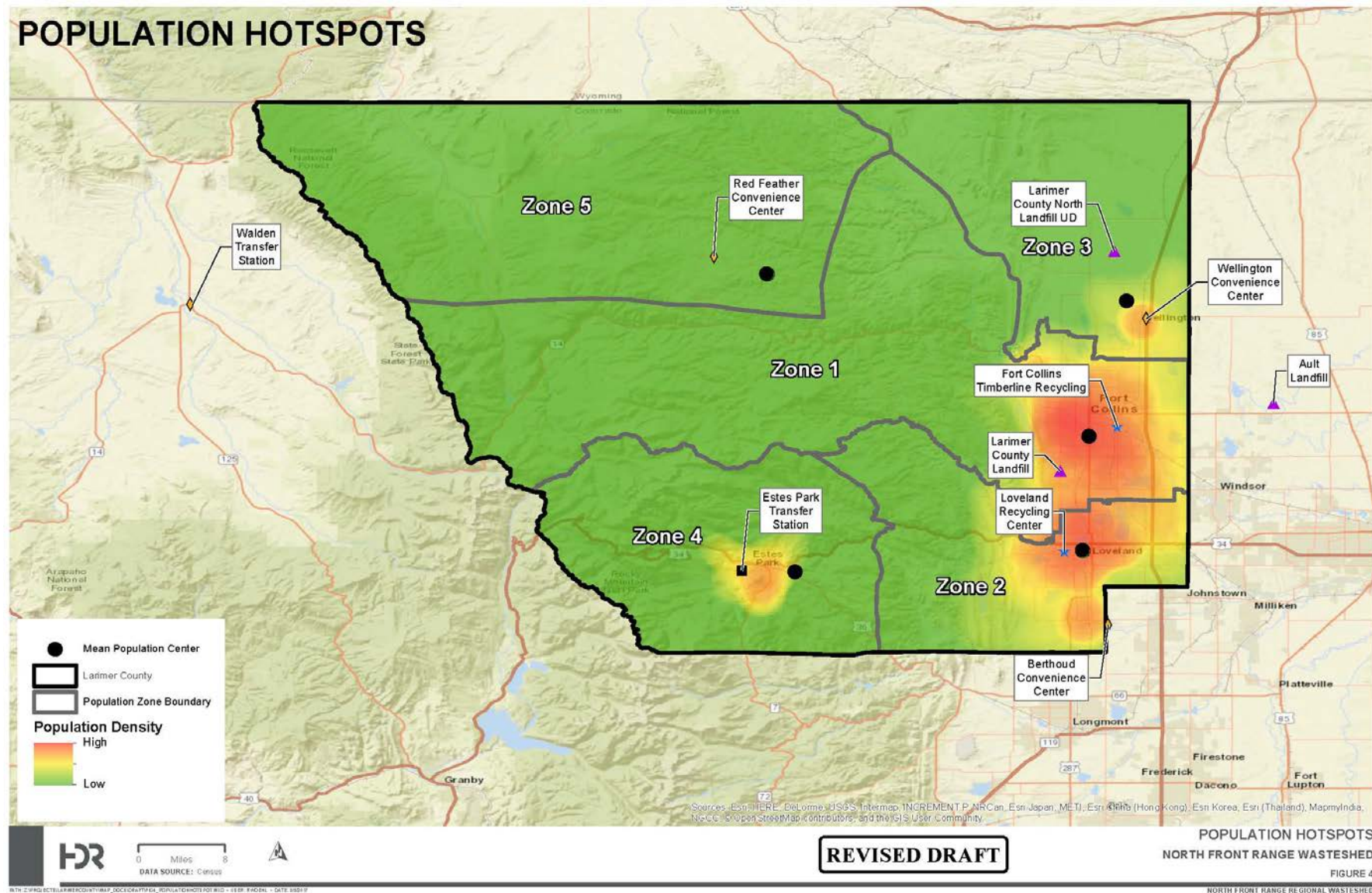
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Figure 1-2. Population Mean Center Locations



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Figure 1-3. Population Hotspots



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2 Status Quo

The current Larimer County Landfill is centrally located in the Wasteshed, 8 miles from Fort Collins, 9 miles from Loveland, and 34 miles from Estes Park. The landfill includes a household hazardous waste drop-off facility, recycling drop-off center, and a recycling processing facility that processes curbside and drop box-collected recyclables for shipment to market.

Under the Status Quo option, the Larimer County Landfill reaches capacity in 2025 and is closed. No action is taken, and no additional infrastructure is constructed. Municipal solid waste is directed to alternative landfills or facilities outside of the Wasteshed. Waste would be hauled by residents, businesses, and the waste industry in individual loads and trucks to these alternative disposal sites.

Larimer County would continue to own and operate the Estes Park Transfer Station and the Wellington, Berthoud, and Red Feather convenience centers, as well as the household hazardous waste drop-off facility, recycling drop boxes, green waste recycling and a recycling processing facility that are currently located at the Larimer County Landfill site. Solid waste from these sites would be transported via truck to an alternative disposal site.

The Timberline Recycling Center, owned and operated by Fort Collins, would continue operations collecting drop-off recycling and “hard to recycle” materials, as would the Hoffman Mill Road Crushing Facility that collects and processes porcelain toilets, asphalt, concrete, and pit run.

The Loveland Recycling Center, owned and operated by Loveland, would also continue operations for acceptance of recyclables and green waste. Table 2-1 describes the goals and objectives achieved under the Status Quo option.

Table 2-1. Status Quo Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally and socially sustainable manner.	No
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	No
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	No
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	No

¹ See Section 1 for a complete list of Goals and Objectives.

2.1 Facility Needs

Size of Facility – Not Applicable.

Land Area – Not Applicable.

Capacity of Facility – Not Applicable.

Process Components – Not Applicable.

Number/Size of Facility(s) needed by 2050 – none.

Private Infrastructure Available

Private infrastructure is available through 2050; see Table 2-2.

Table 2-2. Private Infrastructure Available for Status Quo

Landfill Name	Landfill Address	Miles from Fort Collins	Miles from Loveland	Miles from Estes Park
North Weld Landfill	40000 Weld County Road 25 Ault, CO 80610	14	26	55
Front Range Landfill	1830 County Road 5 Erie, CO 80516	45	32	51
Denver Regional Landfill	1441 Weld County Road Six Erie, CO 80516	45	32	50
Buffalo Ridge Landfill	11655 County Road 59 Keenesburg, CO 80643	67	54	72
Tower Road Landfill	8480 Tower Road Commerce City, CO 80022	65	51	70

2.2 Financial Impacts

Capital – The property purchased by Larimer County for a new landfill becomes available and could be sold. No funds would be expended for the construction of a new landfill facility.

Operational – There would be no landfill operational costs. Landfill monitoring and post-closure costs and care would continue for the life of the post-closure period.

Costs for disposal of waste from the Larimer County convenience centers would increase due to additional travel distances and potential increased disposal fees.

Curbside collection costs for all cities and towns in the Wasteshed, including the unincorporated areas, would increase due to additional travel time and distance, and higher tipping fees for disposal.

Current revenue generated to support other Solid Waste Programs would not be available, resulting in decreased programs for the citizens.

Materials – Materials currently utilized for operations and maintenance of the landfill would no longer be necessary.

Personnel – Landfill operating personnel would be downsized.

Equipment – Landfill operating equipment would no longer be necessary and would be available for sale.

Table 2-3 summarizes the potential disposal cost impacts of the Status Quo option.

Table 2-3. Potential Disposal Cost Impacts of Status Quo

Landfill Name	2016 Tip Fee (Per Ton) ¹	2016 Wasteshed Tons Disposed	2016 Cost for Disposal	Additional Cost Over Larimer County Landfill Disposal Costs
Larimer County Landfill	\$21.20	419,454	\$8,892,425	\$0.00
North Weld Landfill	\$40.00	419,454	\$16,778,160	\$7,885,735
Front Range Landfill	\$53.00	419,454	\$22,231,062	\$13,338,637
Denver Regional Landfill	\$53.00	419,454	\$22,231,062	\$13,338,637
Buffalo Ridge Landfill	\$37.00	419,454	\$15,519,798	\$6,627,373
Tower Road Landfill	\$38.00	419,454	\$15,519,798	\$6,627,373

¹ Tip fees at private landfills are open to negotiation based on tonnage volume.

2.3 Programmatic Impacts

Impacts of the Status Quo option include:

- Self-haul customers would not have easy access to disposal options in the more populated areas.
- The ability to segregate and recycle waste would be limited due to the lack of facilities such as the current segregation program for yard waste, concrete and asphalt accomplished at the Larimer County Landfill site.
- Revenues generated through Solid Waste fees would no longer be kept in county. Funding for education and outreach programs would be limited, as current funding for these programs is generated by tipping fees collected at the Larimer County Landfill. Under the Status Quo option, the Larimer County Landfill would close, and no tipping fees would be generated to fund programs.
- Household waste (HHW) currently collected for free at the HHW Facility has costs that are offset by the tipping fee on solid waste. As no tipping fees would be generated in the future, a fee would have to be implemented for residential HHW collection.
- Traffic volumes would increase and patterns would change based on self-haul customers and waste haulers having increased travel distances.
- Costs for disposal would increase due to increased travel distances and lack of disposal facility competition.
- State of Colorado diversion goals would be difficult to meet based on limited control or no control of the waste stream.
- Cost for disposal at the Convenience Centers would increase due to increased out-of-county disposal costs and increased travel haul distances.
- No data collection or waste audits would be possible, as waste would be exported to an out-of-county facility.

2.4 Regulatory, Administrative, and Permitting Requirements

Not Applicable.

2.5 Risks/Barriers

Risks/barriers associated with maintaining the Status Quo include:

- Increased costs.
- Funding uncertainty for current programs including household hazardous waste collection and disposal, environmental education programs and recycling.
- Loss of the ability to monitor waste disposal through data collection and waste audits.
- Increased travel distances and wear on roads and streets.
- Access to options for self-haulers.

2.6 Sustainable Return on Investment

The base scenario reflects the environment with no other actions, which for this Infrastructure Options Analysis is the “Status Quo”. Currently at the Larimer County Landfill, approximately 55-60 commercial waste trucks dispose of solid waste daily at the landfill. In addition to the commercial waste trucks, the landfill receives about 489 “mom & pop” customers daily. Following the closure of the Larimer County Landfill, it is assumed that solid waste that was brought to the Larimer County Landfill will be disposed of at neighboring landfills in the region. An average distance of 100 miles round trip was assumed for calculating vehicle-miles traveled by waste trucks and automobiles to any one of the other landfills.

3 Central Transfer Station

A transfer station is a light industrial facility where municipal solid waste is temporarily staged in the course of its eventual journey to a landfill or other waste processing and recycling facilities. Figure 3-1 through Figure 3-3 show typical facilities at the Factoria Transfer Station (Bellevue, Washington) and Metro Waste Authority Northwest Transfer Station (Grimes, Iowa). Typical activities at a transfer station include the unloading of garbage trucks and self-haul vehicles, pre-screening and removal of inappropriate items, and compacting and then reloading of items into larger trucks for haul to their final destination. Table 3-1 lists the goals and objectives that would be achieved by the Central Transfer Station option.

Figure 3-1. Factoria Transfer Station Tip Floor in Bellevue, Washington



Figure 3-2. Load Out Tunnels at Metro Waste Authority Northwest Transfer Station in Grimes, Iowa



Figure 3-3. Unloading Bays at Metro Waste Authority Northwest Transfer Station in Grimes, Iowa



The transfer station is a key component of cost-effective solid waste transportation. By transferring waste from local collection vehicles onto larger trailers, the cost of transportation to distant disposal sites or processing facilities can be significantly reduced, freeing collection-specific vehicles and crews to devote their time to actual



collection activities, which in turn keeps customer collection costs lower. Some of the main benefits include:

- Provides fuel savings, reduction in road wear, and less air pollution due to fewer vehicles on the road.
- Provides a trash and recyclable material drop-off location for citizens. This can be accomplished in a separate designated area away from commercial vehicles.
- Reduces total traffic congestion in the community by transferring waste onto larger (and therefore fewer) vehicles.
- Improves safety at the landfill or processing facility.
- Provides the opportunity to screen incoming trash for such purposes as removing hazardous waste and organics, or recovering recyclables.

Table 3-1. Central Transfer Station Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes, if includes recyclable collection
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	No

¹ See Section 1 for a complete list of Goals and Objectives.

3.1 Facility Needs

A new Central Transfer Station would accept solid waste from Larimer County customers, including those from Loveland, Fort Collins, convenience centers, self-haul, and other sources. The Estes Park Transfer Station materials are expected to be direct hauled to a landfill or other disposal facility.

Currently, the Larimer County Landfill receives about 170,000 tons per year (tpy) of solid waste from the customers anticipated to utilize the transfer station. Initial throughput in year 2025 is projected to be approximately 202,000 tpy. Projections to year 2050 bring the potential throughput to approximately 275,000 tpy, or an equivalent average of 900 tons per day (tpd) at 6 days per week of operation. The average annual tonnage over the planning period is approximately 239,000 tpy. A transfer station facility is generally comprised of a transfer station building, maneuvering area, scale house and scales, administration area/building, roadways, and other support structures (i.e., tarping area, trailer parking and storage, and other structures). The transfer station is anticipated to be located at the existing Larimer County Landfill site and to utilize the current scale house, scales, administration building, HHW building, and maintenance building. The transfer station building size required is estimated to be 28,200 square feet. This includes 10 unloading bays, a tipping floor, and two load-out hoppers. The tipping floor storage

capacity should be capable of providing 1 day of waste storage and loader maneuvering area.

The transfer station could also support other waste programs, such as the receipt and transfer of source-separated materials or primarily food waste (processed to create a slurry material). To perform these functions, additional space would typically be required for a separate materials receiving area and possibly for processing equipment.

Depending upon the site topography, orientation and additional desired activities, a transfer station will require a site size of about 7 to 12 acres. See Table 3-2 for Central Transfer Station facility requirements.

Table 3-2. Facility Requirements for Central Transfer Station

Method	Feedstock	Building Size (SF)	Capacity	Land Area (acres)
Transfer Station – Top Load	Solid Waste	28,200	900 tpd	10
Transfer Station with source separated organics (SSO)	Source Separated Organics	10,000 (additional)	-	-

Note: SF = square feet.

Process Components

The transfer station is configured for gravity top loading into transfer trailers. The load-out tunnels are equipped with load-out scales and digital display boards for operators to maximize trailer loads within legal road limits. A tarping area should be provided at the exit of the load-out tunnels. Besides mobile equipment, no other process equipment is needed for basic transfer station operations. An alternative to gravity top loading could be a grapple loaded transfer station.

Number/Size of Facility(s) Needed by 2050

One central transfer station capable of handling up to an average of 900 tpd and most peak days, with some customer queuing, would be needed which includes an area of 10 acres. The configuration of the transfer station should allow for building expansion to accommodate possible MSW processing/diversion activities or future needs.

Private Infrastructure Available

Currently, there are no transfer stations located near Population Zones 1 and 2 that could provide material segregation and disposal opportunities for solid waste to Fort Collins or Loveland.

3.2 Financial Impacts

The estimated financial impacts for implementing the Central Transfer Station option are shown in Table 3-3 through Table 3-7 below.

Capital costs include key components of a conceptual transfer station, located at the existing Larimer County Landfill, including:

- A 28,200-SF transfer station building – fully enclosed, high bay, column-free interior, metal building with corrosion protection features
- Ten unloading bays with minimum 28-foot high door openings
- A 20,000-SF concrete maneuvering area
- Two load-out hoppers to trailers in drive-through tunnels below, and scales
- Two tarping area structures
- Paved roadway network
- Transfer trailer parking area
- Extension/expansion of utilities for electricity, water, and sewer
- Site investigations and earthwork to provide full elevation separation between tipping floor and load-out tunnels
- Select new mobile operating equipment – large front-end loaders and a yard tractor. The primary equipment for a transfer station includes loader(s), yard tractor (for moving transfer trailers around on-site), transfer semi-trucks, transfer trailers, and other support equipment. It is assumed for this scenario that transfer trailers and semi-trucks to haul the waste would be contracted to the private sector.

Table 3-3. Central Transfer Station Mobile Equipment Cost Estimate

Equipment Type	Description	Number	Estimated Costs
Front-End Loader – Large	New	2	\$700,000
Yard Tractor	New	1	\$100,000
Skid Loader	Existing	1	\$0
Water Truck	Existing	1	\$0
Transfer Trucks and Trailers – Subcontracted			\$0
Total Equipment Purchase Cost		Total	\$800,000

Table 3-4. Central Transfer Station Capital Cost Estimate Summary

Task	Features	Transfer Station Total
Site Acquisition	10 acres on Existing Landfill Site	\$0
Site Work	Earthwork, roadways, utilities, storm water control, surveying, etc.	\$1,250,000
Facilities		
Transfer Station/Processing Facility	28,200 SF	\$7,384,000
Scale house and Scales	Existing – Landfill Site	\$0
Maintenance Building	Existing – Landfill Site	\$0
Administration Building	Existing – Landfill Site	\$0

Table 3-4. Central Transfer Station Capital Cost Estimate Summary

Task	Features	Transfer Station Total
Equipment	Initial purchase loader and yard tractor; haul trucks and trailers in annual operations cost	\$800,000
Support Features/Structures	Tarping Structures, Maneuvering Pad	\$504,000
Subtotal Costs		\$9,938,000
Contingency (25%)		\$2,485,000
Soft Costs (19%)	Design, Permitting, Construction Period/CM/CQA	\$1,891,000
Total		\$14,314,000
Annual Capital Cost (20 years, 4% interest)		\$1,054,000

Note: CM = construction management; CQA = construction quality assurance.

Transfer station operations and maintenance are estimated for operations 6 days per week similar to current landfill operations. Table 3-5 and Table 3-6 summarize transfer station operations and estimated haul costs. Transfer haul costs in Table 3-6 assume a nearby landfill approximately 25 miles from the new Central Transfer Station at approximately \$8 per ton. If the landfill is farther away, haul costs are estimated to increase to approximately \$13 per ton at 50 miles one-way and \$18 per ton at 75 miles one-way. The number of drivers, trucks, and trailers increase as the distance to landfills increases.

Table 3-5. Central Transfer Station Operational Cost Estimate Summary

Item	Description	Annual Estimated Costs
Personnel	12 FTE	\$683,000
Building Operations and Maintenance (O&M)	Repairs, maintenance, & utilities	\$220,000
Equipment O&M	Repairs, maintenance, supplies, rental, fuel, replacement reserves	\$340,000
Services	Engineering, janitorial, training, legal, insurance, etc.	\$159,000
Subtotal O&M Costs		\$1,402,000
Contingency (10%)		\$140,000
Total Annual Operational Costs		\$1,542,000

Note: FTE = full-time employees

Table 3-6. Central Transfer Station Average Transfer Haul Operational Cost Estimate Summary

Item	Description	Annual Estimated Costs
Personnel	11 FTE	\$686,000
Equipment O&M	Repairs, maintenance, supplies, rental, fuel	\$612,000
Equipment Replacement Reserves	Annual equipment, haul trucks and trailers, debt net of re-sale	\$312,000
Insurance, Licensing & Taxes	Estimated 2.5% of trucks' capital cost	\$33,000
Subtotal O&M Costs		\$1,643,000
Overhead & Profit (20%)		\$329,000
Total Annual Operational Costs		\$1,972,000

Table 3-7 provides a summary of the estimated costs for a Transfer Station capable of handling up to 275,000 tpy. Initial operations are estimated to begin at approximately 202,000 tpy. The cost per ton is based on the annual costs divided by the average annual throughput of 239,000 tpy over the planning period.

If the transfer station needs to help fund and subsidize the recycling activities, education program, and household hazardous waste program, the net costs of those programs should be added to Table 3-7. Otherwise, the costs for these programs are not included.

Table 3-7. Central Transfer Station Infrastructure Option, Summary of Costs¹ (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton
Facility (From Table 3-4)	\$14,314,000	\$1,054,000	\$4.40
O&M Costs (From Table 3-5)	\$0	\$1,542,000	\$6.50
Transfer Haul Costs (Subcontracted)	\$0	\$1,972,000	\$8.30
Disposal Costs	\$0	\$5,327,000	\$22.29
Net Overall Cost	\$14,314,000	\$9,895,000	\$41.49

¹ Cost estimates are conceptual.

3.3 Programmatic Impacts

As part of an integrated solid waste management system, transfer stations:

- Minimize truck traffic to the landfill by consolidation of loads.
- Reduce the maintenance cost of collection vehicles and the number of collection vehicles on the road. A transfer station allows the collection vehicles to return to the collection routes faster which also lowers customers' collection service costs. These vehicles stay on well-paved roads and do not travel on rough roads, particularly in landfill sites.
- Generate tip fees used to fund other programs and projects (not included in the above).

3.4 Regulatory, Administrative, and Permitting Requirements

State of Colorado Regulation 6 Code of Colorado Regulation (CCR) 1007-2 Part 1 Section 7 Regulations for Transfer Stations establishes minimum health and safety standards for the operation of transfer stations. The criteria apply to all transfer stations at which refuse generated off-site awaits transportation to approved solid waste disposal sites and facilities. Refuse may be transferred from one type of containerized collection receptacle, is processed by shredding, baling, or compaction, and is then placed into another receptacle. Other waste management and disposal activities conducted at the site of the transfer station may require regulation by the State of Colorado, Department of Public Health & Environment (CDPHE) and a certificate of designation (CD) from the local governing body having jurisdiction.

A transfer station is not deemed to be a solid waste disposal site and facility, and therefore is not required to apply for and obtain a CD from the local governing body outlined in the regulations. The governing body having jurisdiction can request, in writing, that the CDPHE conduct a technical review of the site and facility documents and its operation plan. The CDPHE shall be notified by the governing body having jurisdiction when a permit approving a transfer station is issued. A copy of the approved operations plan shall be maintained at the transfer station.

As the permitting authority, the local government having jurisdiction decides which provisions of Section 7 of the regulations to waive and which provisions to enforce, using Section 1.5 Waiver Criteria.

Ozone pollution has re-emerged as a problem for the Front Range, and in 2007 the area, including parts of Larimer County, violated the federal 8-hour ozone standard and was designated "nonattainment." The EPA designates which facilities, as major sources, must obtain a Title V Air Operating Permit based on the following criteria:

- A major source has actual or potential emissions at or above the major source threshold for any "air pollutant."
- The major source threshold for any air pollutant is 100 tons per year (the "default value").
- Lower thresholds apply in non-attainment areas, but only for the pollutants that are in non-attainment.
- Major source thresholds for "hazardous air pollutants" (HAPs) are 10 tons per year for a single HAP or 25 tons per year for any combination of HAPs.
- Municipal solid waste landfills (design capacity \geq 2.5 million mega-grams and 2.5 million cubic meters).

Normally, transfer stations do not have to obtain a Title V permit. The proposed location of the Central Transfer Station is in the non-attainment area of Larimer County and may require the implementation of additional measures.

3.5 Risks/Barriers

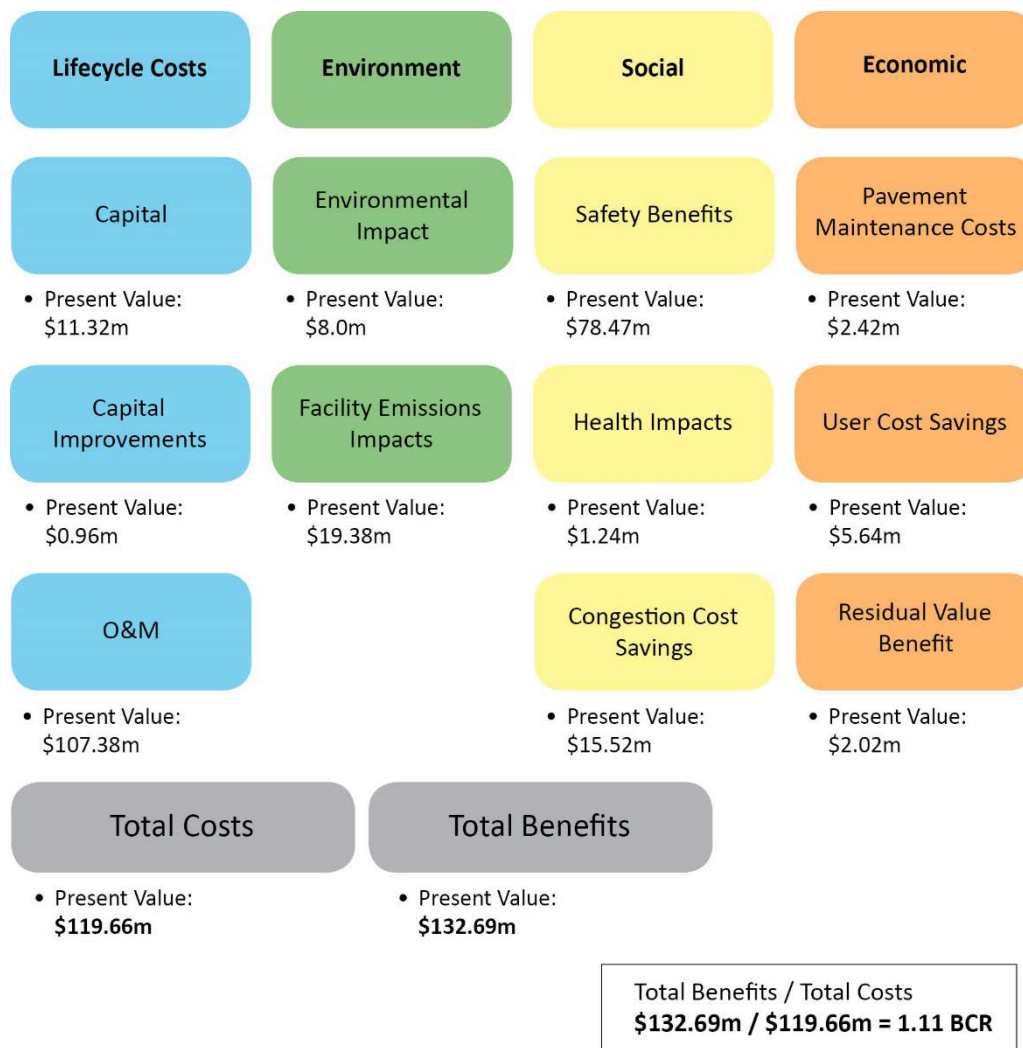
Potential risks/barriers associated with a Central Transfer Station include:

- Odor issues (limited with enclosed building),
- Insects and rodents, but significantly reduced with limited storage of waste and daily clean up.
- Windblown litter dependent on tarping and untarping area locations,
- Dust (can be limited with misting system),
- Additional truck traffic hauling to disposal facility, and
- Large equipment operating near unloading customers.

3.6 Sustainable Return on Investment

The proposed Central Transfer Station is anticipated to be located in the same location as the existing Larimer County Landfill. As such, an average distance of 15 miles round trip was used in the analysis to calculate vehicle-miles traveled for waste trucks and “mom & pop” automobiles. Fifty-five (55) waste trucks and 489 “mom & pop” customers were assumed daily for the analysis. An average distance of 50 miles round trip, was assumed for waste transferred out of the facility for disposal. Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the Central Transfer Station was modeled and is depicted in the following figure.

Figure 3-4. Central Transfer Station Sustainability Benefit Factors



Some of the Central Transfer Station findings include:

- The Central Transfer Station alternative will result in positive environmental and health benefits associated with the facility emissions reduction. Assumed as part of the analysis is the Coalition's requirement that the disposal of solid waste from the Central Transfer Station will be made at a landfill facility with gas recovery. This facility will be treated as a net producer of energy, averaging 21.8 million kWh per year.
- Establishing a Central Transfer Station retains a stable and competitive market in the region by controlling costs and managing portions of the waste stream handled. Without a County owned transfer facility, the competitive market is anticipated to increase. As such, there is a user cost savings to the customers currently using the County solid waste system.
- The O&M costs associated with a Central Transfer Facility include annual operations, transfer haul, and disposal costs totaling \$8.8 million annually. It is anticipated that a \$3.5 million capital improvement investment will be required within the 25 years.



- The SROI analysis compares the Central Transfer Station to the Base Case. With a 4 percent discount rate, a \$119.7 million investment would result in \$132.7 million in total benefits and a benefit-cost ratio of 1.11.

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4 New County Landfill

MSW landfills are well-engineered and managed facilities for the disposal of solid waste. Landfills are located, designed, operated, and monitored to ensure compliance with State and Federal regulations. They are also designed to protect the environment from contaminants, which may be present in the waste stream. Landfills cannot be built in environmentally sensitive areas, and they include using on-site environmental monitoring systems. These monitoring systems check for any sign of groundwater contamination and for landfill gas, and also provide additional safeguards. Today's landfills must meet stringent design, operation, and closure requirements established under the Resource Conservation and Recovery Act (RCRA) and the State of Colorado Department of Public Health and Environment Solid Waste Regulations and Statutes (6 CCR 1007-2). Disposing of waste in landfills is one part of an integrated waste management system.

The Larimer County Landfill is the cornerstone of current solid waste services that are provided to community partners in the North Front Range Regional Wasteshed. The Larimer County Landfill is anticipated to reach capacity in 2025. Prior studies concluded that expanding the existing landfill is not feasible due to a variety of issues.

Recognizing the capacity limitations at the current landfill site, in 2006, Larimer County purchased a 640-acre section of property at the intersection of County Road 76 East and County Road 11 North (see Figure 4-1). The potential landfill site has few neighbors in the surrounding area, a low water table, and county roads with good access.

Figure 4-1. Larimer County Potential New Landfill Site



A New County Landfill would have the potential to service Fort Collins, Loveland, Estes Park, unincorporated Larimer County, and other jurisdictions in Colorado and Wyoming. Table 4-1 describes the goals and objectives achieved by a New County Landfill.

Table 4-1. New County Landfill Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

4.1 Facility Needs

Table 4-2 summarizes the facility requirements of a New County Landfill.

Table 4-2. Facility Requirements for New County Landfill

Method	Feedstock	Size (acres)	Capacity (CY)	Land Area (acres)
Landfill Mass Fill with Compactor	Solid Waste, C&D, Yard Waste	120	25,400,000	640

An initial lined area of 120 acres, to be developed in phases, will provide sufficient landfill capacity for the North Front Range Regional Wasteshed through the 2050 planning period and beyond. Assuming the development of the landfill includes excavations, approximately 25 feet below ground surface with 3:1 side slopes and waste filling to approximately 200 feet above ground surface with 4:1 side slopes, the volume available for waste disposal is estimated to be 25,400,000 cubic yards (CY) in the 120-acre lined footprint. Depending upon the site features, additional area could be developed for landfill lateral expansion. Ancillary features for the site will include access roads, scales and scale house, maintenance shop, sediment basins, leachate storage, buffers, borrow soil area, groundwater monitoring system, and future gas collection system. It is assumed that no self-hauled waste will be accepted at the new landfill site.

Minimum required capacity of the landfill, through 2050, is approximately 13,518,000 tons of waste to meet the current disposal projections of the Wasteshed. This assumes status quo on the current programs and diversion activities of Larimer County. Based on current landfill operations, the average density or Airspace Utilization Factor achieved by Larimer County has been about 1,430 pounds per cubic yard (lbs/CY) in 2016 and 1,462 lbs/CY in 2017. This includes normal operations for compaction, daily cover soil/alternative daily covers, and intermediate cover. Utilizing an Airspace Utilization

Factor of 1,400 lbs/CY and the waste disposal projections, approximately 19,311,000 CY or 76 percent of the 120 acres is estimated to be consumed through 2050.

Process Components

The primary process component is a landfill compactor and other mobile equipment for daily operations and support needs. No other process equipment is required.

Number/Size of Facility(s) needed by 2050

One landfill facility, with an initial 120 acres of permitted disposal area for municipal solid waste acceptance, will meet the needs of the North Front Range Regional Wasteshed through 2050 and beyond.

Private Infrastructure Available

This infrastructure option would have the same private infrastructure available as the Status Quo option (see Table 2-2 for list).

4.2 Financial Impacts

The New County Landfill option assumes development of a MSW landfill and supporting facilities on County-owned property. MSW landfill development will include site work (site preparation, utilities, access roadways, storm water management, and bulk excavation), new mobile equipment, landfill liner and leachate collection system, leachate pumps and lagoon, gas collection system, groundwater monitoring system, scale house and scales, and maintenance building.

All current landfill operating equipment will relocate to the new landfill upon closure of the Larimer County Landfill. Additional equipment for consideration, but not included in the cost estimate, is a landfill tipper with estimated cost ranging from \$300,000 to \$350,000 to facilitate unloading of non-walking floor trailers (see Table 4-3). Trailers without walking floors are lighter weight and can manage a greater net waste load within legal weight limits.

Table 4-3. New County Landfill Mobile Equipment Cost Estimate

Equipment Type	Description	Number	Estimated Costs
Landfill Compactor	Existing + New	2	\$1,000,000
Track Dozer	Existing	1	\$0
Wheel Loader (JD624 or CAT936)	Existing	1	\$0
Skid Loader	Existing	1	\$0
Water Truck	Existing	1	\$0
Scraper	Existing	1	\$0
Motor Grader	Existing	1	\$0
Roll-Off Truck	Existing	1	\$0
Roll-Off Containers	Existing	2 to 6	\$0
Total Equipment Purchase Cost			\$1,000,000

Probable costs for construction, facility operations and maintenance, closure, and post-closure period care were developed for this option (see Table 4-4). The site is currently undeveloped agricultural land. Special considerations for this site and option include:

- Minimum utilities such as water, sewer, and electricity, do not exist at the site.
 - Installation of water supply well and pump is required for non-potable water and fire protection. Bottled water is assumed supplied for drinking water.
 - Installation of on-site fire protection (storage tank(s), pump and pump house), if required.
 - Installation of on-site septic system is required for sanitary sewer.
 - Adequacy/availability of electricity and communication services along nearby public roads is unknown. New electrical service onto the site is required.
- New entrance and access roadways.
- Excavation to approximately 25 feet below ground surface to maintain minimum 5-foot separation between groundwater and bottom of waste. Deeper excavations would require lowering of upper groundwater table through engineered groundwater control trenches and State approval.
- Additional site investigations in area of landfill and buildings is required. Network of groundwater monitoring wells will need to be installed.
- Landfill gas migration monitoring probes will need to be installed.
- Air regulations such as New Source Performance Standards and Title V Permitting will likely require an active landfill gas collection system.

Additional assumptions reflected in the capital cost opinion are summarized below:

- Soil for earthwork and liner construction is available on-site.
- Liner system is composite liner with leachate collection system.
- No unusual site subsurface conditions exist that necessitate over-excavation or special foundations for the buildings.
- Entrance roads and primary access roads are anticipated to be asphalt. Gravel or rocked roadways is used in all other exterior areas.
- Support facilities include scale house, and maintenance building. No other facilities are included.
- No special architectural treatments for the buildings.

Table 4-4. New MSW Landfill Capital Cost Estimate Summary

Task	Features	Initial Phase	Total Build-Out
Site Acquisition	640 acres purchased in 2006	\$0	\$0
Site Work	Bulk excavation, earthwork, roadways, utilities, stormwater control, surveying, etc.	\$3,273,000	\$20,816,000
Facilities			
Landfill Liner & Leachate Collection System	120 acres full build-out; initial Phase 1 at 12 acres + leachate lagoon	\$4,766,000	\$27,070,000
Scale House and Scales	300 SF; 3 scales	\$352,000	\$352,000
Maintenance Building	2,320 SF	\$494,000	\$494,000
Mobile Equipment (Existing)	Initial Purchase	\$0	\$1,000,000
Support Features/Structures	Groundwater monitoring system	\$276,000	\$276,000
Subtotal Costs		\$9,161,000	\$50,080,000
Contingency (25%)		\$2,290,000	\$12,502,000
Soft Costs (21%)	Design, Permitting, Construction Period/CM/CQA	\$2,107,000	\$10,502,000
Total		\$13,558,000	\$73,012,000
Annual Capital Cost (20 years, 4% interest) (Phase 1 Cell at 3 years, 4% interest)		\$2,863,000	\$5,373,000

The landfill O&M is assumed to be similar to existing facility operations costs at the Larimer County Landfill. The recycling facility, household hazardous waste facility, and electronics and used oil facility are anticipated to remain at their current location at the Larimer County Solid Waste Facility. The net expenses (actual expenses less program revenues) of these recycling and waste diversion operations have been and will continue to be subsidized by the landfill tipping fee but are not included in the operating costs below.

Operation costs are expected to include annual O&M of an active gas collection system beginning five (5) years after start of initial waste filling in the new landfill.

All current landfill operating personnel will relocate to the new landfill upon closure of the Larimer County Landfill. Over the 25-year planning period, additional operating personnel such as equipment operators are anticipated to be needed. The equipment operator annual salary with benefits is estimated at approximately \$65,000 in 2017 dollars. Other operating personnel may be needed if hours of operations change or other changes occur.

A summary of the annual O&M costs are presented in Table 4-5 below. Annual equipment replacement costs were also estimated.

Table 4-5. New County Landfill Operational Cost Estimate Summary

Item	Description	Annual Estimated Costs
Personnel	18 FTE	\$1,090,000
Building O&M	Repairs, maintenance & utilities	\$250,000
Equipment O&M	Repairs, maintenance, supplies, rental, fuel, replacement reserves, active landfill gas operations O&M	\$932,000
Services	Engineering, legal, pest control, dust control, insurance, groundwater & landfill gas operations monitoring, etc.	\$262,000
SW Program Expenses	Existing recycling, education & hazardous waste programs	\$0
Subtotal O&M Costs		\$2,534,000
Contingency (10%)		\$253,000
Total Annual Operational Costs		\$2,787,000

The closure costs for the new MSW landfill include 120 acres of composite capping system and installation of an active gas collection system. The initial installation of the active gas collection system for Phase 1 with the blower skid and flare would need to occur in areas within 5 years of first waste placement. Interim gas collection will need to be installed as waste disposal continues. For simple analysis, the cost per acre assumes complete gas collection system.

Annual post-closure costs for new MSW landfill estimates the care of 120 acres of capped landfill, groundwater monitoring, landfill gas migration monitoring, and O&M of an active landfill gas collection system. The total 30 years post-closure costs are estimated to be \$8,580,000 with 10 percent contingency. Table 4-6 summarizes the total costs of the New County Landfill option.

Table 4-6. New County Landfill Infrastructure Option, Summary of Costs¹ (2017 \$)

Task	Total Capital Costs ²	Annual Cost	Cost per Ton
Facility	\$72,012,000	\$5,373,000	\$10.30
O&M Costs		\$2,787,000	\$5.40
Closure Costs	\$33,773,000	\$2,486,000	\$4.80
Post-Closure Costs		\$286,000	\$0.60
State Surcharge		\$619,000	\$1.19
Net Overall Cost	\$106,785,000	\$11,551,000	\$22.29

¹ Cost estimates are conceptual.

² Capital costs are on total 120-acre landfill build-out.

4.3 Programmatic Impacts

Impacts of a new MSW landfill include:

- Landfills are an effective disposal method when managed effectively.
- Landfills are part of an integrated solid waste management system.
- Landfills minimize environmental risks to groundwater contamination.
- Production of energy from landfill gas, in the future, provides potential additional monetary resources.
- Landfills allow for the sorting of recyclables from the waste stream.
- Landfills generate tip fees can be used to fund other programs and projects.
- A landfill would assist in keeping the North Front Range Regional Wasteshed free of littering and illegal dumping.
- Access to waste data collection.

4.4 Regulatory, Administrative, and Permitting Requirements

4.4.1 Summary of Federal Regulations

Summary of U.S. Code of Federal Regulations for Municipal Solid Waste Landfills

All MSW landfills must comply with the Federal regulations in 40 Code of Federal Regulations (CFR) Part 258 (Subtitle D of RCRA) or equivalent State regulations. Those regulations include the following requirements:

- **Location restrictions** – ensure that landfills are built in suitable geological areas away from faults, wetlands, floodplains, and other restricted areas.
- **Composite liners requirements** – include a flexible membrane (i.e., geomembrane) overlaying 2 feet of compacted clay soil lining the bottom and sides of the landfill. They protect groundwater and the underlying soil from leachate releases.
- **Leachate collection and removal systems** – sit on top of the composite liner and remove leachate from the landfill for treatment and disposal.
- **Operating practices** – include compacting and covering waste frequently with several inches of soil or alternative daily cover. These practices help reduce odor, control litter, insects, and rodents, and protect public health.
- **Groundwater monitoring requirements** – requires regular testing of groundwater wells to determine whether waste materials have escaped from the landfill.
- **Closure and post-closure care requirements** – include covering landfills and providing long-term care of closed landfills.

- **Corrective action provisions** – control and clean up landfill releases, if they occur, and achieve groundwater protection standards.
- **Financial assurance** – provides funding for environmental protection during and after landfill closure (i.e., closure and post-closure care – 30 years).

Summary of New Source Performance Standards (NSPS) Requirements for Municipal Solid Waste Landfills

Landfills are also subject to the requirements of the more specific federal NSPS and Maximum Achievable Control Technology (MACT) regulations, as follows:

- NSPS, Subpart Cc for Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills found in 40 CFR Part 60, Subpart Cc:
<http://www.epa.gov/ttn/atw/landfill/fr16jn98.pdf>
- NSPS, subpart WWW for Standards of Performance for Municipal Solid Waste Landfills found in 40 CFR Part 60, Subpart WWW:
<http://www.epa.gov/ttn/atw/landfill/fr16jn98.pdf>
- MACT, Subpart AAAA for National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills found in 40 CFR Part 63, Subpart AAAA:
<http://www.epa.gov/ttn/atw/landfill/fr16ja03.pdf> .

The proposed location of the New County Landfill is outside the non-attainment area discussed in Section 1.6.1.

4.4.2 Summary of State of Colorado Solid Waste Regulations

The CDPHE has adopted regulations pertaining to General Requirements and Information Concerning all Solid Waste Disposal Sites and Facilities in the State of Colorado in Section 6 CCR 1007-2.

Permitting of solid waste sites and facilities is a joint effort between the local governing body with jurisdiction (county or municipality) and the CDPHE.

- There is no statewide application form for a solid waste CD. People proposing a facility should contact the local governing body that has jurisdiction where the proposed site is to be located.
- The State conducts a comprehensive technical review of applications for a CD as a solid waste site or facility to determine whether the location, design, and operating criteria of the proposed facility are protective of human health and the environment.
- Any technical conditions of approval listed in the final report will be incorporated as requirements in the CD as issued by the local governing body with jurisdiction.
- In addition to solid waste landfills, CDs are generally required for waste impoundments, water treatment plant sludge disposal sites, medical waste treatment, storage and/or disposal facilities, composting facilities, and on-site disposal of regulated asbestos-contaminated soil.

4.5 Risks/Barriers

Potential risks/barriers associated with a New County Landfill include:

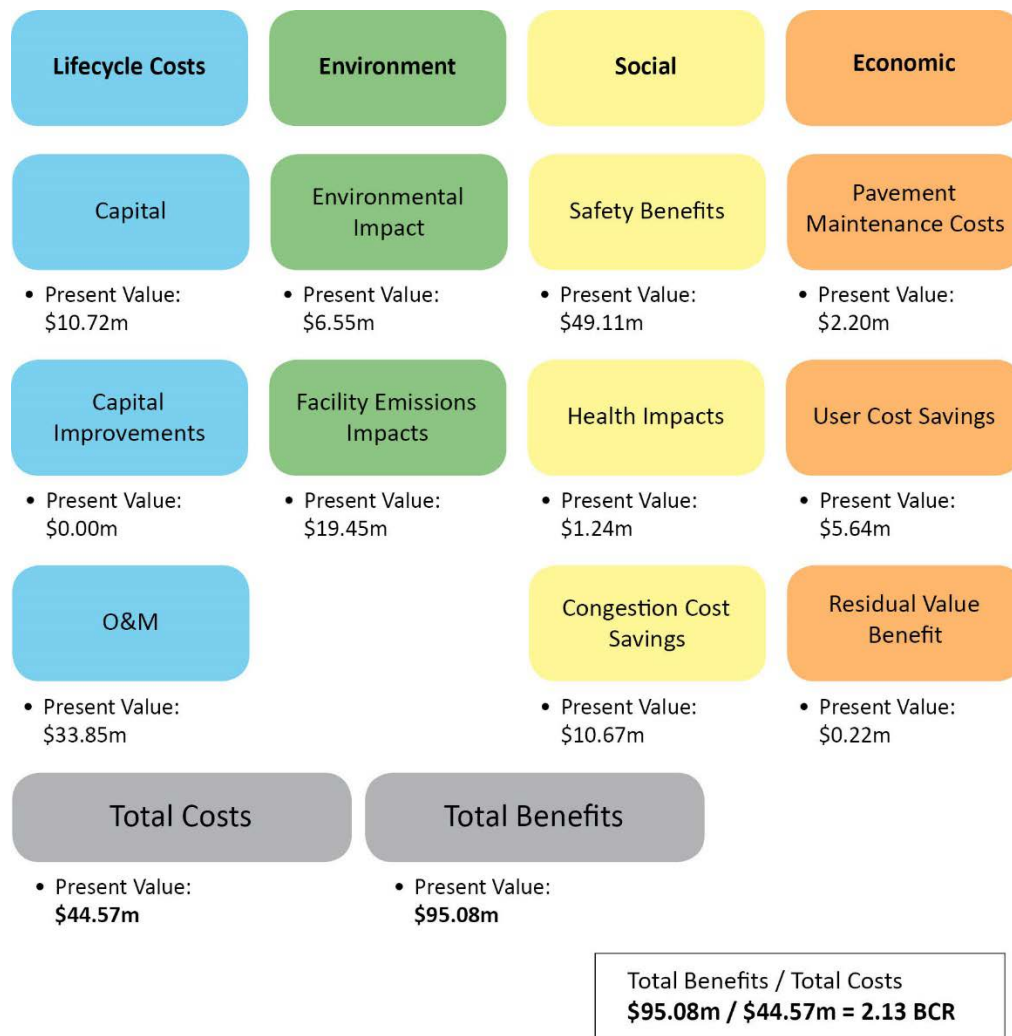
- Atmospheric and hydrogeological effects (air and groundwater contamination).
- Production of greenhouse gasses.
- Effects on wildlife in the area.
- Landfill fires.
- Odor issues.
- Windblown litter.
- Dust.
- Additional truck traffic on road adjacent to the site.

Neighboring property owners who can be opposed to a landfill adjacent to their property.

4.6 Sustainable Return on Investment

The proposed New County Landfill is anticipated to be located at the intersection of County Road 76 East and County Road 11 North, land that was purchased by Larimer County in 2006. An average distance of 50 miles round trip was used in the analysis to calculate vehicle-miles traveled for waste trucks and automobiles. Fifty-five (55) waste trucks and 489 “mom & pop” customers were assumed daily for analysis. Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the New County Landfill was modeled and is depicted in the following figure.

Figure 4-2. New County Landfill Sustainability Benefit Factors



Some of the New County Landfill findings include:

- The New County Landfill alternative will result in positive environmental and health benefits associated with the facility emissions reduction. The Coalition will require the facility to include a gas recovery system, and it will be treated as a net producer of energy, averaging 21.8 million kWh per year.
- Establishing a New County Landfill retains a stable and competitive market in the region by controlling costs and managing portions of the waste stream handled. Without a County owned landfill facility, the competitive market is anticipated to increase. As such, there is a user cost savings to the customers currently using the County solid waste system.
- The O&M costs associated with a New County Landfill totals \$2.8 million annually. The anticipated useful life of the new landfill is a minimum of 25 years.
- The SROI analysis compares the New County Landfill to the Base Case. With a 4 percent discount rate, a \$44.6 million investment would result in \$95.1 million in total benefits and a benefit-cost ratio of 2.13.

5 Material Recovery Facility (Clean)

A Clean Material Recovery Facility (MRF) processes source-separated recyclables which are shipped to other facilities as commodities. For planning and economic modeling purposes, the estimates in this section include a Single Stream MRF-type facility. The existing Recycling Center owned by Larimer County and currently operated by Waste Management of Colorado is mainly a transfer facility and not a full processing MRF. Single stream sourced materials are assumed to be “clean” by virtue of containing little contamination. This allows Single Stream/Clean MRFs to have relatively high recovery rates and low residue/contamination rates. Typically, materials managed at a MRF include various types and grades of containers and paper products (fiber), the most common of which include:

- Aluminum (used beverage cans)
- Steel cans (tin cans typically used for canned foods)
- Scrap metal (mixed types of non-container metal)
- Plastic containers
- Glass containers
- Newspaper or Old Newspaper
- Cardboard or Old Corrugated Cardboard
- Mixed paper

There are several types of Clean MRFs; the most common types include dual stream and single stream MRFs. A dual stream MRF receives the containers separately from the paper or fiber materials because the collection system uses two bins for recyclables and thus sorts the containers and fiber materials on two separate processing lines. Single stream recycling collects all the recyclable materials in a single bin or container, and the MRF equipment must separate the containers from the fiber materials and into the designated commodities. For this discussion, a single stream MRF, the most common type of MRF, is assumed. It should be noted that the principles, costs, and impacts are similar for a dual stream MRF, with a few exceptions.

MRF technology is constantly changing with new approaches to better separate and process the mixed stream into commodities. MRFs have moved away from a simple conveyor with sorters on both sides to screening devices that separate materials by their varying properties. Optical sorters in use today, when properly arranged, are much more efficient than manual sorters but still require quality control measures. Robotic sorting is beginning to be applied and, while faster than manual sorting at identifying target materials, still requires some development before they will be common on process lines. At the same time, the material mix and characteristics of the various fiber and container materials are constantly changing as well. These factors plus changes in markets and local needs all add up to a facility that will need steady updating on a periodic basis. Few MRFs operate for more than about 5 to 10 years without some major changes and equipment updates. At a minimum, a major update to a MRF in the order of at least \$0.5

to \$1 million should be anticipated at least every 10 years. More conservatively, a million dollar replacement or update should be anticipated every 5 years.

Table 5-1. Materials Recovery Facility (Clean) Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

5.1 Facility Needs

Table 5-2 summarizes the facility requirements of a Clean MRF.

Table 5-2. Facility Requirements for Clean MRF

Method	Feedstock	Building Size (SF) ¹	Capacity (tons)	Land Area (acres)
Clean MRF – Initial Phase	Recyclable Material	48,000	75,000	4
Clean MRF – Total Build-Out	Recyclable Material	54,000	94,000	4

¹ Total Building area reflects the size of the total building including the existing 27,000 SF Larimer County owned Recyclable Transfer Facility which is repurposed to function as a part of the Clean MRF. So the new building construction is 27,000 SF smaller than these numbers.

Currently about 39,000 tons of single stream recyclables are received each year at the Larimer County Recycling Transfer Facility. Additional recyclable materials can be found in the waste stream currently landfilled.. These materials include fiber (paper and paper board), cardboard, various recyclable plastics, beverage glass, aluminum, tin, and other materials, as described in the 2016 waste characterization study. For planning purposes, the analysis assumed 35 percent of the recyclable materials currently being landfilled could be directed to a Clean MRF. These tons are added to the quantity of recyclables currently recovered, but are projected to 2030 and 2050 to reflect the “initial” and “total build-out” quantities for modeling purposes. For planning purposes, the analysis assumed that an initial facility would process the lower range of this quantity and participation would increase over time to eventually process the upper range for the total build-out facility, as illustrated in Table 5-3.

Table 5-3. Clean MRF (Single Stream) Sizing

	Initial Capacity (2030)	Total Build-Out Capacity (2050)
Recyclables currently recovered, projected to the year shown	52,000	65,000
Recyclables currently disposed of in the MSW that could be directed to a Clean MRF	23,000	30,000
Total Clean MRF Tonnage	75,000	94,000

Depending on a number of factors such as topography, site orientation, and presence of wetlands, a Clean MRF would require a site size of about 4 acres. A Clean MRF would require truck scales and limited queuing space for trucks arriving at the site. Incoming recyclable collection trucks would travel to the tipping floor. Outbound materials would be carried on tractor trailers. They would require maneuvering space to align with loading docks. Parking areas would be needed for facility operators, administrative personnel, and visitors.

Based upon a facility capacity of about 75,000 to 94,000 tons of recyclables per year (reflecting the initial facility throughput and the total build-out facility throughput capacity), a facility with one single stream processing line would be appropriate for the Wasteshed. A typical processing facility can normally manage between 25 to 35 tph of material. As growth occurs, operating hours can be extended by increasing hours each day, processing a half or full day on Saturday, or even adding a full second shift.

Process Components

A single stream facility will consist of a receiving area, processing area, and storage and load-out area. The receiving area consists of an enclosed tipping floor and storage area sized to accommodate about 1 to 2 days of processing needs. An infeed conveyor is provided, allowing a front end loader to feed material to the processing line.

The processing area is where the separation of the feedstock into commodities occurs. Most processing systems today continue to move toward higher technology solutions as a means of cutting labor costs. A metering device such as a metering drum is used to control the processing rate. A presort area is needed to remove items that could damage downstream equipment, are oversized, or otherwise should be removed from the line. This includes scrap metal and bulky plastics. These steps are completed manually by two to six sorters picking target materials from a horizontal presort conveyor.

Screens are used to recover cardboard materials as well as glass and fines to get the remaining materials ready for the various sorters. From this point a combination of screens and optical sorters are used to capture many commodities. Labor is used for quality control and some sorting. Optical sorters commonly are used for the various types of plastics, such as polyethylene terephthalate, as well as for inappropriate materials such as film plastic, containers, wood, or even wet fiber from fiber processing lines. A ferrous magnet is used to recover tin cans, and an eddy current separator is normally used for aluminum recovery. Glass cleanup systems are used to reduce the quantity of

shredded paper, fines, bottle caps, corks, and other types of materials, but the final product is normally a mixed glass stream.

Commodities are temporarily stored in a variety of bins, cages, bunkers, and roll-off containers, depending on the material and facility needs. Fiber products are generally stored in large live-bottom bins. Containers may be stored in expanded metal cages or silos, or may be placed in live-bottom bins. Scrap metal is often loaded directly into roll-off containers, ready to ship to market. Glass often is stored in concrete bunkers for loading into trucks for transport, but it may be stored in silos or loaded directly into roll-off bins. Other arrangements can be provided, depending on mill and facility needs.

The Clean MRF was modeled for the initial throughput capacity of 75,000 tons per year and 94,000 tons per year for the total build-out. These capacities correspond to a 48,000 square foot building and a 54,000 square foot building, respectively. The model also assumes the existing 27,000 square foot recycling transfer facility would be utilized for this scenario, thereby requiring 21,000 to 27,000 square feet of additional building space to provide the full area required.

Number/Size of Facility(s) needed by 2050

A single centrally located facility equipped with a single processing line will meet initial needs with some room for growth. The technology for a Clean MRF is rapidly changing as the materials change and technology advances. Equipment generally requires some updating after about 5 years and may require replacement after about 10 years. These requirements allow for upgrading the processing system, assuming the processing line is arranged to accommodate the new equipment designs. Thus, while requiring an ongoing investment, a facility is able to remain current with changes in commodities and material splits. As investment is needed, a review of overall system needs can occur, and when another processing line is needed, a second site or line can be added. Since Clean MRFs can be permitted and installed reasonably quickly, the extra capacity does not need to be added initially.

As the population continues to grow and waste is generated, when a single processing shift for the initial facility is no longer able to manage the demand, it is possible to evaluate whether the Wasteshed is better served with a second facility or if concentrating processing at the original facility is the better alternative. The future mix of materials, recycling rates, technology, and materials characteristics will all factor into this decision. Based upon current conditions, it is anticipated that either a single facility operating with a second shift or a second facility would be required to meet demand.

Private Infrastructure Available

Two recycling centers are currently located in the region. These facilities can provide backup capacity for certain materials and may pull some of the region's material away from a new Clean MRF. Table 5-4 lists currently available private infrastructure.



Table 5-4. Private Infrastructure Available for MRF/Transfer (Clean)

Facility Name	Facility Address	Miles from Fort Collins	Miles from Loveland	Miles from Estes Park
Waste-Not Recycling	1065 Popular Street Johnstown, CO 80534	19	7	52
Franklin Street MRF	5395 Franklin Street Denver, CO 80517	60	46	66

Waste-Not Recycling accepts commercial source-separated recyclables, and thus would not be able to process single stream material.

5.2 Financial Impacts

Table 5-5 through Table 5-10 provide a summary of the estimated cost of a Clean (Single Stream) MRF processing 75,000 tpy in 2030 (which is termed “initial” for comparative purposes of this report) and 94,000 tpy as the total-build out facility in 2050. The costs of these facilities were based on the equipment and site development cost of Clean MRF reference facilities, which were scaled up or down based on a ratio of the annual throughput tonnages. The processing equipment is the most expensive portion of the facility and consists of process components described in Facility Needs above. The building and site related improvements are the second most expensive portion of the facility. As described above, the model relied on the use of the existing 27,000 square foot transfer station to reduce the size of the new building required. A planning level contingency of 25% was included to account for unknown issues that may arise as the project evolves. Soft costs include environmental review, design, permitting, construction management and finance.

For the MRF, the residuals are the materials left over after recovery of the commodities. This is the trash, soiled paper, film plastic, textiles, unrecovered commodities and other materials remaining at the end of the processing line. A residual rate of 15% is assumed. This material is landfilled, which is assumed to cost \$30.59 per ton for hauling and disposal.

One of the key aspects of the economic viability of a Clean MRF is the marketing of recovered materials. The lack of solid waste materials allows the operator to secure high dollar values for some recyclables such as cardboard, paper, and plastics.

Consequently, the revenues from recovered materials somewhat offset the cost of the facility. These projections show the Clean MRF essentially breaking even with a slight revenue per year. Revenues are estimated based on the sale of recycled materials. Revenues consist of a significant portion of a Clean MRF analysis in that they can potentially offset the cost of amortized capital plus operating costs. The value of commodities such as paper, cardboard, aluminum and mixed plastics are tracked by industry groups. The market values for these materials vary daily. Some of these markets are local, and others are overseas. These markets are subject to variations in domestic and international commodity prices. This feasibility analysis estimated potential revenue from materials recovered by averaging commodity prices by using a blended rate of \$75 per ton for all recyclables. In actuality, the commodity price for individual commodities varies substantially. To derive a more accurate value for revenues, an

analysis of the quantities for each of the key recyclables would need to be provided. Also, the single largest buyer of recycled materials is China. China imposed a ‘Green Fence’ policy in 2013 that imposed quality standards on recyclable materials, resulting in dramatic drop in commodity pricing. Although commodity prices have rebounded, China has announced new rules in 2018 that could affect recyclable materials quality and commodity pricing again. To test the sensitivity of commodity pricing, the effect of commodity prices dropping by \$24 per ton to \$50 per ton was considered. The resulting revenues illustrated on Table 5-9 and Table 5-10 would shift from a revenue of \$5 and \$10 per ton to a cost of \$16 and \$11 per ton respectively. As this is a planning document intended to explore a variety of options, further analysis of the viability of a Clean MRF based on historical commodity pricing may be advisable.

Table 5-5. Clean MRF Mobile Equipment Cost Estimate

Equipment Type	Description	Initial Phase Estimated Costs	Total Build-Out Estimated Costs
Front End Loaders (3 at Total Build-Out)	New	\$600,000	\$900,000
Forklifts (2)	New	\$400,000	\$400,000
Total Equipment Purchase Cost		\$1,000,000	\$1,300,000

Table 5-6. Clean MRF Capital Cost Estimate Summary

Description	Features	Initial Phase	Total Build-Out
Facilities	Enclosed building with enclosed maneuvering, receiving, and material staging areas, processing area, and materials storage area	\$4,738,000	\$5,595,000
Processing Equipment	Single stream processing line (in-feed, sorting conveyors, OOC screen containers sort line, fiber sort line, magnets, eddy-current, baler with in-feed conveyor	\$12,035,000	\$13,828,000
Subtotal Costs		\$16,773,000	\$19,423,000
Contingency (25%)		\$4,193,000	\$4,856,000
Soft Costs (16%)	Design, Permitting, Construction Period/CM/CQA	\$2,684,000	\$3,108,000
Total		\$23,649,000	\$27,386,000
Annual Capital Cost (20 years, 4% interest)		\$1,827,000	\$2,116,000

Table 5-7. Clean MRF Operational Cost Estimate Summary (Initial Phase)

Item	Description	Annual Estimated Costs
Personnel	24 FTE	\$1,398,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Repairs, maintenance, supplies, rental, fuel, legal, insurance, etc. electricity, water, sewer, gas, phones	\$514,000
Subtotal O&M Costs		\$1,912,000
Contingency (10%)		\$191,000
Total Annual Operational Costs		\$2,103,000

Table 5-8. Clean MRF Operational Cost Estimate Summary (Total Build-Out)

Item	Description	Annual Estimated Costs
Personnel	26 FTE	\$1,485,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Repairs, maintenance, supplies, rental, fuel, legal, insurance, etc. electricity, water, sewer, gas, phones	\$647,000
Subtotal O&M Costs		\$2,132,000
Contingency (10%)		\$213,000
Total Annual Operational Costs		\$2,345,000

Table 5-9. Clean MRF Infrastructure Option, Summary of Costs,¹ Initial Phase (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$23,649,000	\$1,827,000	\$24.55
O&M Costs		\$2,103,000	\$28.26
Residuals Haul Costs & Disposal		\$341,000	\$4.59
Revenues		\$(4,745,000)	\$(63.75)
Net Overall Cost	\$23,649,000	\$(473,000)	\$(6)

¹ Cost estimates are conceptual.

Table 5-10. Clean MRF Infrastructure Option, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$27,386,000	\$2,116,000	\$22.56
O&M Costs		\$2,345,000	\$25.00
Residuals Haul Costs & Disposal		\$430,000	\$4.59
Revenues		\$(5,980,000)	\$(63.75)
Net Overall Cost	\$27,386,000	\$(1,088,000)	\$(12)

¹ Cost estimates are conceptual.

5.3 Programmatic Impacts

A Clean MRF:

- Is an excellent public awareness tool, allowing opportunities for tours and school and civic programs.
- Reduces pressure on landfill resources.
- Increases the need for public education regarding which materials should be placed in which bin. A good education program, however, can greatly reduce problems at the Clean MRF.
- Provides a revenue stream to offset a significant portion of the costs.
- Increases employment with opportunities for public-private partnerships.

5.4 Regulatory, Administrative, and Permitting Requirements

5.4.1 Summary of State of Colorado Solid Waste Regulations

A Clean MRF would not be required in order to obtain a CD. Sites operated for the legitimate purpose of processing, reclaiming, or recycling recyclable materials, as long as the materials are not likely to contaminate groundwater or create off-site odors as a result of those operations, are considered exceptions to the CD requirements, per 6 CCR 1007-2 Section 1.4 and Colorado Revised Statutes (CRS) Title 30 Government County § 30-20-102 (Unlawful to operate site and facility without certificate of designation—exceptions).

MRFs are regulated under 6 CCR 1007-2 Section 8.3. All MRFs must register with the CDPHE through submittal of a Recycling Facility Initial Registration Form. General Site Requirements for MRFs are listed under Section 8.3.4 and include the following:

- An operations plan, which should demonstrate how the facility qualifies for CD exemption, and how it will operate to ensure it does not fall under the definition of a solid waste disposal site and facility.
- After a 1-year accumulation period, recyclable materials that are recycled must account for at least 75 percent of the total weight or volume of recyclable materials received and currently in storage. This must be determined through a consistent measurement method that may include a 3-year rolling average.
 - A recycling facility may apply for a commodity and site-specific variance to the accumulation period and/or the recycling rate, which must be approved by the CDPHE.

MRFs are required to submit a completed Recycling Facility Annual Reporting Form to the CDPHE by March 1 each year that covers the previous calendar year. The information reported includes incoming tonnage by material type, outgoing tonnage by destination and material type, and amount of material remaining on site. Exemptions for confidential business information may be requested per § 24-72-204(3)(a)(IV), CRS.

MRFs must follow the closure requirements set in 6 CCR 1007-2 Section 8.3.6, which include giving the CDPHE notice at least 60 calendar days before initiating closure. After closure is initiated, all closure activities must be completed within 180 calendar days. Any material left on-site after closure is complete will render the site a solid waste disposal site. Potential off-site odors, groundwater contamination, and nuisance conditions must also be addressed. The final closure report is due to the CDPHE within 90 calendar days of closure completion.

5.4.2 Other Considerations

Some provisions for sorter and operator comfort such as dust control, noise abatement, and heating, ventilation, and air conditioning may be required. Many facilities have climate-controlled sorting houses within the building where most of the facility workers are normally stationed. Fire protection provisions to protect the building are compounded with the need to protect personnel and equipment. MRF fires can be devastating since many of the materials managed are highly combustible.

Measures to incentivize or require proper recycling participation contribute to the success of Clean MRFs. Such actions may include requiring businesses to incorporate recycling programs, and requiring waste collection firms and incorporated communities to offer recycling services. Recycling education and support can be a burden, and measures that stipulate a percentage or fixed fee amount for utility or solid waste collection services be applied to recycling education and support can go a long way to making a program successful.

5.5 Risks/Barriers

Potential risks/barriers associated with a Clean MRF include:

- Recycling acceptance and participation,
- Effectiveness of education programs,
- Commodity pricing, and
- Distance to markets.

5.6 Sustainable Return on Investment

Sustainable Return on Investment (SROI) is a proven, Cost-Benefit Analysis based approach used to assist in making planning and budgeting decisions, which provides a full range of possible outcomes using state-of-the-art risk analysis techniques. It further includes a sustainable value method developed to provide a thorough, transparent alternatives' analysis that considers a wide range of goals and incorporates triple bottom line (TBL) aspects and outcomes that are more difficult to quantify. The SROI approach assigns dollar values to benefit categories that are difficult to monetize and compares value directly with cost. Results of this analysis include monetized benefits and costs, net present value and benefit-cost ratio (BCR).

The proposed clean Material Recovery Facility (MRF) is anticipated to be located at approximately the same location as the existing Larimer County Landfill. An average distance of 15 miles was used in the analysis to calculate vehicle-miles traveled for

recycling trucks and automobiles. Between 65 and 85 trucks were assumed daily for analysis. An average distance of 100 miles was assumed for disposal of diverted recyclables not collected at the MRF Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the Clean MRF was modeled and is depicted in the following figure.

Figure 5-1. Material Recovery Facility (Clean) Sustainability Benefit Factors



Some of the Material Recovery Facility (Clean) findings include:

- Currently 39,000 tons of single stream recyclable material are collected at the existing Larimer County Materials Recovery Transfer Facility. Solid waste volume projections anticipate by 2025 approximately 52,000 tons of recyclable material will

be received and 65,000 tons by 2050. It is anticipated that the clean MRF would capture an additional 35 percent over the projected tonnage. Paper, plastic, glass and metal recyclables would be captured at the clean MRF.

- The O&M costs associated with the clean MRF include annual operations and transfer haul costs totaling \$2.4 million annually. It is anticipated that a \$1.0 million capital improvement investment will be required after 5 years.
- The SROI analysis compares the Material Recovery Facility (Clean) to the Base Case. With a 4 percent discount rate, a \$49.0 million investment would result in \$110.2 million in total benefits and a benefit-cost ratio of 2.25.

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6 Yard Waste Organic Processing Facility

Aerobic windrow composting of yard waste organic materials (yard waste, leaves, branches, grass) consists of grinding, moisture conditioning, and placing the material in elongated piles called windrows to allow it to naturally decompose. The aerobic windrow process allows aerobic decomposition by mechanical turning of the piles with a machine or forced aeration to improve porosity. Frequent turning of the piles introduces oxygen, accelerates physical degradation of feedstocks and provides an opportunity to adjust the moisture content to the optimum level. The average time required for active composting is 8 to 12 weeks. Figure 6-1 shows an example of an outdoor aerobic windrow composting system.

Aerobic composting is used by numerous communities and commercial operations throughout the U.S. and the world for composting yard and green waste; however, it is not used for a mixed MSW feedstock. Although windrow composting is the most common method of processing yard waste, aerated static pile (ASP) composting is used for composting highly putrescible materials such as food waste. Products from aerobic composting are compost and mulch. Aerobic composting has been used at various processing quantities, from as low as only a few tons per day to more than 500 tpd. An aerobic composting facility of 250 to 400 tpd is usually the norm for capacity.

Figure 6-1. Example of a Windrow Aerobic Composting Facility



Benefits include diversion of waste from landfills and the local production of beneficial use compost and mulch, which can be used in the community. One potential drawback of composting is the creation of odors, noise, and dust. This can be mitigated through proper infrastructure, operations, and facility siting.

Table 6-1. Yard Waste Organic Processing Facility Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

6.1 Facility Needs

It is currently estimated that 39,000 tons of yard waste is recovered in the region, and this tonnage is estimated to increase to 70,000 tons in 2050. The quantity of material that could be captured for processing is a portion of the total quantity generated and varies depending on whether the program is voluntary or mandatory. The capture rate is discussed in more detail below, but as an overview, the quantity of material that can be captured relates to different methods of incentivizing, encouraging, or mandating compliance with certain set-out/collection procedures. Low capture rates are typically due to low participation levels, which could be caused by a variety of issues such as inconvenience, nuisances (e.g., odor, vector attractant), or cost. High capture rates are typically due to mandated programs with either incentives or penalties to force conformity in set-out/collection behaviors.

Participation rates of residents setting out yard waste are typically high, particularly if collection services coincide with waste collection services. For communities with high percentages of self-haul uses, yard waste participation can also be relatively high if financial incentives are offered that encourage separation of yard waste. For planning purposes, the following initial capture rates for yard waste composting were used on the projected 2030 and 2050 tons per year for the initial and total build-out facilities, respectively.

Table 6-2. Assumed Tonnages for Yard Waste Composting

Material Type	Initial Phase	Total Build-Out
Yard Waste Available for Compost (Tons Per Year)	43,000	67,000

Table 6-3 assumes that one facility will be built to handle all potential yard waste collected for composting.

Table 6-3. Facility Requirements for Yard Waste Organics

Method	Feedstock	Size (acres)	Capacity (tpy)
Turned Windrow – Initial	Yard waste	12	43,000
Turned Windrow – Total Build-Out	Yard waste	17	67,000

Private Infrastructure Available

Table 6-4 lists the private facilities available for organic yard waste disposal or processing.

Table 6-4. Private Infrastructure Available for Disposal or Processing of Yard Waste Organics

Facility Name	Facility Address	Miles from Fort Collins	Miles from Loveland	Miles from Estes Park
North Weld Landfill	40000 Weld County Road 25 Ault, CO 80610	14	26	55
Front Range Landfill	1830 County Road 5 Erie, CO 80516	45	32	51
Denver Regional Landfill	1441 Weld County Road 6 Erie, CO 80516	45	32	50
Buffalo Ridge Landfill	11655 County Road 59 Keenesburg, CO 80643	67	54	72
Hageman's Earth Cycle Inc.	3501 E Prospect Road Fort Collins, CO 80525	5	17	62
A-1 Organics (Eaton)	16350 County Road 76 Eaton, CO 80615	21	27	72
A-1 Organics (Rattler Ridge)	12002 County Road 59 Keenesburg, CO 80643	67	54	72

Compost facilities processing only yard waste typically employ turned windrow processing, which requires more land than ASP composting. Process components of a turned windrow composting system include:

- Waste receiving and unloading, occasionally in an enclosed building equipped with an air collection and treatment system (when odor issues exist with neighbors)
- Preprocessing, consisting of material visual screening for removal of undesirable materials such as packaging or items that could damage the grinder
- Grinding and mixing system
- Active compost area
- Curing area
- Finished product storage, blending and load out

6.2 Financial Impacts

The estimated financial impacts for implementing the yard waste organics processing facility option are shown in Table 6-5 through Table 6-10. The model reflects revenues of \$8 per ton for compost from yard waste only. Residues removed during processing were estimated to be approximately one percent of incoming tonnage. The residual wastes from the facility are assumed to be transported and disposed of at the landfill for \$30.59 per ton. Residual disposal costs are developed from transfer station haul costs, and landfill disposal fees. Haul costs for yard waste composting may be higher due to the small volume of residual materials that are expected.

Table 6-5. Yard Waste Organics Processing Facility Mobile Equipment Cost Estimate – Turned Windrow

Equipment Type	Description	Initial Phase Estimated Costs	Total Build-Out Estimated Costs
Front End Loaders	New	\$350,000	\$700,000
Compost Turner	New	\$600,000	\$600,000
Water Truck	New	\$200,000	\$200,000
Grinder/Shredder	New	\$600,000	\$600,000
Screen Compost Finish	New	\$300,000	\$300,000
Finish Grinder	New	\$150,000	\$150,000
Conveyors	New	\$210,000	\$280,000
Total Equipment Purchase Cost		\$2,410,000	\$2,830,000

Table 6-6. Yard Waste Organics Capital Cost Estimate Summary

Description	Features	Turned Windrow Initial Phase	Turned Windrow Total Build-Out
Facilities	Receiving area, materials staging area, grinding/screening, compost pad, curing pad, final product screening and storage pad	\$3,374,000	\$4,712,000
Processing Equipment	See above list	\$2,410,000	\$2,830,000
Subtotal Costs		\$5,784,000	\$7,542,000
Contingency (25%)		\$1,446,000	\$1,885,000
Soft Costs (15%)	Design, CM, Permitting, CQA	\$868,000	\$1,131,000
Total		\$8,097,000	\$10,559,000
Annual Capital Cost (15 years, 4% interest)		\$801,000	\$1,045,000

Table 6-7. Turned Windrow Composting Operational Cost Estimate Summary – Initial Phase

Item	Description	Annual Estimated Costs
Personnel	7 FTE	\$353,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$463,000
Subtotal O&M Costs		\$816,000
Contingency (10%)		\$82,000
Total Annual Operational Costs		\$897,000

Table 6-8. Turned Windrow Composting Operational Cost Estimate Summary – Total Build-Out

Item	Description	Annual Estimated Costs
Personnel	9 FTE	\$500,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$702,000
Subtotal O&M Costs		\$1,202,000
Contingency (10%)		\$120,000
Total Annual Operational Costs		\$1,322,000

Table 6-9. Turned Windrow Composting Infrastructure Option, Summary of Costs,¹ Initial Phase (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$8,098,000	\$801,000	\$18.59
O&M Costs		\$897,000	\$20.82
Residuals Haul Costs & Disposal		\$13,000	\$0.31
Revenues		\$(193,000)	\$(4.48)
Net Overall Cost	\$8,098,000	\$1,518,000	\$35

¹ Cost estimates are conceptual.

**Table 6-10. Turned Windrow Composting Infrastructure Option, Summary of Costs,¹
Total Build-Out (2017 \$)**

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$10,559,000	\$1,045,000	\$15.67
O&M Costs		\$1,322,000	\$19.83
Residuals Haul Costs & Disposal (included in O&M Costs)		\$20,000	\$0.31
Revenues		\$(299,000)	\$(4.48)
Net Overall Cost	\$10,559,000	\$2,089,000	\$31

¹ Cost estimates are conceptual.

6.3 Programmatic Impacts

Impacts of a yard waste organic processing facility would include:

- An increase in the amount of yard waste organics collected and composted would result in a decrease in the tons disposed of at landfills, thus extending the life of the landfills.
- Reduction in landfill tipping fee revenues, which may affect the budgets of programs funded by tipping fees.
- A new composting facility in Larimer County could reduce the travel distances required for material to go to the existing out-of-county facilities reducing greenhouse gases and wear/tear on roads.
- Easier to track and a potential revenue source.
- Finished compost can improve soil quality through naturally increasing nutrient content, retention of moisture and assist in storm water management.

6.4 Regulatory, Administrative, and Permitting Requirements

Compost facilities are subject to the requirements of Section 14 of the Colorado Regulations Pertaining to Solid Waste Sites and Facilities, must register with the CDPHE, and submit an annual report each year.¹ Yard waste organics are considered a Type 1 feedstock, and a facility that processes only yard waste organics would fall under one of the following categories for permitting requirements:

- Conditionally Exempt Small Quantity Composting Facility: A compost facility with up to 100 CY of Type 1 feedstock on site or in process.

¹ <https://www.colorado.gov/pacific/cdphe/swforms>

- Class 1 Composting Facility: A compost facility with less than 50,000 CY of Type 1 feedstocks on site or in process.
- Class III Composting Facility: Any compost facility composting Type 1, Type 2, and/or Type 3 feedstocks or other materials approved by the CDPHE.²

The tonnages shown in Table 6-3 would likely equate to approximately 35,000 to 60,000 CY on site or in process at any time, depending on the density of the material and the percent capture rate of the program.

In addition, permitting of solid waste sites and facilities is a joint effort between the local governing body with jurisdiction (county or municipality) and the CDPHE.

- There is no statewide application form for a solid waste CD. People proposing a facility should contact the local governing body that has jurisdiction where the proposed site is to be located.
- The State conducts a comprehensive technical review of applications for a CD as a solid waste site or facility to determine whether the location, design, and operating criteria of the proposed facility are protective of human health and the environment.
- Any technical conditions of approval listed in the final report will be incorporated as requirements in the CD as issued by the local governing body with jurisdiction.
- In addition to solid waste landfills, CDs are generally required for waste impoundments, water treatment plant sludge disposal sites, medical waste treatment, storage and/or disposal facilities, composting facilities, and on-site disposal of regulated asbestos-contaminated soil.

6.5 Risks/Barriers

Risks and barriers to implementing a yard waste-only, turned windrow compost system include:

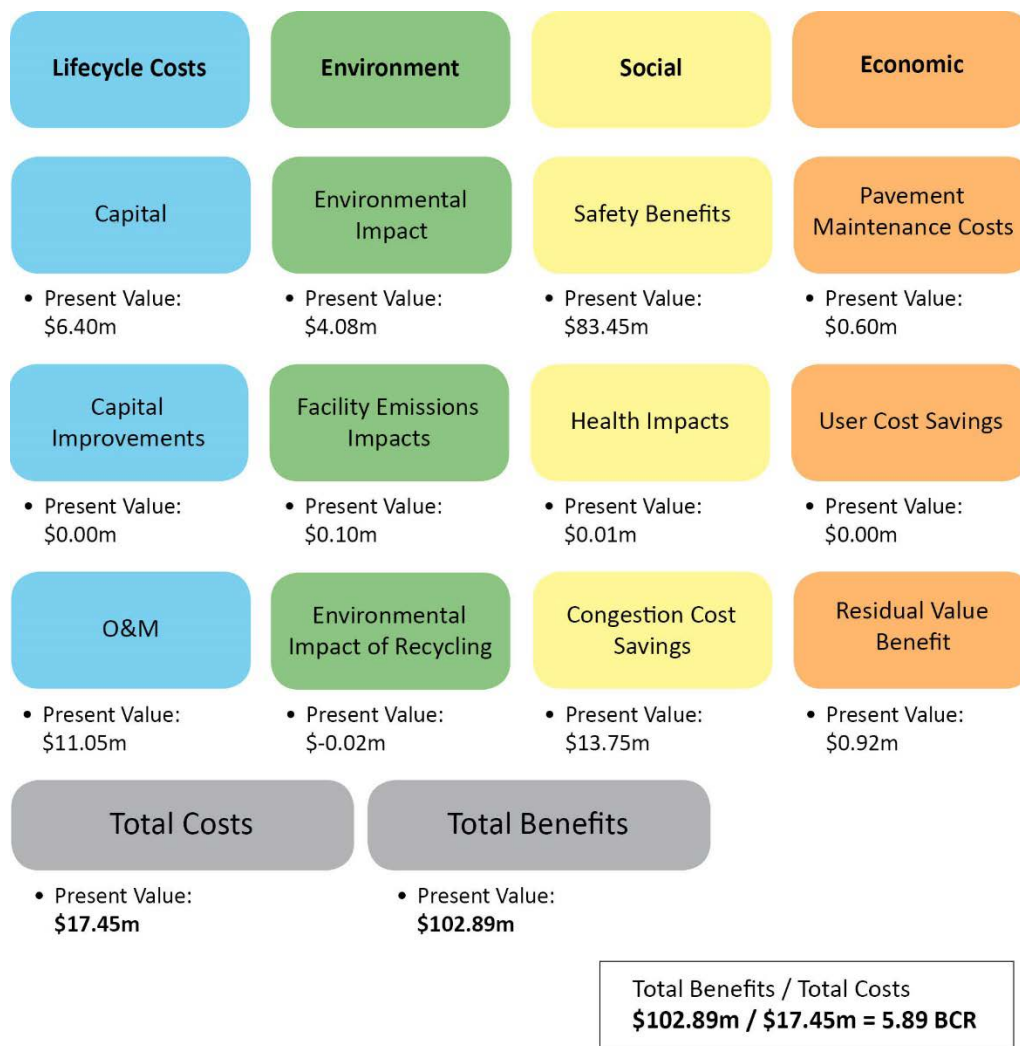
- Educating the generators of appropriate materials for the program so that the contamination levels of the feedstock are minimal. Contaminated feedstock material can be removed, but this increases the cost of the pre-processing effort and/or the effort of post-processing cured compost, as well as possibly reducing the market value of the finished compost material.
- Developing and/or identify a market demand for compost and/or mulch.
- Identifying a facility site location on suitable land with reasonable access to transportation corridors, proximity to the communities providing the feedstock, and on-site utilities to support the facility.

² <https://www.colorado.gov/pacific/sites/default/files/Part%201%20eff%2004-14-17.pdf>

6.6 Sustainable Return on Investment

The proposed yard waste organic processing facility is anticipated to be located at approximately the same location as the existing Larimer County Landfill. An average distance of 15 miles (roundtrip) was used in the analysis to calculate vehicle-miles traveled for yard waste and roll-off trucks and automobiles, and an average of 15 trucks daily was assumed for analysis. An average distance of 100 miles (roundtrip) was assumed for disposal of diverted solid waste not collected at the yard waste facility. Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the Yard Waste Organic Processing Facility was modeled and is depicted in the following figure.

Figure 6-2. Yard Waste Organic Processing Facility Sustainability Benefit Factors



Some of the Yard Waste Organic Processing Facility findings include:

- Currently 39,000 tons of yard waste organic material is collected by the Cities of Fort Collins and Loveland and the projected tonnage is 70,000 tons in 2050. It is

anticipated that the yard waste organic processing facility would capture an additional 10 percent over the projected tonnage. Yard waste materials would be captured at the processing facility.

- The O&M costs associated with the yard waste organic processing facility include annual operations and transfer haul costs totaling \$910 thousand annually. It is anticipated useful life of the organics processing facility will be at least 25 years.
- The SROI analysis compares the yard waste organic processing facility to the Base Case. With a 4 percent discount rate, a \$17.5 million investment would result in \$102.9 million in total benefits and a benefit-cost ratio of 5.89.

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7 Construction & Demolition Waste Processing Facility (C&D)

Processing of C&D materials is a process that can vary according to the types of materials available and the demand (markets) for the materials that can be developed from the process.³ C&D processing facilities are common in regions where there are high disposal fees or high landfill diversion requirements. Some C&D processing facilities tend to focus on specific materials such as lumber/woody wastes as opposed to concrete and asphalt. For the purposes of this study, we focus on construction and demolition materials (e.g., wood, drywall, asphalt shingles, metals, concrete, asphalt).

The C&D process begins with construction materials received onto a tipping floor (or outdoor pad, in some cases). Materials are first viewed visually, using mobile equipment to remove large or bulky items or high-value materials. Typically, a loader or a grapple is used to lift and place materials onto a conveyor or surge hopper to convey the material to the sort lines and mechanical equipment for separation. In most cases, a combination of mechanical equipment and manual labor is used to separate the material into various commodities. The types of processing that can be used include:

- Air Separators: To separate small pieces of paper
- Magnets: To recover ferrous metal
- Optical-Sorting: To separate wood and aluminum
- Vacuum System: To separate film plastics
- Vibratory Screen (Small Stones/Rocks): To separate small stones/rocks, which will be reused for construction and avoiding use as alternative daily cover
- Vibratory Screen (Wood): To separate out wood

These types of facilities usually recover between 70 and 80 percent of the material they process. The optimal capacity is in the range of 300 tpd per infeed line. The C&D processing equipment has an estimated useful operating life of 10 to 15 years, as these facilities operate under difficult conditions. Many C&D facilities are retrofitted throughout their life with new processing equipment as needed.

³ https://www.epa.gov/sites/production/files/2016-11/documents/shc_3.63_poster_39.pdf

Table 7-1. C&D Processing Facility Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

7.1 Facility Needs

The facility requirements and potential disposal cost impacts of a C&D processing facility are shown in Table 7-2 and Table 7-3, respectively.

Table 7-2. Facility Requirements for C&D Processing Facility

Method	Feedstock	Building Size (SF)	Capacity (tons)	Land Area (acres)
C&D Processing – Initial Phase	C&D Materials	55,000	90,000	10
C&D Processing – Total Build-Out	C&D Materials	225,000	200,000	18

Based on the assumption that the initial facility would capture 70 percent of the C&D materials, it is estimated that between 90,000 and 200,000 tons per year could be processed at a centrally located C&D facility.

Size of Facility – The initial facility would have a building area in the range of 55,000 square feet and the total build-out facility would have a building area of 225,000 square feet.

Land Area –The initial facility would require 10 acres, but as the quantity increases, the total build-out would need 18 acres.

Capacity of Facility – C&D facilities are economical when operating in the range of 50 to 74 tph for at least one shift per day.

Process Components – Components include conveyors, screens, sorting platforms, and related systems. See description above.

Number/Size of Facility(s) needed by 2050 – One facility would be needed by 2050.

Table 7-3. Private Infrastructure Available for Disposal or Processing of C&D

Facility Name	2016 Tip Fee (Per Ton) ¹
North Weld Landfill	\$40.00
Front Range Landfill	\$53.00
Denver Regional Landfill	\$53.00
Buffalo Ridge Landfill	\$37.00
Hageman's Earth Cycle, Inc.	Car: \$6.50; SUV, Van, Small Truck: \$8.25; Full Size Truck: \$10.25; Sod/Soil and Dirty Rock: \$7.50/CY
A-1 Organics (Eaton)	Stumps \$8/CY Unsorted wood \$9/CY Sod/soil:\$8/CY
A-1 Organics Keenesburg (Rattler Ridge)	Not provided on A1 site; assumed same as Eaton
Western Disposal Services (5880 Butte Mill Rd, Boulder, CO)	Construction trash/wood: \$115/ton Heavy Construction debris (shingles, compacted loads): \$162/ton

¹ Tip fees at private landfills are open to negotiation based on tonnage volume.

7.2 Financial Impacts

The estimated financial impacts for implementing a C&D processing facility are depicted in Table 7-4 through Table 7-8. The costs are based on the equipment and site development cost of several reference facilities, most of which are privately owned, which were scaled up or down based on a ratio of the annual throughput tonnages. Revenues for the C&D facility are modeled as \$10.50 per ton for all recovered tons. Recycled concrete can be sold for Class 2 or 3 aggregate/road base material, metals of various types (steel, aluminum, copper, stainless steel, etc.) have commodity values corresponding to their quality, chipped wood can be sold to biomass facilities, etc. In 2017, Larimer County contracted with a company to crush source separated concrete and asphalt at the Larimer County Landfill at a cost of \$7.75 per ton. To derive a more accurate value for revenues, an analysis of the quantities for each of the key recyclables would need to be developed. Residuals from the C&D facility were estimated to be 30 percent of the incoming tonnage, and the residual wastes from the facility are assumed to be transported and disposed of at the landfill for \$30.59 per ton. This amount is divided by the total tons arriving to yield the cost per ton illustrated in Table 7-7 and Table 7-8.

Table 7-4. C&D Processing Capital Cost Estimate Summary

Description	Features	Initial Phase	Total Build-Out
Facilities	Entrance scales, maneuvering and unloading area, materials staging area, utilities, power, post-processed staging and materials storage/load-out areas	\$5,836,000	\$9,855,000
Processing Equipment	Processing equipment, in-feed conveyors, screens, sorting lines, magnets, wood grinding equipment, metals processing equipment	\$3,887,000	\$7,774,000
Subtotal Costs		\$9,723,000	\$17,629,000
Contingency (25%)		\$2,431,000	\$4,407,000
Soft Costs (16%)	Design, Permitting, Construction Period/CM/CQA	\$1,556,000	\$2,821,000
Total		\$13,710,000	\$24,857,000
Annual Capital Cost (15 years, 4% interest)		\$1,295,000	\$2,247,000

Table 7-5. C&D Processing Operational Cost Estimate Summary (Initial Phase)

Item	Description	Annual Estimated Costs
Personnel	28 FTE	\$1,689,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$704,000
Out sourced services	Asphalt and concrete grinding	\$53,000
O&M Costs		\$2,446,000
Contingency (10%)		\$245,000
Total Annual Operational Costs		\$2,690,000

Table 7-6. C&D Processing Operational Cost Estimate Summary (Total Build-Out)

Item	Description	Annual Estimated Costs
Personnel	55 FTE	\$3,320,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc. electricity, water, sewer, gas, phones	\$1,562,000
Out sourced services	Asphalt and concrete grinding	\$118,000
Subtotal O&M Costs		\$5,000,000
Contingency (10%)		\$50,000
Total Annual Operational Costs		\$5,050,000

Table 7-7. C&D Processing Infrastructure Option, Summary of Costs,¹ Initial Phase (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$13,710,000	\$1,295,000	\$14.26
O&M Costs		\$2,690,000	\$29.64
Residuals Haul Costs & Disposal		\$833,000	\$9.18
Revenues		\$(953,000)	\$(10.50)
Net Overall Cost	\$13,710,000	\$3,864,000	\$43

¹ Cost estimates are conceptual.

Table 7-8. C&D Processing Infrastructure Option, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$24,856,000	\$2,347,000	\$11.64
O&M Costs		\$5,050,000	\$25.04
Residuals Haul Costs & Disposal		\$1,850,000	\$9.18
Revenues		\$(2,117,000)	\$(10.50)
Net Overall Cost	\$24,856,000	\$7,130,000	\$35

¹ Cost estimates are conceptual.

7.3 Programmatic Impacts

Impacts of a C&D processing facility would include:

- C&D processing facilities are predominantly developed by private sector entities seeking to make a profit on the commodities recovered compared to the tipping fees. While this may not always be the case, some C&D facilities have been developed to meet landfill diversion goals and public sector waste reduction and recycling mandates.
- Local and regional requirements may be required for the issuance of building permits and/or demolition permits for contractors regarding processing of construction materials.
- A C&D processing facility would divert construction-related materials from the landfill, which would extend the life of the landfills, resulting in a reduction in revenues from tipping fees, which may affect the landfill economics and the programs funded by them.

- A new C&D processing facility in Larimer County could reduce the travel distances required for material to go to the existing out-of-county facilities, making it easier to track material and provide a potential revenue source.
- May attract material from beyond the Wasteshed.

7.4 Regulatory, Administrative, and Permitting Requirements

As C&D waste is considered an industrial waste under 6 CCR 1007-2 Part 1, the regulation of C&D processing facilities is covered under Section 8.5, Industrial Recycling Operations. The facility must register with the CDPHE and submit a completed Recycling Facility Initial Registration Form. General Site Requirements for Industrial Recycling Operations are listed under Section 8.5.5 and include the following:

- An operations plan, which should demonstrate how the facility qualifies for CD exemption, and how it will operate to ensure it does not fall under the definition of a solid waste disposal site and facility. This includes a description of the types of recyclable materials managed and what methods the facility uses to prevent unauthorized traffic, receipt of unauthorized waste, and illegal dumping. It must also include a closure plan.
- If the operations will process liquid or leachable recyclable materials, the facility must have the design and operations plan approved by the CDPHE prior to receiving recyclable materials.
- After a 1-year accumulation period, recyclable materials that are recycled must account for at least 75 percent of the total weight or volume of recyclable materials received and currently in storage. This must be determined through a consistent measurement method that may include a 3-year rolling average.
 - An industrial recycling facility may apply for a commodity and site-specific variance to the accumulation period and/or the recycling rate, which must be approved by the CDPHE.

Industrial Recycling Facilities are required to submit a completed Recycling Facility Annual Reporting Form to the CDPHE by March 1 each year that covers the previous calendar year. The information reported includes incoming tonnage according to CDPHE material classifications, amount of each type recovered for recycling, outgoing tonnage by destination and material type, and amount of material remaining on site. Exemptions for confidential business information may be requested per § 24-72-204(3)(a)(IV), CRS.

Industrial Recycling Facilities must follow the closure requirements set in 6 CCR 1007-2 Section 8.5.7, which include giving the CDPHE written notice at least 60 calendar days before the closure date. After closure is initiated, all closure activities must be completed within 180 calendar days. Any material left on site after closure is complete will render the site a solid waste disposal site. Potential off-site odors, ground water contamination, and nuisance conditions must also be addressed. The final closure report is due to the CDPHE within 90 calendar days of closure completion.

7.5 Risks/Barriers

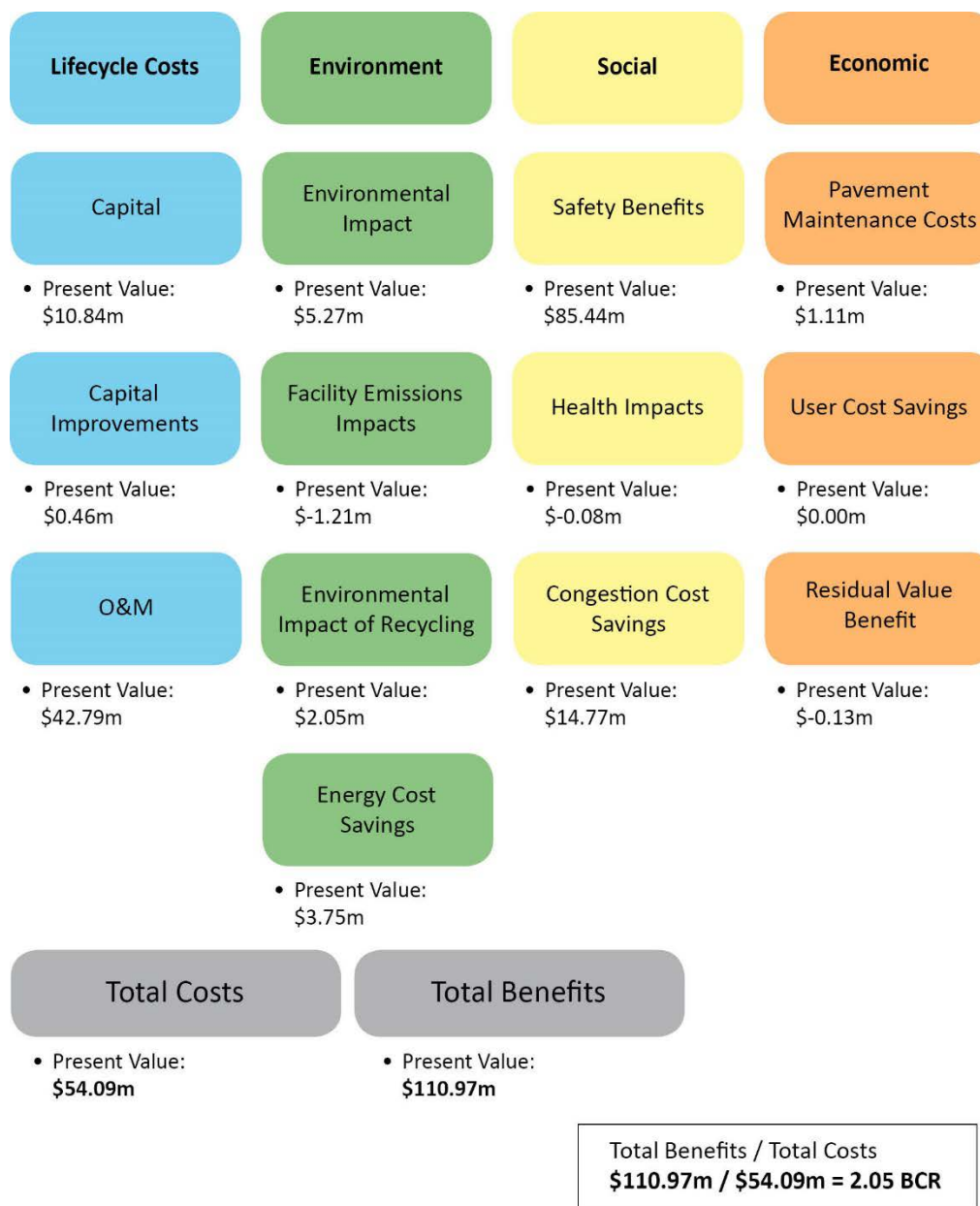
Risks and barriers to implementing a C&D processing facility include:

- Implementing local and regional recycling regulations on construction permits and demolition permits such as green building materials and certification programs to serve as market drivers.
- Establishment of local markets for recovered materials (shredded wood, biomass, aggregates, metals, dirt, gypsum) that support the cost of recovery.
- Having industrial zoned regions in relative proximity to where new construction/demolition is occurring.
- The variability of the construction industry providing feedstock.
- Potential challenges from contamination from unauthorized materials (lead paint, asbestos, and other hazardous materials).

7.6 Sustainable Return on Investment

The proposed C&D Processing Facility is anticipated to be located at approximately the same location as the existing Larimer County Landfill. An average distance of 15 miles (roundtrip) was used in the analysis to calculate vehicle-miles traveled for roll-off trucks. An average of 30 trucks daily was assumed for analysis. An average distance of 100 miles (roundtrip) was assumed for disposal of diverted solid waste not collected at the C&D facility. Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the C&D Waste Processing Facility was modeled and is depicted in the following figure.

Figure 7-1. C & D Processing Facility Sustainability Benefit Factors



Some of the C&D Processing Facility findings include:

- The projected tonnage captured at the C&D facility is 90,000 and 200,000 tons in 2025 and 2050, respectively. It is anticipated that the C&D facility would capture an additional 50 percent over the projected tonnage. C&D materials would be captured at the processing facility.
- The O&M costs associated with the C&D processing facility include annual operations and transfer haul costs totaling \$3.5 million annually. It is anticipated that a \$1.0 million capital improvement investment will be made after 12 years.

- The SROI analysis compares the C&D processing facility to the Base Case. With a 4 percent discount rate, a \$54.1 million investment would result in \$111.0 million in total benefits and a benefit-cost ratio of 2.05.

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8 Energy from Waste Facility - Direct Combustion

Direct combustion of waste, referred to as waste-to-energy (WTE) or energy from waste, involves the complete oxidation of a fuel by combustion under controlled conditions. The heat generated from the combustion process is recovered in a boiler to generate steam, which can be used directly for heating/industrial purposes or passed through a steam turbine-generator to create electricity. Figure 8-1 shows an example of an approximately 1,260 tpd direct combustion facility, the Lee County Facility in Fort Myers, Florida.

There are several types of boilers used in direct combustion technologies; the most popular include (1) mass burn with a grate system, (2) stoker-fired, and (3) fluidized bed. Mass burn technology has been the standard for many years, as it does not require much, if any, front-end processing and is the basis for discussion in this section. The Lee County Facility referenced above uses a mass burn technology. Both the stoker-fired and fluidized bed systems require pre-processing of the waste and operate with prepared refuse-derived fuel (RDF), which is discussed later in this report.

Figure 8-1. Aerial View of Lee County WTE Facility in Fort Myers, Florida



The larger Mass Burn Combustion processes with waterwall boilers are sized at 100 to about 1,000 tpd per processing train. MSW is fed directly into a combustion system with an integral boiler with little to no pre-processing other than the removal of large bulky items such as furniture and white goods.

An ash residue consisting of combined fly ash and bottom ash is generated from combustion. Ferrous and nonferrous metals can be recovered from the ash. Most direct combustion facilities in the U.S. combine the fly and bottom ash to meet the requirements for it to be classified as a nonhazardous material to be landfilled in Class III landfills, usually in a monofill, which was assumed for this analysis.

Table 8-1 indicates whether Energy from Waste Facility Direct Combustion would achieve the goals and objectives.

Table 8-1. Energy from Waste Facility Direct Combustion Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	No ²
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

² While it may be possible to permit, finance, construct, and commission a new direct combustion facility by 2025, most projects require about 10 years from concept to commissioning.

8.1 Facility Needs

The facility requirements of Energy from Waste Direct Combustion are shown in Table 8-2.

Table 8-2. Facility Requirements for Energy from Waste Facility Direct Combustion

Method	Feedstock	Building Size (SF)	Capacity (tpy)	Land Area (acres)
Direct Combustion - Initial Facility	MSW	84,000	263,000	7
Direct Combustion - Long Term Facility (2050)	MSW	101,000	425,000	11

The post-recycling available tonnage is potentially 263,000 tpy in 2014 and the potential tonnage in 2050 would be about 425,000 tpy. Modern facilities have a capacity factor of about 90 percent. Based upon the initial needs and growth projections, an initial facility size would include two 430 tpd units and one turbine generator which could be arranged to allow for future expansion in order to add an additional processing unit and turbine generator. A turbine generator set could be sized for the future expanded facility and would reduce future capital requirements, but increase initial cost and result in a slightly lower initial efficiency.

Often, public-private partnerships are developed for direct combustion facilities. Larimer County could own the facility to maintain more control or allow a private contractor to own and operate the facility. Normally, a 20- to 25-year contract is signed.

Within a few years of commissioning, the region will begin to generate more waste than the initial facility can process. About every 5 years, growth projections should be reviewed to determine whether the expansion is warranted. Under the current growth projections, the additional processing unit would be utilized at near capacity in about 25 to 27 years. This happens to be about the time the contract renewal would occur, which would be an ideal time for expansion.

Process Components

The initial facility design would include two complete processing trains and a single turbine generator for electrical production. The facility would consist of a complete system including, but not limited to:

- On-site queuing
- Scales and scale house
- Tipping floor designed to receive transfer trailers and packer trucks
- Waste storage pit and redundant cranes designed for 5 days of storage for the expanded facility
- Fire detection and protection systems and equipment
- Steam turbine generator
- Water treatment and makeup systems
- Auxiliary fuel and burner systems
- Air-cooled condenser, with associated pumps, piping, and controls
- Ash-handling facility (monofill)
- Ferrous recovery equipment
- Nonferrous recovery equipment
- Reagent receiving and preparation systems
- Air compressors
- Control room and personnel facilities
- Two processing trains, each containing:
 - Feed chute, stoker and reciprocating mass burn grate system
 - Furnace and integral multipass waterwall boiler
 - Superheater, evaporator, and economizer tube bundles
 - Spray dryer absorber or quench reactor
 - Fabric filter

- Fans
 - Stack
- Continuous emission monitoring system
- Combustion control system
- Nitrogen oxides control system
- Mercury/Dioxin control system (Powdered Activated Carbon Injection System)

Number/Size of Facility(s) needed by 2050

The potential tonnage in 2050 would be about 425,000 tpy. An additional 340 tpd processing train and turbine generator would be required to process this tonnage.

Private Infrastructure Available

At the present time, there are no other direct combustion facilities in the region. A local utility was contacted for some initial information regarding potential interconnection, power prices, and contractual arrangements.

8.2 Financial Impacts

The estimated financial impacts for implementing the Energy from Waste Facility Direct Combustion option are shown in Table 8-3 through Table 8-5.

The residuals from the facility consist of ash and residue remaining after the combustion process is complete. After metal recovery, the remaining ash and residue is transported to the landfill for disposal.

Sources of revenue from the operation of the Energy from Waste Facility include electrical power production and metals recovery revenue. Electrical power produced by the facility would be sold to the local utility. An Energy from Waste Facility can produce about 650 kWh per ton of waste processed net of electrical power consumed by the facility. Discussions with a local utility indicated that the expected price per kWh of electricity is about \$0.025 per kWh produced.

Both magnetic ferrous and non-ferrous metal can be recovered from the ash and residue produced by the facility. A recovery rate of about 3.5% ferrous and 0.4% non-ferrous metal based on the waste processed can be recovered. The metals are sold to recyclers at market rate. For this analysis \$180 per ton of ferrous and \$1,200 per ton of non-ferrous were assumed.

Table 8-3. Energy from Waste Facility Direct Combustion Capital Cost Estimate Summary

Description	Features	Initial Phase	Total Build-Out
Site Work	Access roads, scales, scale house, utilities	\$3,098,000	\$4,868,000
Facilities	Equipment Installation & Commissioning	\$227,616,000	\$311,044,000
Subtotal Costs		\$230,714,000	\$315,912,000
Contingency (25%)		\$57,678,000	\$78,978,000
Soft Costs (11%)	(Design, CM, Permitting, CQA)	\$25,379,000	\$34,750,000
Total		\$313,771,000	\$429,640,000
Annual Capital Cost (20 years, 4% interest)		\$24,242,000	\$33,194,000

Table 8-4. Energy from Waste Facility Direct Combustion Operational Cost Estimate Summary (Total Build-Out)

Item	Description	Annual Estimated Costs
Personnel	50 FTE	\$5,183,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$14,801,000
Subtotal O&M Costs		\$19,984,000
Contingency (10%)		\$1,998,000
Total Annual Operational Costs		\$21,982,000

Table 8-5. Energy from Waste Facility Direct Combustion Infrastructure Option, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton
Facility	\$429,640,000	\$33,194,000	\$78
O&M Costs		\$21,982,000	\$52
Residuals Haul Costs & Disposal		\$3,249,000	\$8
Revenues		\$(11,618,000)	\$(27)
Net Overall Cost	\$429,640,000	\$46,808,000	\$110

¹ Cost estimates are conceptual.

8.3 Programmatic Impacts

Impacts of processing municipal solid waste in a direct combustion facility would include:

- There would be a decrease in the tons of waste disposed of at landfills, thus extending the life of landfills.

- Ash, spent reagents, and a small quantity of non-processable materials would still require disposal. Ash and spent reagents are about 30 percent of the processed tonnage by weight and only about 10 percent by volume. A landfill life can be increased by a factor of 10 with direct combustion. Ash and spent reagents are often placed in a monofill.
- The costs for the facility would impact the budgets; however, new revenue may be generated from the production of electricity and recovery of metals, which can help offset some of the project costs.
- Opportunities for public-private partnerships would exist and, depending on whether the County or a private operator is used, employment could also increase. Most facilities in the U.S. are operated by private operators, but a facility could be operated by the County or a local utility.

8.4 Regulatory, Administrative, and Permitting Requirements

8.4.1 Summary of Federal Regulations

Facilities combusting municipal solid waste are subject to 40 CFR 60 Section 129 for municipal waste combustors. A specific MACT rule has been developed that would require certain emission limits, operating requirements, reporting requirements, and other provisions that would need to be followed. The facility would need to comply with NSPS provisions found in 40 CFR Part 60, Subpart Eb. The facility would also need to obtain a Title V operating permit.

8.4.2 Summary of State of Colorado Solid Waste Regulations

Direct combustion facilities are considered solid waste incineration facilities under the CDPHE regulations pertaining to General Requirements and Information Concerning all Solid Waste Disposal Sites and Facilities in the State of Colorado in Section 6 CCR 1007-2. Incineration Facilities and any privately operated Solid Waste-to-Energy facilities not contracted to a county and/or municipality are subject to Section 11. Any Solid Waste-to-Energy incineration facilities that are sited and operated by a county and/or municipality are regulated under 6 CCR 1007-4, which was promulgated pursuant to the Solid Waste-to-Energy Incineration Systems Act.

Although the application and approval processes are different, the regulations governing the operating types of solid waste incineration facilities have many similarities. For example, the design, construction, operation, and monitoring of all solid waste incineration facilities must be in compliance with all applicable requirements of the Colorado Air Pollution Prevention and Control Act, §§ 25-7-101 to 610, CRS, its implementing regulations promulgated by the Air Quality Control Commission, 5 CCR 1001-1 to 22, and with all State and local water quality control regulations and sewer district requirements. Routine reporting is done on a quarterly basis to the CDPHE and the local governing body having jurisdiction. Upset conditions and corrective actions taken must be reported within 1 business day of occurrence.

No solid waste incineration facilities may accept any hazardous wastes. Specific approval for any special wastes received must be granted by the Hazardous Materials and Waste Management Division and the Air Pollution Control Division. Asbestos must be handled and disposed of according to Section 5 of the Colorado Regulations pertaining to Solid Waste Disposal Sites and Facilities.

6 CCR 1007-2 Section 11, Privately Operated Solid Waste to Energy Facilities

Privately operated solid waste-to-energy facilities located in the unincorporated portion of any county and not under contract to a county and/or municipality must obtain a CD from the board of county commissioners.

Solid waste incineration facilities must have an engineering design and operations report with the minimum requirements set in Section 11.2. In addition, the facility must submit a Facility Operating Plan with its application. Schedule requirements for notifying the CDPHE and general public of start-up and closure are found in Section 11.3. Section 11.4 covers what records are to be maintained at the facility and made available to the CDPHE and the local governing body having jurisdiction.

Requirements for the management of residual ash from solid waste incineration facilities are covered under Section 11.5. The residual ash must be either beneficially used or reused (as defined in paragraph 11.5.5), or disposed of in accordance with all applicable Solid Waste Disposal Sites and Facilities Act regulations (see 6 CCR 1007-2 Section 6, Incinerator Ash Disposal Sites and Facilities).

6 CCR 1007-4, Solid Waste-to-Energy Incineration Systems Act, Publicly Sited and Operated Solid Waste to Energy Facilities

The regulations in 6 CCR 1007-4 were promulgated pursuant to the Solid Waste-to-Energy Incineration Systems Act. Solid waste-to-energy facilities sited and operated by a county or municipality separately or according to an intergovernmental agreement must obtain a State Certificate of Approval from the CDPHE, Hazardous Materials and Waste Management Division. The certificate is awarded upon review of a completed solid waste-to-energy facility application, and does not relieve the applicant of obligations to comply with requirements from other public agencies, such as the Air Pollution Control Division, the Water Quality Control Division, and local government permitting and zoning authorities. Substantial changes in operation require an amended Certificate of Approval. Compliance waivers for the regulations found in the Solid Waste-to-Energy Incineration Systems Act may be approved by the CDPHE if certain conditions are met.

The application package should contain an engineering design and operations report that meets the requirements of 6 CCR 1007-4, Sections 2.1 through 3.1.4, as well as a description of the local review process that includes a projected schedule. In addition, the facility must submit a Facility Operating Plan with its application, in compliance with the requirements of Section 3.1.4. Operating requirements, including schedule requirements for notifying the CDPHE and general public of start-up and closure, are detailed in Section 4. Section 5 covers what records are to be maintained at the facility and made available to the CDPHE and the local governing body having jurisdiction.

Requirements for the management of residual ash from solid waste incineration facilities are covered under Section 6. The residual ash must either be beneficially used or reused (as defined in paragraph 6.1.5), or disposed of in accordance with all applicable Solid Waste Disposal Sites and Facilities Act regulations (see 6 CCR 1007-2 Section 6, Incinerator Ash Disposal Sites and Facilities).

8.5 Risks/Barriers

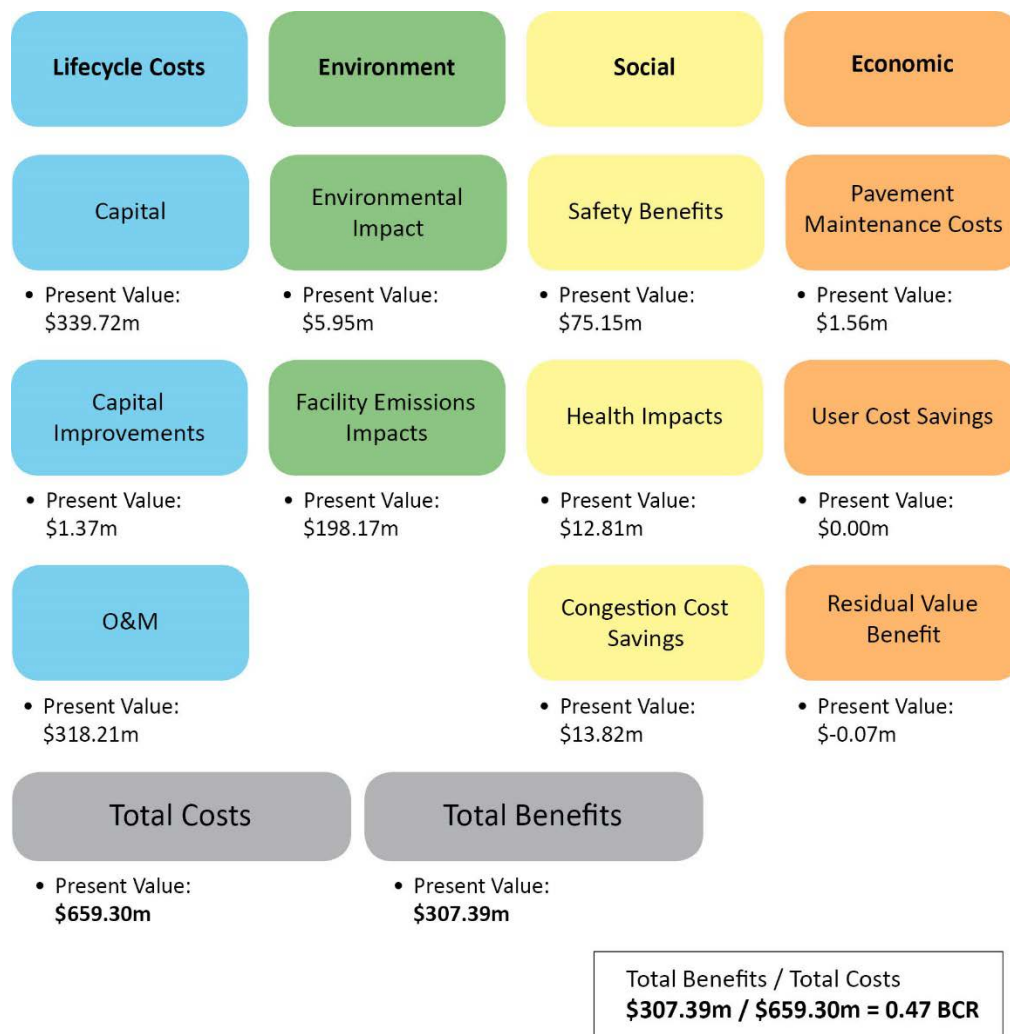
Risks and barriers for implementing a direct combustion facility include:

- The capital and operating costs for a direct combustion facility are greater than the costs of landfilling the waste and other disposal options.
- A facility will require negotiation of a Power Purchase Agreement (PPA) for supply of the power to a utility. While one or more local utilities may be willing to consider such a program, or an agreement could be reached subject to Public Utility Regulatory Policies Act requirements, electric rates in the area are quite low, negatively impacting economics. There is very low likelihood that electric rates will drop below current levels. Economics for direct combustion are highly dependent on electrical power revenues.
- Energy from Waste Facility Direct Combustion often receives significant opposition and requires significant commitment on behalf of the local community and various stakeholders. Opposition to direct combustion projects comes from many different angles, although in certain communities, states, and countries, acceptance of the technology and method of solid waste management is well received.
- Permitting a waste combustion facility is a long and arduous process. Typical timelines often anticipate about 10 years from initial concept to a commissioned facility.
- Extensive financing is necessary for the facility.
- Identifying a facility site location on suitable land with reasonable access to transportation corridors, proximity to the population centers and power interconnection point, and utilities to support the facility can be difficult.
- As for all solid waste facilities issues such as odor management, vectors, litter, dust, traffic, and noise must be addressed for neighboring properties.
- Annual waste tonnage is normally guaranteed by the municipality for an Energy from Waste Facility. The facility operator needs to combust at least this quantity of waste to generate the necessary facility revenues. If the guaranteed tonnage is not supplied to the facility, normally the municipality will need to pay for lost revenue. An example of a situation where this has occurred is for the H-POWER Facility in Kapolei, Hawaii. The H-POWER Facility is sized to combust all the post-recycling waste for the Island of Oahu. The island location means that an economic slowdown reducing the island's waste production will result in a waste shortfall that is difficult to make up. Other potential situations can occur when the waste throughput is not guaranteed or not available.

8.6 Sustainable Return on Investment

The proposed Energy from Waste Facility (direct combustion) is anticipated to be located at approximately the same location as the existing Larimer County Landfill. An average distance of 15 miles (roundtrip) was used in the analysis to calculate vehicle-miles traveled for waste trucks and automobiles. Fifty-five (55) waste trucks and 489 “mom & pop” customers were assumed daily for analysis. Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the Energy from Waste Facility – Direct Combustion was modeled and is depicted in the following figure.

Figure 8-2. Energy from Waste Direct Combustion Facility Sustainability Benefit Factors



Some of the Energy from Waste Direct Combustion findings include:

- The O&M costs associated with the energy from waste facility include annual operations and hauling costs totaling \$26.2 million annually. It is anticipated that a \$3.0 million capital improvement will be made after 12 years.

- The SROI analysis compares the energy from waste facility to the Base Case. With a 4 percent discount rate, a \$659.3 million investment would result in \$307.4 million in total benefits and a benefit-cost ratio of 0.47.

9 Mixed Waste Processing (Dirty MRF)

There are a number of types of MRFs in operation in the U.S. and around the world. Most can be classified into two groups: (1) those that accept source separated recyclables, sometimes referred to as “clean” MRFs, and (2) those that take mixed MSW, also referred to as a “Dirty” MRF, and process these materials to recover recyclables and reusable materials, leaving the residual waste for landfill, or another appropriate waste reduction application. This section describes the latter technology, a Dirty MRF (Dirty MRF) that handles mixed solid waste materials.

A Dirty MRF diverts recyclables from a landfill, the preparation of feedstock for thermal, chemical, or biological processes. Some of the commodities recovered from a Dirty MRF will be more contaminated than those recovered from a “clean” MRF.

Table 9-1. Mixed Waste Processing (Dirty MRF) Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

9.1 Facility Needs

The facility requirements of Mixed Waste Processing are shown in Table 9-2.

Table 9-2. Facility Requirements for Dirty MRF

Method	Feedstock	Building Size (SF)	Capacity (tons)	Land Area (acres)
Dirty MRF - Initial Phase	MSW	83,000	143,000	7
Dirty MRF - Total Build-Out	MSW	130,000	212,000	10

A Dirty MRF processing the throughput rate above will require a site size of 7 to 10 acres. The facility would include entrance and exit scales, maneuvering areas, and a receiving/tipping floor with ample storage capacity for peak loads, processing equipment, bale storage for recovered materials, load-out of residues, and other items. An administration area would be needed for worker break rooms, restrooms, and

administrative offices. Parking areas would be needed for facility operators and administration.

Assuming a capture rate of 50 percent of the MSW from the Wasteshed and using the projected 2030 and 2050 quantities for the initial and total build-out facilities, respectively, the initial Dirty MRF would process 143,000 tpy and the total build-out Dirty MRF would process 212,000 tons per year.

Process Components

A Dirty MRF will consist of a receiving area, processing area, recovered materials staging area, and load-out area. The receiving area consists of a covered tipping floor and storage area sized to accommodate about 2 days of processing needs. An infeed conveyor is provided allowing a front-end loader to feed material to the processing line.

The processing area is where the feedstock is separated into commodities. Most processing systems today continue to move toward higher technology solutions as a means of cutting labor costs. A presort area is needed to remove items that could damage downstream equipment, are oversized, and otherwise should be removed from the line. This includes scrap metal and bulky plastics. These steps are completed manually by two to six sorters picking target materials from a horizontal presort conveyor.

Rotating screens are commonly used in Dirty MRFs to open bags to liberate their contents and to separate large materials from smaller. Following the rotating screens, the larger items are typically manually sorted to extract higher value materials such as cardboard. The mid-sized and unders from the screen are typically directed to individual processing lines where either manual or mechanical systems extract plastics, metals, tin, and other commodities.

Commodities are temporarily stored in a variety of bins, cages, bunkers, and roll-off containers, depending on the material and facility needs. Fiber products are generally stored in large live-bottom bins. Containers may be stored in expanded metal cages or silos or may be placed in live-bottom bins. Scrap metal is often loaded directly into roll-off containers, ready to ship to market. Glass often is stored in concrete bunkers for loading into trucks for transport, but may be stored in silos or loaded directly into roll-off bins. Other arrangements can be provided, depending on mill and facility needs.

Number/Size of Facility(s) needed by 2050

A single centrally located facility equipped with a single processing line will meet initial needs with some room for growth. The technology for a Dirty MRF is also rapidly changing as the materials change and technology advances. Equipment generally requires some updating after about 5 years and may require replacement after about 10 years. These requirements allow for upgrading the processing system, assuming the processing line is arranged to accommodate the new equipment designs. Thus, while requiring an ongoing investment, a facility is able to remain current with changes in commodities and material splits. As investment is needed, a review of overall system needs can occur, and when another processing line is needed, a second site or line can be added.



Private Infrastructure Available

No Dirty MRFs are currently present in the region.

9.2 Financial Impacts

Table 9-3 through Table 9-8 provide a summary of the estimated cost of a Dirty MRF. One of the key differences of the economics of a Dirty MRF is the marketing of recovered materials. The presence of solid waste materials contaminates and reduces the value of some recyclables, such as cardboard, paper, and plastics due to lower quality materials. Consequently, the revenues from recovered materials from these facilities are lower than the revenues from a clean MRF. The costs of these facilities were based on the equipment and site development costs of Dirty MRF reference facilities, which were scaled up or down based on a ratio of the annual throughput tonnages. The processing equipment is the most expensive portion of the facility and consists of process components described in Facility Needs above. Mobile equipment purchase and maintenance is included in the Operations cost and reflects assumptions of a seven year operating life. The building and site related improvements are the second most expensive portion of the facility. A planning level contingency of 25% was included to account for unknown issues that may arise as the project evolves. Soft costs include environmental review, design, permitting, construction management and finance. Residues from the Dirty MRF were estimated to be 65 percent of processed tonnage, and are assumed to be transported and disposed of at the landfill for \$30.59 per ton. This amount is divided by the total tons arriving to yield the costs per ton illustrated in Table 9-7 and Table 9-8.

One of the key differences of a Dirty MRF compared to a Clean MRF is the quality and corresponding marketability of the recovered commodities. The presence of solid waste materials may affect the quality of the commodity (e.g., moisture from solid waste affecting paper and cardboard values) which can result in the operator receiving lower dollar values for some recyclables such as cardboard, paper, and plastics. Consequently, the revenues from recovered materials from a Dirty MRF are not as likely to affect the cost of the MWMRF and the MWMRF is more likely to be dependent on the tip fee as the revenue source for the facility. As described in the Clean MRF section, commodity prices are subject to variations in domestic and international commodity prices. This feasibility analysis estimated potential revenue from materials recovered by averaging commodity prices by using a blended rate of \$50 per ton for all recyclables, which is \$25 less per ton than used in the Clean MRF section above. The Chinese imposed 'Green Fence' policy in 2013 affected lower quality material sources more than the higher quality commodities. Although commodity prices have rebounded, China has announced new rules in 2018 that could affect recyclable materials quality and commodity pricing again. To test the sensitivity of commodity pricing, the effect of commodity prices dropping to \$25 per ton was considered. The resulting revenues illustrated on Table 9-7 and Table 9-8 would shift the cost of the Dirty MRF from \$56 and \$52 per ton to a cost of \$65 and \$61 per ton respectively.

The following tables provide the equipment, capital, and operating estimates for the Dirty MRF initial and total build-out facilities.

Table 9-3. Dirty MRF Mobile Equipment Cost Estimate

Equipment Type	Description	Initial Phase Estimated Costs	Total Build-Out Estimated Costs
Front End Loaders	New	\$900,000	\$1,800,000
Forklifts	New	\$400,000	\$600,000
Total Equipment Purchase Cost		\$1,300,000	\$2,400,000

Table 9-4. Dirty MRF Capital Cost Estimate Summary

Description	Features	Initial Phase	Total Build-Out
Facilities		\$13,102,000	\$17,561,000
Processing Equipment		\$20,353,000	\$25,777,000
Subtotal Costs		\$33,455,000	\$43,339,000
Contingency (25%)		\$8,364,000	\$10,835,000
Soft Costs (16%)	Design, Permitting, Construction Period/CM/CQA	\$5,353,000	\$6,934,000
Total		\$47,172,000	\$61,107,000
Annual Capital Cost (20 years, 4% interest)		\$3,645,000	\$4,721,000

Table 9-5. Dirty MRF Operational Cost Estimate Summary (Initial Phase)

Item	Description	Annual Estimated Costs
Personnel	60 FTE	\$3,101,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Repairs, maintenance, supplies, rental, fuel, legal, insurance, electricity, water, sewer, gas, phones	\$1,248,000
Subtotal O&M Costs		\$4,349,000
Contingency (10%)		\$435,000
Total Annual Operational Costs		\$4,784,000

Table 9-6. Dirty MRF Operational Cost Estimate Summary (Total Build-Out)

Item	Description	Annual Estimated Costs
Personnel	85 FTE	\$4,339,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Repairs, maintenance, supplies, rental, fuel, legal, insurance, electricity, water, sewer, gas, phones	\$1,944,000
Subtotal O&M Costs		\$6,283,000
Contingency (10%)		\$628,000
Total Annual Operational Costs		\$6,911,000

Table 9-7. Dirty MRF Infrastructure Option, Summary of Costs,¹ Initial Phase (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$47,172,000	\$3,645,000	\$25.41
O&M Costs		\$4,784,000	\$33.36
Residuals Haul Costs & Disposal		\$2,852,000	\$19.88
Revenues		\$(2,510,000)	\$(17.50)
Net Overall Cost	\$47,172,000	\$8,771,000	\$61

¹ Cost estimates are conceptual.

Table 9-8. Dirty MRF Infrastructure Option, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$61,107,000	\$4,721,000	\$22.23
O&M Costs		\$6,911,000	\$32.54
Residuals Haul Costs & Disposal		\$4,223,000	\$19.88
Revenues		\$(3,717,000)	\$(17.50)
Net Overall Cost	\$61,107,000	\$12,139,000	\$57

¹ Cost estimates are conceptual.

9.3 Programmatic Impacts

Impacts of a Dirty MRF would include:

- Recover recyclables that are otherwise landfilled, thus extending the life of the landfill.
- Reduce pressure on landfill resources.
- Increase solid waste system costs due to increased infrastructure and processing costs.
- Reduce the need for public education because recyclables can be left in the waste bin, no longer requiring source separation.
- Require an increase in residential and commercial waste service fees to offset the increased cost.

9.4 Regulatory, Administrative, and Permitting Requirements

9.4.1 Summary of State of Colorado Solid Waste Regulations

MRFs are regulated under 6 CCR 1007-2 Section 8.3. However, 6 CCR 1007-2 Section 8.3.4(D) states that intermediate processing facilities that accept recyclable material combined with municipal solid waste shall comply with all regulations in Section 7 regarding transfer stations. Please refer to Section 3.4 of this report for an overview of transfer station regulations.

9.4.2 Other Considerations

Some provisions for sorter and operator comfort, such as dust control, noise abatement, and heating, ventilation, and air conditioning may be required. Many facilities have climate-controlled sorting houses built within the building where most of the facility workers are normally stationed. Fire protection provisions to protect the building are compounded with the need to protect personnel and equipment. MRF fires can be devastating since many of the materials managed are highly combustible.

One benefit of the Dirty MRF is the reduced level of public education required, as compared to a clean MRF system. A potential disadvantage is that the citizen's in the Wasteshed could react negatively to not being required to sort recyclables as they have been doing for many years.

9.5 Risks/Barriers

Risks and barriers to employing a Dirty MRF include:

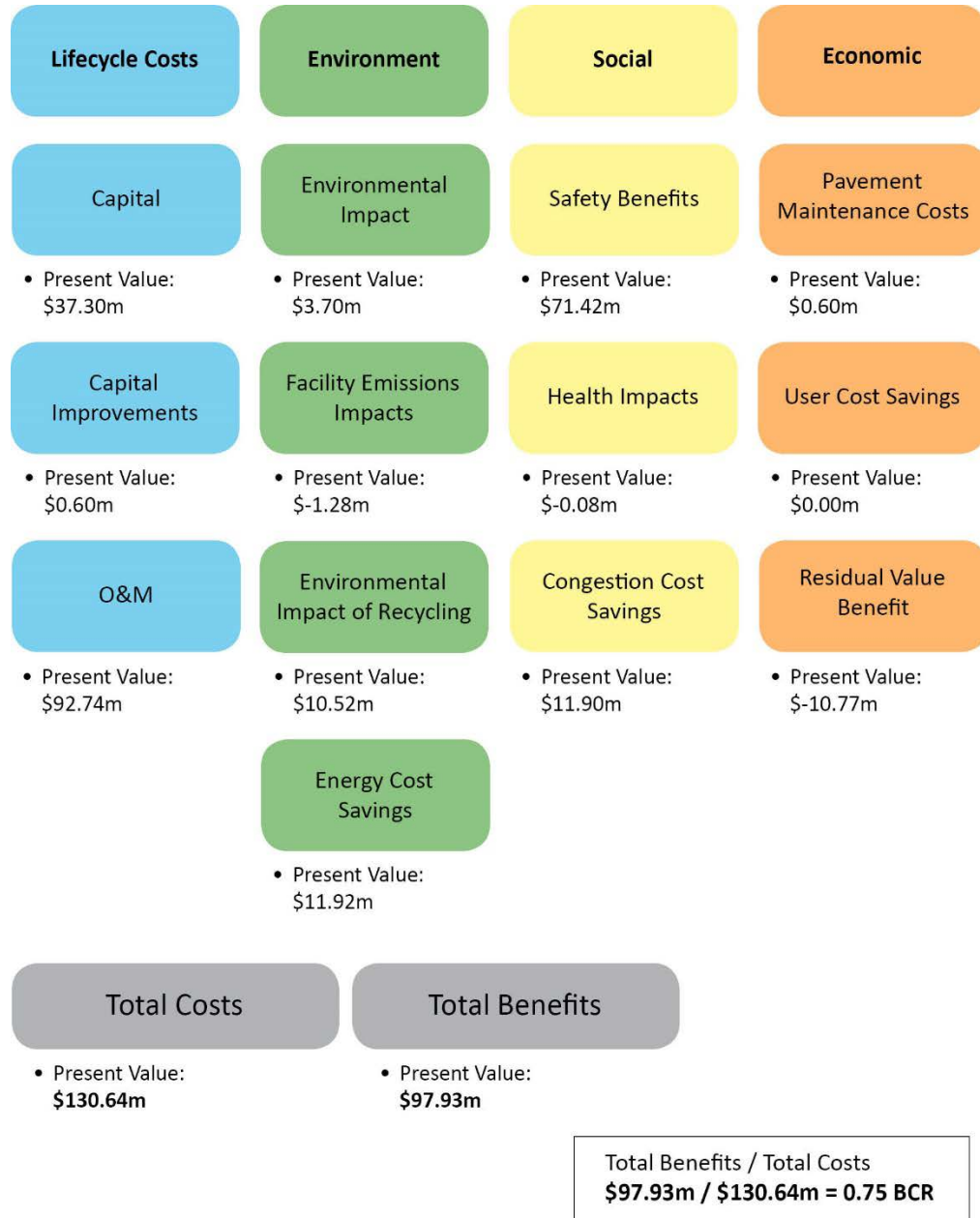
- The capital and operational costs of the facility. To mitigate these costs, communities typically employ flow control or mandatory collection to ensure capture of the Wasteshed's waste and its related revenues.
- The Dirty MRF is also subject to fluctuations of commodity pricing, but to a lesser degree than a clean MRF.
- Confusion among customers about material separation and the potential loss of credibility with the public, who are savvy to the fact that not separating materials cause them to be down-graded and worth less monetarily.
- The quality of the associated jobs in operating this type of facility are not consistent with the community's values and aspirations.

9.6 Sustainable Return on Investment

The proposed Dirty MRF is anticipated be located at approximately the same location as the existing Larimer County Landfill. An average distance of 15 miles (roundtrip) was used in the analysis to calculate vehicle-miles traveled for waste trucks and automobiles. Fifty-five (55) waste trucks and 489 "mom & pop" customers were assumed daily for analysis. An average distance of 100 miles (roundtrip) was assumed for disposal of diverted solid waste not collected at the Dirty MRF. Utilizing

this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the Dirty MRF was modeled and is depicted in the following figure.

Figure 9-1. Dirty MRF Facility Sustainability Benefit Factors



Some of the Dirty MRF findings include:

- Approximately 143,000 tons per year is anticipated to be received at the Dirty MRF initially and 212,000 tons per year by 2050. It is anticipated that the Dirty MRF would capture an additional 50 percent over the projected tonnage. Paper, plastic, glass and metal recyclables would be captured at the Mixed Waste MRF.

- The O&M costs associated with the Dirty MRF include annual operations and transfer haul costs totaling \$7.6 million annually. It is anticipated that a \$1.0 million capital improvement investment will be required after 5 years.
- The SROI analysis compares the Dirty MRF to the Base Case. With a 4 percent discount rate, a \$130.6 million investment would result in \$97.9 million in total benefits and a benefit-cost ratio of 0.75.

10 Aerobic Composting, Including Food Waste

Aerobic composting of feedstock that includes food waste is becoming more commonly performed using an aerated composting process. The addition of food waste to the composting process requires additional controls to ensure that the biological process remains aerobic to control odors. The aerated composting process refers to any of a number of systems used to biodegrade organic material without physical manipulation during primary composting. In Aerated Static Pile (ASP) composting technology, fresh air is forced into the pile to speed up the process and to ensure that the system remains aerobic. This method is suited to producing large volumes of compost in relatively smaller areas compared to turned windrow composting. The blended mixture is usually placed on perforated piping, providing air circulation for controlled aeration. It may be in windrows, open or covered, or in closed containers (in-vessel). The aerated composting process can occur in a variety of ways, including negative aeration (where air is drawn from the pile), positive aeration (where air is pushed into the pile), or respiring (where alternating negative and positive aeration is employed). This technology can be particularly odorous if the composting pile is allowed to have pockets of anaerobic activity. Figure 10-1 shows an example of aerobic composting using a forced ASP composting technology system.

In most facilities using the aerated compost process, a series of perforated pipes draws air down through the windrows to an air collection manifold that runs under the windrows. The compost-air can be drawn through the compost using a blower system, which then pushes the air through a biofilter that acts as an emission and odor control system. Alternatively, air can be injected into the windrows.

Additional odor control at the facility level can be achieved through enclosing all or part of the facility and treating building air with a biofilter as well. For comparative purposes, economics of enclosed aerated static pile composting have also been included.

Figure 10-1. Example of an Aerobic Composting Facility – Forced Aerated Static Pile



Table 10-1 indicates whether aerobic composting would achieve the goals and objectives.

Table 10-1. Aerobic Composting, Including Food Waste, Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

10.1 Facility Needs

The expected quantity of feedstock generated was estimated using the same process as described in the Yard Waste composting above. The material quantity estimates show 39,000 tons of yard waste currently recovered, which is estimated to increase to 70,000 tons in 2050. Assuming local residents and businesses add food waste to the yard waste program, a projected capture rate of between 15 percent (initially) and 35 percent (total build-out) of food waste is included in the ASP quantities below. The quantity of co-collected yard and food waste material that could be captured for processing is anticipated to be similar to yard waste, as discussed above. However, unlike yard waste alone, the addition of food waste is likely to be more attractive to participants with weekly waste collection service. Also, the allowance of compostable plastic bags can improve the attractiveness of the program.

Although participation rates of residents utilizing curbside collection of yard waste is typically high, the added food waste material could result in reduced participation levels similar to a source-separated organics program (see Section 11, Anaerobic Digestion, below). Therefore, the capture rates shown in Table 10-2 were used for planning purposes for co-collected yard/food waste composting based on the projected 2030 and 2050 quantities.

Table 10-2. Assumed Capture Rates for Combined Yard and Food Waste Organics

Material Type	Initial Phase	Total Build-Out
Combined Yard and Food Waste Available for Compost (Tons Per Year)	54,000	100,000

Number/Size of Facility(s) needed

Table 10-3 shows the size of the ASP composting facility for both the initial development and the total build-out (2050).

Table 10-3. Facility Requirements for Combined Yard and Food Waste

Method	Feedstock Type	Tons Per Year (tpy)	Area (acres)
Aerated Static Pile – Initial Phase	Food and yard waste	54,000	8
Aerated Static Pile – Total Build-Out	Food and yard waste	100,000	14
Enclosed Receiving and Preprocessing - Aerated Static Pile – Initial Phase	Food and yard waste	54,000	8
Enclosed Receiving through Initial Composting Aerated Static Pile – Total Build-Out	Food and yard waste	100,000	14

Private Infrastructure Available

Table 10-4 shows the privately owned composting or yard waste infrastructure in the region.

Table 10-4. Private Infrastructure Available for Combined Yard Waste and Food Waste

Facility Name	Facility Address	Miles from Fort Collins	Miles from Loveland	Miles from Estes Park
A-1 Organics (Rattler Ridge)	12002 County Road 59 Keenesburg, CO 80643	67	54	72

Compost facilities processing food waste and employing ASP composting require less land per throughput ton compared to turned windrow composting. The ASP employs condensed piles that complete the processing quicker than turned composting due to the elevated oxygen levels in the ASP system. Process components of an ASP composting system include:

- Waste receiving and unloading, typically in an enclosed building equipped with an air collection and treatment system
- Preprocessing, consisting of material visual screening for removal of undesirable materials such as packaging or items that could damage the grinder
- Grinding and mixing system
- Air manifold system to provide air to the compost material
- A pipe-on-grade composting bed as the aeration methodology
- Curing area
- Finished product storage, blending, and load out
- Leachate collection system

- Leachate treatment (aeration)
- Foul air treatment (biofilter)

10.2 Financial Impacts

10.2.1 Aerated Static Pile

The financial impacts of a combined yard and food waste compost facility using forced aeration illustrating the two ranges (initial and total build-out ranges as described above) of possible throughput capacity are illustrated in Table 10-5 through Table 10-10. The ASP cost model reflects a pipe-on-grade system as a cost saving measure compared to below-grade systems. Operations costs include the estimated cost of equipment, materials, and nine full-time personnel. The model reflects revenues of \$4 per ton for compost from food and yard waste mixtures. This is half of the estimated revenue of compost from yard waste only. The lower value is due to the potential for contaminants like film plastics and broken glass to make it into the finished product, thereby reducing its market value. Residuals removed during processing were estimated to be approximately one percent of incoming tonnage. The residual wastes from the facility are assumed to be transported and disposed of at the landfill for \$30.59 per ton. Residual disposal costs are developed from transfer station haul costs, and landfill disposal fees. Residual haul costs for yard and food waste composting may be higher due to the small volume of residual materials that are expected.

To offer a better understanding of the cost of enclosing composting, two variations of the ASP system are provided. The Partially Enclosed, Initial ASP costs reflect the cost of enclosing the receiving and pre-processing systems in building equipped with foul air treatment, but not the ASP composting process, based on the assumption the ASP would be a negative-air system only and all potentially odorous air would be collected and treated in the biofilter. As a contrast, the Fully Enclosed - Full Build-out ASP costs reflect an enclosed building for the receiving, preprocessing and ASP composting bed. The impact of these costs are evident in the summary costs per ton on Tables 10-9 and 10-10.

Table 10-5. Yard and Food Waste Organics Processing Facility Mobile Equipment Cost Estimate – Aerated Static Pile

Equipment Type	Description	Initial Phase Estimated Costs	Total Build-Out Estimated Costs
Front End Loaders	New	\$700,000	\$1,050,000
Aeration Equipment	New	\$400,000	\$800,000
Pre-sorting/contaminate removal	New	\$250,000	\$250,000
Grinder/Shredder	New	\$600,000	\$600,000
Screen Compost Finish	New	\$300,000	\$300,000
Finish Grinder	New	\$150,000	\$150,000
Conveyors	New	\$210,000	\$210,000
Total Equipment Purchase Cost		\$2,610,000	\$3,360,000

Table 10-6. ASP Composting Capital Cost Estimate Summary (pipe-on-grade)

Description	Features	ASP Initial Phase	ASP Total Build-Out
Facilities	Concrete surfaces such as the receiving, unloading area, grinding area, aerated compost floor, curing floor, final storage area, etc.	\$4,946,000	\$8,359,000
Processing Equipment	Grinder, fans, manifold, controllers, biofilter fans, etc.	\$2,610,000	\$3,360,000
Subtotal Costs		\$7,556,000	\$11,719,000
Contingency (25%)		\$1,889,000	\$2,930,000
Soft Costs (15%)	Design, CM, Permitting, CQA	\$1,134,000	\$1,758,000
Total		\$10,579,000	\$16,407,000
Annual Capital Cost (15 years, 4% interest)		\$1,047,000	\$1,623,000

Table 10-7. ASP Composting Operational Cost Estimate Summary – Initial Phase

Item	Description	Annual Estimated Costs
Personnel	9 FTE	\$515,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$756,000
Subtotal O&M Costs		\$1,271,000
Contingency (10%)		\$127,000
Total Annual Operational Costs		\$1,398,000

Table 10-8. ASP Composting Operational Cost Estimate Summary – Total Build-Out

Item	Description	Annual Estimated Costs
Personnel	11 FTE	\$723,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$1,275,000
Subtotal O&M Costs		\$1,997,000
Contingency (10%)		\$200,000
Total Annual Operational Costs		\$2,197,000

Table 10-9. ASP Composting Infrastructure Option, Summary of Costs,¹ Initial Phase (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$10,579,000	\$1,047,000	\$19.31
O&M Costs		\$1,399,000	\$25.80
Residuals Haul Costs & Disposal (included in O&M)		\$17,000	\$0.31
Revenues		\$(120,000)	\$(2.22)
Net Overall Cost	\$10,579,000	\$2,342,000	\$43

¹ Cost estimates are conceptual.

Table 10-10. ASP Composting Infrastructure Option, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$16,407,000	\$1,623,000	\$16.33
O&M Costs		\$2,198,000	\$22.11
Residuals Haul Costs & Disposal (included in O&M)		\$30,000	\$0.31
Revenues		\$(243,000)	\$(2.45)
Net Overall Cost	\$16,407,000	\$3,607,000	\$36

¹ Cost estimates are conceptual.

10.2.2 Enclosed Aerated Static Pile

HDR also reviewed documentation provided by BioCoTech Americas LLC regarding the 'BioSpeed Aerobic In-vessel technology' proposal provided to Fort Collins on June 16, 2017. The BioSpeed equipment is offered in four models, ranging from the #M1 with a daily throughput capacity of 235 pounds, to the #M18 with a daily capacity of up to 2 tpd. The equipment is described to employ a thermophilic process that completes the composting process in one to three days. The proposer assumed the most rapid cycle of 1 day when offering an array of 27 of the largest unit (#M18) to process 20,000 tons per year of food waste. The estimated capital cost of the array was \$10.5 million. Unfortunately, the operations cost was not provided, so HDR is not able to make a direct comparison to the other composting technologies. However, based on capital cost alone, the BioSpeed units would cost approximately \$60 per ton of throughput capacity prior to adding the cost of operations.

HDR also explored the use of an enclosed forced aeration composting facility using ASP, with two different extents of enclosure. The Initial Phase for Enclosed ASP is modeled as a building over the unloading/pre-processing area, leaving the ASP composting areas

outside, but using a negative air system with a biofilter for emissions control. The Total Build-Out is modeled with a building enclosing the full ASP area, not just the unloading/pre-processing area. Table 10-11 through Table 10-16 show the cost effects of enclosing the receiving area and primary composting phase of the process.

Table 10-11. Enclosed ASP Facility Mobile Equipment Cost Estimate

Equipment Type	Description	Initial Phase Estimated Costs	Total Build-Out Estimated Costs
Front End Loaders	New	\$700,000	\$1,050,000
Aeration Equipment	New	\$400,000	\$800,000
Pre-sorting/contaminate removal	New	\$250,000	\$250,000
Grinder/Shredder	New	\$600,000	\$600,000
Screen Compost Finish	New	\$300,000	\$300,000
Finish Grinder	New	\$150,000	\$150,000
Conveyors	New	\$210,000	\$210,000
Total Equipment Purchase Cost		\$2,610,000	\$3,360,000

Table 10-12. Enclosed ASP Capital Cost Estimate Summary

Description	Features	ASP Initial Phase (Partially Enclosed)	ASP Total Build-Out (Fully Enclosed)
Facilities	Concrete surfaces such as the receiving, unloading area, grinding area, aerated compost floor, curing floor, final storage area, etc.	\$8,295,000	\$34,425,000
Processing Equipment	Grinder, fans, manifold, controllers, biofilter fans, etc.	\$2,610,000	\$3,360,000
Subtotal Costs		\$10,905,000	\$37,785,000
Contingency (25%)		\$2,726,000	\$9,446,000
Soft Costs (15%)	Design, CM, Permitting, CQA	\$1,636,000	\$5,668,000
Total		\$15,267,000	\$52,899,000
Annual Capital Cost (15 years, 4% interest)		\$1,510,000	\$5,234,000

Table 10-13. Partially Enclosed ASP Composting Operational Cost Estimate Summary – Initial Phase

Item	Description	Annual Estimated Costs
Personnel	9 FTE	\$515,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$756,000
Subtotal O&M Costs		\$1,271,000
Contingency (10%)		\$127,000
Total Annual Operational Costs		\$1,398,000

Table 10-14. Fully Enclosed ASP Composting Operational Cost Estimate Summary – Total Build-Out

Item	Description	Annual Estimated Costs
Personnel	11 FTE	\$723,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$1,275,000
Subtotal O&M Costs		\$1,998,000
Contingency (10%)		\$200,000
Total Annual Operational Costs		\$2,198,000

Table 10-15. Partially Enclosed ASP Composting Infrastructure Option, Summary of Costs,¹ Initial Phase – Partially Enclosed (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$15,267,000	\$1,510,000	\$27.85
O&M Costs		\$1,399,000	\$25.80
Residuals Haul Costs & Disposal (included in O&M)		\$17,000	\$0.31
Revenues		\$(120,000)	\$(2.22)
Net Overall Cost²	\$15,267,000	\$2,805,000	\$52

¹ Cost estimates are conceptual.

² The Initial Phase for Enclosed ASP is modeled as a building over the unloading/pre-processing area, leaving the ASP composting areas outside, but using a negative air system with a biofilter for emissions control.

Table 10-16. Fully Enclosed ASP Composting Infrastructure Option, Summary of Costs,¹ Total Build-Out – Fully Enclosed (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton Processed
Facility	\$52,899,000	\$5,234,000	\$52.66
O&M Costs		\$2,197,000	\$22.11
Residuals Haul Costs & Disposal (included in O&M)		\$30,000	\$0.31
Revenues		\$(243,000)	\$(2.45)
Net Overall Cost²	\$52,899,000	\$7,218,000	\$73

¹ Cost estimates are conceptual.

² The Total Build-Out is modeled with a building enclosing the full ASP area, not just the unloading/pre-processing area.

10.3 Programmatic Impacts

The impacts of aerobic composting include:

- An increase in the amount of yard and food waste organics collected and composted that would result in a decrease in the tons disposed of at landfills, extending the life of the landfills.
- Reduces landfill tipping fees used to fund other programs.
- A reduction in the travel distances required for material to go to the existing out-of-county facilities reducing greenhouse gases and wear/tear on roads.
- Easier to track and a potential revenue source.

10.4 Regulatory, Administrative, and Permitting Requirements

Compost facilities are subject to the requirements of Section 14 of the Colorado Regulations Pertaining to Solid Waste Sites and Facilities, and must register with the CDPHE and submit an annual report each year.⁴ Yard waste organics are considered a Type 1 feedstock. Food waste in the form of source-separated organics, food residuals, or food processing vegetative wastes is considered a Type 2 feedstock. Any other type of food processing residual is considered a Type 3 feedstock. It is assumed that the food waste processed under this infrastructure option is only Type 2 feedstocks. A facility that processes only yard and food waste (and no manure) would fall under one of the following categories for permitting requirements:

- Conditionally Exempt Small Quantity Composting Facility: A compost facility with up to 100 CY of Type 1 feedstock and up to 5 CY of Type 2 feedstock on site or in process. If the material is composted in vessel, the compost facility may have up to 100 CY of Type 1 and up to 10 CY of Type 2 feedstock on site or in process.

⁴ <https://www.colorado.gov/pacific/cdphe/swforms>

- **Class 1 Composting Facility:** A compost facility with only source-separated organics and/or food residuals generated on site together with Type 1 feedstocks, manure, and greenwaste (known as “other compatible materials”), with the following limits:
 - A total volume of no greater than 5,000 CY of source-separated organics on site at any one time (finished qualified product does not count toward this total); and
 - A composting area of two (2) acres in size or less;
 - Or, the facility may be classified as Class 1 if composting occurs at the site of generation or on agriculturally zoned property owned by the generator using only agricultural waste generated on site together with other compatible materials, if the facility does not meet the general or conditional exemptions in the regulations.
- **Class III Composting Facility:** Any compost facility composting Type 1, Type 2, and/or Type 3 feedstocks or other materials approved by the CDPHE.⁵

The tonnages shown in Table 10-3 would likely equate to approximately 35,000 to 70,000 CY of material on site or in process at any time, depending on the density of the material and the percent capture rate of the program. Of this, approximately 10 to 20 percent of the volume would be food waste, meaning that approximately 3,500 to 14,000 CY of food waste could be on site at any time. It is likely that a new facility built for this infrastructure option would need to be permitted as a Class I or Class III composting facility.

In addition, permitting of solid waste sites and facilities is a joint effort between the local governing body with jurisdiction (county or municipality) and the CDPHE.

- There is no statewide application form for a solid waste CD. People proposing a facility should contact the local governing body that has jurisdiction where the proposed site is to be located.
- The State conducts a comprehensive technical review of applications for a CD as a solid waste site or facility to determine whether the location, design, and operating criteria of the proposed facility are protective of human health and the environment.
- Any technical conditions of approval are listed in the final report will be incorporated as requirements in the CD as issued by the local governing body with jurisdiction.
- In addition to solid waste landfills, CDs are generally required for waste impoundments, water treatment plant sludge disposal sites, medical waste treatment, storage and/or disposal facilities, composting facilities, and on-site disposal of regulated asbestos-contaminated soil.

10.5 Risks/Barriers

Risks and barriers to implementing a co-collected yard/green and food waste composting system include:

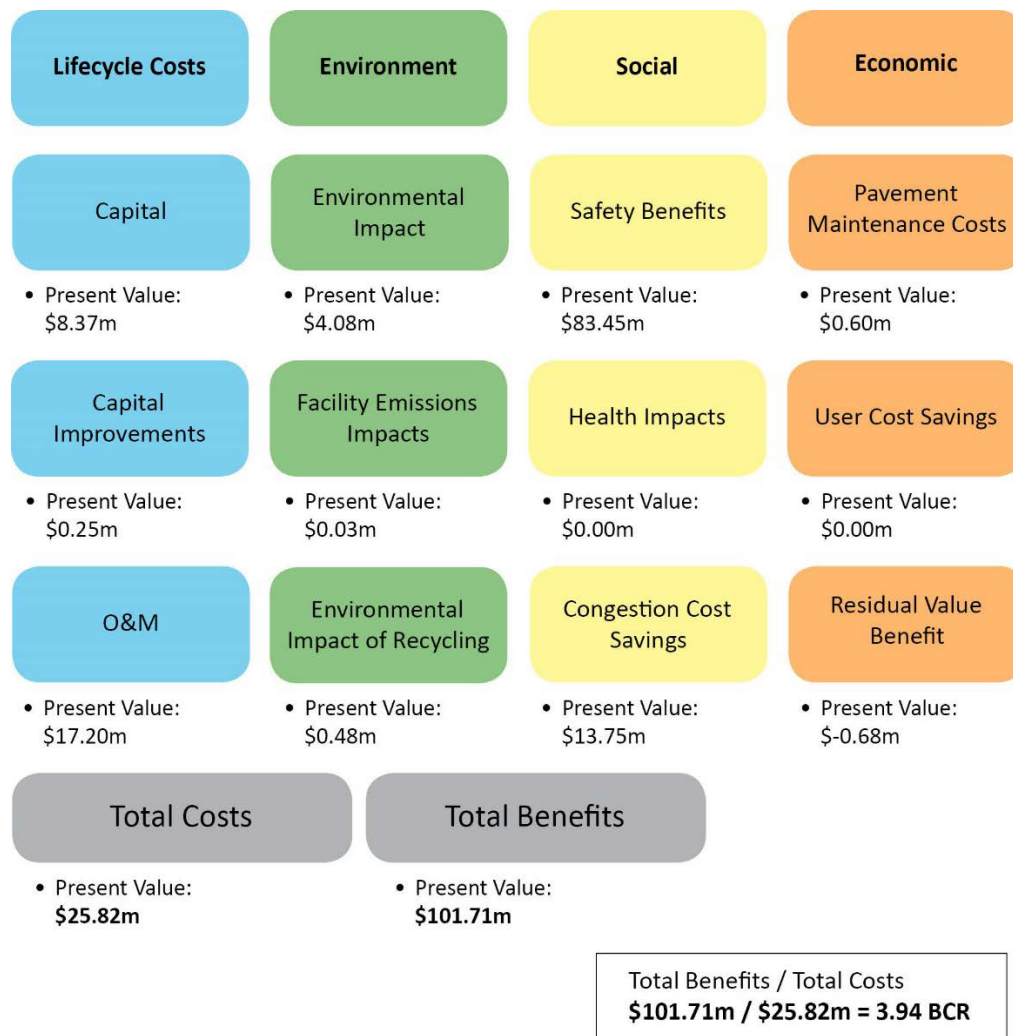
⁵ <https://www.colorado.gov/pacific/sites/default/files/Part%201%20eff%2004-14-17.pdf>

- Educating the generators of appropriate materials for the program so that the contamination levels of the feedstock are minimal. Contaminated feedstock material can be removed, but this increases the cost of the pre-processing effort and/or the effort of post-processing cured compost, as well as possibly reducing the market value of the finished compost material.
- Developing a market demand for compost.
- Identifying a facility site location on suitable land with reasonable access to transportation corridors, proximity to the communities providing the feedstock, and utilities to support the facility.

10.6 Sustainable Return on Investment

The proposed aerobic composting facility, which includes food waste, is anticipated to be located at approximately the same location as the existing Larimer County Landfill. An average distance of 15 miles (roundtrip) was used in the analysis to calculate vehicle-miles traveled for food waste collection trucks. Fifteen trucks were assumed daily for analysis. An average distance of 100 miles (roundtrip) was assumed for disposal of diverted organics not collected at the aerobic composting facility. Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the Aerobic Composting, Including Food Waste was modeled and is depicted in the following figure.

Figure 10-2. Aerobic Composting Including Food Waste Facility Sustainability Benefit Factors



Some of the Aerobic Composting including Food Waste findings include:

- 54,000 tons of organics material is anticipated initially to be collected in 2025 with a projected tonnage of 100,000 tons in 2050. It is anticipated that the aerobic composting facility would capture an additional 50 percent of organics, including food waste, over the projected tonnage.
- The O&M costs associated with the aerobics composting facility include annual operations and transfer haul costs totaling \$1.4 million annually. It is anticipated that a \$500 thousand capital improvement investment will be required after 10 years.
- The SROI analysis compares the aerobic composting facility to the Base Case. With a 4 percent discount rate, a \$25.8 million investment would result in \$101.7 million in total benefits and a benefit-cost ratio of 3.94.

11 Anaerobic Digestion

The anaerobic digestion (AD) process occurs when organic matter is decomposed using bacteria in the absence of oxygen. By consuming the organic materials, the bacteria produce a biogas (primarily methane and carbon dioxide). Feedstocks for AD vary according to the type of technology, but in broad terms could include MSW-derived organics, manure, food waste, grass clippings, and, for some technologies, yard waste, brush, and wastewater treatment plant biosolids. Biologically inert materials that might be contained in the digestion feedstock, such as metals, glass, and plastics, are undesirable and considered contamination, and must be either removed prior to digestion (for wet type systems) or screened-out during or after digestion (for dry type systems).

There are several factors that influence the design and performance of an AD system. Some of these factors include the concentration and composition of nutrients in the feedstock, temperature of the digesting mass, retention time of the material in the reactor, pH, acid concentration, and oxygen level.

For comparative purposes, the study evaluated two types of AD:

- Source separated food wastes/organic wastes to a dedicated digester system
- Source separated food wastes to a WWTP digester

Locally, the use of the digester capacity at WWTPs such as the Drake Water Reclamation Facility (DWRf) could be explored. A study titled “City of Fort Collins Drake Water Reclamation Facility Food Waste Digestion Study,” July 2017, was recently prepared evaluating the viability of accepting food waste at the WWTP⁶. Sources of appropriate organic materials could include fats, oils, and grease (FOG) from restaurant grease traps, food waste, and other forms of municipal organics. The study included a construction cost estimate for the development of a food waste receiving facility for an estimated cost of \$7 million. However, the study did not describe the incremental cost of the AD process in terms of added materials, chemicals, labor, energy, or possible increases in biosolids quantities. The facility would be sized to process 9,800 pounds per day (29.5 tpd) of food waste, which represents the capacity of the existing anaerobic digesters at 2030 influent flows and loads. Implementation of a food waste receiving facility at the DWRf will allow the City to increase digester gas production, which is estimated at more than 300 kilowatts of on-site electricity generation. Further dialogue is underway with DWRf would be needed to quantify the AD system cost for the purposes of comparison to other AD alternatives.

Benefits of anaerobic digestion include diversion of waste from landfill, production of energy, and potential uses of the byproducts. The management of odors, noise, and dust can be mitigated with proper operations and facility siting.

Table 11-1 indicates whether anaerobic digestion would achieve the goals and objectives.

⁶ City of Fort Collins Drake Water Reclamation Facility Food Waste Digestion Study’, Corollo Engineers, July 2017

Table 11-1. Anaerobic Digestion Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

11.1 Facility Needs

11.1.1 Source Separated Organics to a Dedicated Digester

The quantity of material that could be captured for anaerobic digestion is a portion of the total quantity generated and varies depending on whether the program is voluntary or mandatory. The capture rate is discussed in more detail below, but as an overview, the quantity of material that can be captured relates to different methods of incentivizing, encouraging, or mandating compliance with certain set-out/collection procedures. Low capture rates are typically due to low participation levels, which could be caused by a variety of issues such as inconvenience, nuisances (e.g., odor or vector attractant), or cost. High capture rates are typically due to mandated programs with either incentives or penalties to force conformity in set-out/collection behaviors. Inasmuch as the collection and processing of organic waste is an emerging industry, there is little research on estimating both the generation and capture rate of multiple communities.

Using low, medium, and high capture rates of 15 percent for the initial AD quantities and 50 percent for the total build-out quantity (see Table 11-2), HDR developed a probable quantity of food waste that could be captured as feedstock for digestion. The lower capture rate reflects a volunteer source separated program where residences and businesses can opt-in to the program, typically as part of a waste management system, with service fees that also incentivize recycling. The higher capture rate reflects a mandatory program similar to those implemented in larger cities such as Portland, Oregon. This methodology does not differentiate between commercial and residential waste streams because it is based on the population of the community and not types of businesses.

Table 11-2. Assumed Capture Rates for Food Waste Organics

Material Type	Initial (15%)	Total Build-Out (50%)
Food Waste Available for Anaerobic Digestion (Tons Per Year)	14,000	47,000

AD facilities require relatively small amounts of land. An AD facility (pre-processing through digestion and dewatering) can fit on a parcel of 3 to 4 acres. The composting portion of the process will require additional area, depending on the method of composting (see Table 11-3).

Table 11-3. Facility Requirements for Dedicated Anaerobic Digestion Facility Processing Source Separated Organics/Food Waste

Method	Feedstock Type	Tons Per Year (tpy)	Area (acres)
Anaerobic Digestion – Initial Phase	Food waste	14,000	2
Anaerobic Digestion – Total Build-Out	Food waste	47,000	3
SSO to WWTP – Initial Phase	Food waste	14,000	1
SSO to WWTP – Total Build-Out	Food waste	47,000	2

Process Components

Process components of a Food Waste and dedicated AD system include:

- Waste receiving and unloading, typically in an enclosed building equipped with an air collection and treatment system.
- Preprocessing, consisting of material visual screening for removal of undesirable materials such as packaging or items that could damage the grinder.
- Grinding to reduce size for pumping (if a wet system), but also for accelerated digestion.
- Pumping (again if a wet system) into a hydrolysis or digestion tank.
- Digestion tanks where the material will reside for several weeks and where sugars in the feedstock are consumed by bacteria and converted to methane.
- Decanting and dewatering of the effluent to concentrate the solids into a slurry for subsequent management as a digestate.
- Effluent treatment to reduce nitrogen and biochemical oxygen demand for use as a fertilizer or land application.
- Digestate stabilization and processing using aerobic composting to produce a useful soil amendment.
- Biogas dewatering and upgrading for use as a low Btu grade fuel in an internal combustion engine or turbine (as combined heat and power), or further refinement into compressed natural gas (CNG) for transportation fuel or renewable natural gas (RNG) and injection into a utility pipe.
- Odor control system to collect foul air from various point sources, such as the unloading and pretreatment areas. The odor control system could be a relatively low-tech biofilter or a more advanced chemical treatment system.

Process components of a Food Waste to WWTP AD system include:

- Waste receiving and unloading, typically in an enclosed building equipped with a foul air collection and treatment system.

- Preprocessing, consisting of material visual screening for removal of undesirable materials such as packaging or items that could damage the grinder.
- Grinding to reduce size for pumping (if a wet system), but also for accelerated digestion.
- Pumping into a pumper truck for transfer to the WWTP.
- A receiving facility at the WWTP
- A blending/metering system for injection into the WWTP digesters
- Use of the existing WWTP effluent treatment, biogas beneficial use, and odor control system.

Private Infrastructure Available

- No anaerobic digesters are currently operational in the region.

11.2 Financial Impacts

11.2.1 Source Separated Organics to a Dedicated Digester or a WWTP

In HDR's role of assisting various public entities seek private companies to offer AD of food waste, a wide range of costs have been observed that correlate inversely with the throughput quantity of material processed. Economies of scale of the equipment become significant when the facilities reach 40,000 tons per year or greater. Lower tonnage systems experience a lack of economies of scale and result in significantly elevated unit throughput cost. This is due primarily to the size of certain pieces of equipment, such as pumps, grinders, augers, and biogas refinement systems.

The estimated financial impacts for implementing a source separated organics (SSO) to Dedicated AD Facility are shown in Table 11-4 through Table 11-9. The use of dedicated digesters are assumed to be modeled as privately owned so capital costs are amortized over 15 years in contrast to publicly owned WWTP digesters which were modeled using a 20 year amortization period.

The model reflects revenues from the sale of biogas upgraded to renewable energy as compressed natural gas at \$2 per gasoline gallon equivalent (GGE). Residues removed during processing were estimated to be approximately three percent of incoming tonnage. The residual wastes from the facility are assumed to be transported and disposed of at the landfill for \$30.59 per ton. The residual waste category also includes the management of digestate which is assumed to be composted but charged a tip fee of \$25 per ton at the compost facility. Residual disposal costs are developed from transfer station haul costs, and landfill disposal fees. Haul costs for AD residuals may be higher due to the small volume of residual materials that are expected.

Table 11-4. SSO Receiving Facility Mobile Equipment Cost Estimate

Equipment Type	Description	Initial Phase Estimated Costs	Total Build-Out Estimated Costs
Front End Loaders	New	\$350,000	\$700,000
Total Equipment Purchase Cost		\$350,000	\$700,000

Table 11-5. SSO to Dedicated Anaerobic Digestion Capital Cost Estimate Summary

Description	Features	Initial Phase	Total Build-Out
Facilities	Receiving building, utilities	\$3,043,000	\$6,539,000
Processing Equipment	Grinders, pumping systems, dedicated digester, effluent treatment, biogas upgrade and cogen system	\$5,420,000	\$15,427,000
Subtotal Costs		\$8,463,000	\$21,966,000
Contingency (25%)		\$2,116,000	\$5,491,000
Soft Costs (16%)	Design, CM, Permitting, CQA	\$1,354,000	\$3,515,000
Total		\$11,933,000	\$30,972,000
Annual Capital Cost (15 years, 4% interest)		\$948,000	\$2,485,000

Table 11-6. SSO to Dedicated Anaerobic Digestion Facility Operational Cost Estimate Summary – Initial Phase

Item	Description	Annual Estimated Costs
Personnel	2.5 FTE	\$293,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$306,000
Subtotal O&M Costs		\$599,000
Contingency (10%)		\$60,000
Total Annual Operational Costs		\$659,000

Table 11-7. SSO to Dedicated Anaerobic Digestion Facility Operational Cost Estimate Summary – Total Build-Out

Item	Description	Annual Estimated Costs
Personnel	5.5 FTE	\$857,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Electricity, water, sewer, gas, phones, repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$900,000
Subtotal O&M Costs		\$1,758,000
Contingency (10%)		\$176,000
Total Annual Operational Costs		\$1,934,000

Table 11-8. SSO to Dedicated Anaerobic Digestion Facility, Summary of Costs,¹ Initial Phase (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton
Facility	\$11,933,000	\$948,000	\$67.61
O&M Costs		\$659,000	\$47.01
Residuals Haul Costs & Disposal		\$271,000	\$19.35
Revenues		\$(163,000)	\$(11.63)
Net Overall Cost	\$11,933,000	\$1,715,000	\$122

¹ Cost estimates are conceptual.

Table 11-9. SSO to Dedicated Anaerobic Digestion Facility, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton
Facility	\$30,972,000	\$2,485,000	\$53.18
O&M Costs		\$1,934,000	\$41.39
Residuals Haul Costs & Disposal		\$903,000	\$19.34
Revenues		\$(543,000)	\$(11.63)
Net Overall Cost	\$30,972,000	\$4,778,000	\$102

¹ Cost estimates are conceptual.

The estimated financial impacts for implementing a SSO to WWTP Facility are shown in Table 11-10 through Table 11-15.

Table 11-10. SSO to WWTP Receiving Facility Mobile Equipment Cost Estimate

Equipment Type	Description	Initial Phase Estimated Costs	Total Build-Out Estimated Costs
Front End Loaders	New	\$350,000	\$700,000
Total Equipment Purchase Cost		\$350,000	\$700,000

Table 11-11. SSO to WWTP Facility Capital Cost Estimate Summary

Description	Features	Initial Phase	Total Build-Out
Preprocessing Facilities	Receiving building, odor control, utilities, preprocessing system (sorting, grinders, etc.)	\$2,276,000	\$5,440,000
AD Equipment	none (at WWTP)	\$0	\$0
Subtotal Costs		\$2,276,000	\$5,440,000
Contingency (25%)		\$569,000	\$1,360,000
Soft Costs (6%)		\$364,000	\$870,000
Total		\$3,210,000	\$7,670,000
Annual Capital Cost (20 years, 4% interest)		\$235,000	\$565,000

Table 11-12. SSO to WWTP Facility Operational Cost Estimate Summary – Initial Phase

Item	Description	Annual Estimated Costs
Haul Cost to WWTP	Pumper truck and driver to deliver organic slurry to WWTP	\$136,000
WWTP Tip Fee	WWTP fee to accept, digest and manage effluent, digestate and biogas (assumed \$50/ton).	\$680,000
Subtotal O&M Costs		\$816,000
Contingency (10%)		\$82,000
Total Annual Operational Costs		\$898,000

Table 11-13. SSO to WWTP Facility Cost Estimate Summary – Total Build-Out

Item	Description	Annual Estimated Costs
Haul Cost to WWTP	Pumper truck and driver to deliver organic slurry to WWTP	\$454,000
WWTP Tip Fee	WWTP fee to accept, digest and manage effluent, digestate and biogas (assumed \$50/ton)	\$2,270,000
Subtotal O&M Costs		\$2,714,000
Contingency (10%)		\$272,000
Total Annual Operational Costs		\$2,996,000

Table 11-14. SSO to WWTP Facility, Summary of Costs,¹ Initial Phase (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton
Preprocessing SSO Facility	\$3,210,000	\$235,000	\$16.80
Haul and Digester Costs		\$898,000	\$64.03
Residuals Haul Costs & Disposal ²		\$13,000	\$.930
Revenues ²		\$0	\$0
Net Overall Cost	\$3,209,000	\$1,146,000	\$82

¹ Cost estimates are conceptual.

² This model is based on the King County AD estimate that charges a tip fee which includes all costs (e.g., digestate, effluent, biogas upgrades and revenues).

Table 11-15. SSO to WWTP Facility, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton
Preprocessing SSO Facility	\$7,670,000	\$565,000	\$12.10
Haul and Digester Costs		\$2,996,000	\$64.13
Residuals Haul Costs & Disposal ²		\$43,000	\$.92
Revenues ²		\$0	\$0
Net Overall Cost	\$7,670,000	\$3,604,000	\$77

¹ Cost estimates are conceptual.

² This model is based on the King County AD estimate that charges a tip fee which includes all costs (e.g., digestate, effluent, biogas upgrades and revenues).

11.2.2 Private Infrastructure Investment

A Food Waste AD program has the possibility of being attractive for private infrastructure investment. There are two categories of private infrastructure in this arena:

- Waste haulers offering to include a pre-processing system as a part of their collection program. These systems tend to include mechanical pre-processing systems that can be located inside an existing waste transfer or MRF building. The equipment is used to prepare the material for shipment to either a nearby WWTP for co-digestion, to a dedicated digestion facility capable of accepting the material, or a composter (if the AD facility is down for repairs, or for other reasons).
- AD developers who have a specific type of digestion technology and offer to design, build, and operate a facility under a long-term service agreement. These systems are typically fully integrated and include pre-processing, digestion, effluent, and digestate management, with biogas upgrading to CNG or RNG.

Some of the AD development companies who offer full service AD programs are listed in Table 11-16.

Table 11-16. AD Development Companies

Company	Type of Digestion
Anaergia	Wet
Dranko	Dry
IBR	Up-flow anaerobic sludge blanket
Kompogas	Dry
Eisenmann	Horizontal Plug flow (high solids)
Orgaworld	Offer both wet and dry
OWS	Vertical plug flow (high solids)
Quazar	Continuously Stirred Tank
Urbaser	Offer both wet and dry
ZWED	Dry

11.3 Programmatic Impacts

The impacts of an AD process include the following:

- Collecting food waste or source separated organics and diverting it to an AD facility would result in a decrease in the tons of waste disposed of at landfills, extending the life of the landfills.
- There would be a reduction in tipping fees, which may affect the budgets of programs funded by tipping fees.
- New revenue may be generated from the byproducts of AD, such as biogas used to generate heat, electricity, or vehicle fuel, and digestate that could be used as soil amendment or to create compost.
- A new AD facility in Larimer County could reduce the travel distances required for material to go to the existing out-of-county facilities reducing greenhouse gases and wear/tear on roads.
- Easier to track and a potential revenue source.

11.4 Regulatory, Administrative, and Permitting Requirements

AD is being promoted by the Colorado Energy Office for the management of manure, and the office provides an “Anaerobic Digestion Toolkit” with additional information about AD and relevant contacts in State government and AD subject matter experts. The toolkit also contains a Market Assessment of Agricultural Anaerobic Digesters. In 2014, the passage of HB14-1159 provided a sales tax exemption for all AD equipment, including

biogas upgrade systems.⁷ The program generally relies on the EPA AgStar⁸ system, which encourages AD for agriculture manures. While these regulations are intended to encourage on-farm types of AD systems, it is possible that a combined agriculture AD/municipal AD system could benefit from the program. Further exploration of these regulations would be needed to determine how they influence municipal organics programs.

Permitting of solid waste sites and facilities is a joint effort between the local governing body with jurisdiction (county or municipality) and the CDPHE.

- There is no statewide application form for a solid waste CD. People proposing a facility should contact the local governing body that has jurisdiction where the proposed site is to be located.
- The State conducts a comprehensive technical review of applications for a CD as a solid waste site or facility to determine whether the location, design, and operating criteria of the proposed facility are protective of human health and the environment.
- Any technical conditions of approval listed in the final report will be incorporated as requirements in the CD as issued by the local governing body with jurisdiction.
- In addition to solid waste landfills, CDs are generally required for waste impoundments, water treatment plant sludge disposal sites, medical waste treatment, storage and/or disposal facilities, composting facilities, and onsite disposal of regulated asbestos-contaminated soil.

11.5 Risks/Barriers

Risks and barriers to implementing an AD system for food waste include:

- Capturing enough food waste feedstock material to achieve economies of scale so that the system is affordable. The projected quantities of material in the region are below the threshold of being attractive with the exception of the “high” capture range. High capture ranges typically reflect a city- or county-wide program where public involvement is considered fully engaged.
- Educating the generators of appropriate materials for the program so that the contamination levels of the feedstock are minimal. Contaminated feedstock material can complicate the process dramatically and even result in making the system not viable.
- Developing off-take agreements for the biogas that the AD system will produce, including electricity (for the lower throughput system), or CNG fuel or RBG as a utility wielded to a user willing to pay elevated costs for the renewable attributes of the CNG or RNG.
- Developing markets for the other byproducts, compost, or liquid fertilizers, so that these byproducts are also a value to the system.

⁷ <https://www.colorado.gov/pacific/energyoffice/waste-energy#>

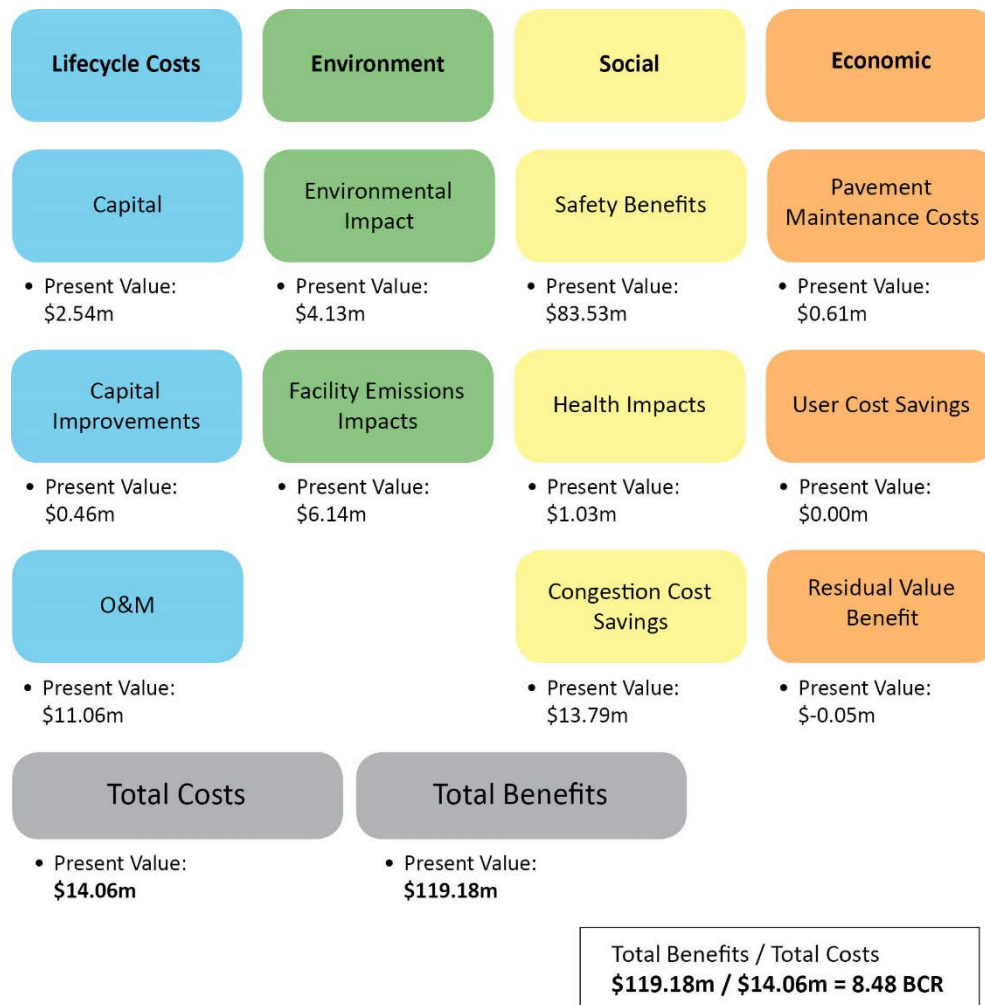
⁸ <https://www.epa.gov/agstar>

- If a co-digestion system is envisioned, developing a rapport with the WWTP management and operations staff to fully vet the programmatic attributes of the AD system and reaching consensus as to the benefits of the system.

11.6 Sustainable Return on Investment

The proposed anaerobic digestion facility including food waste is anticipated to be located at approximately the same location as the existing Larimer County Landfill. The SROI model represents the collection of source separated organic waste processed into a slurry and delivered in a tanker truck to a WWTP. An average distance of 15 miles (roundtrip) was used in the analysis to calculate vehicle-miles traveled for food waste collection trucks. An average distance of 100 miles (roundtrip) was assumed for disposal of diverted solid waste not collected at the anaerobic digestion facility. Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the Anaerobic Digestion was modeled and is depicted in the following figure.

Figure 11-1. Anaerobic Digestion Facility Sustainability Benefit Factors



Some of the Anaerobic Digestion findings include:

- The O&M costs associated with the anaerobic digestion facility include annual operations and transfer haul costs totaling \$990 thousand annually. It is anticipated that a \$1.0 million capital improvement investment will be required after 12 years.
- The SROI analysis compares the anaerobic digestion facility to the Base Case. With a 4 percent discount rate, a \$14.1 million investment would result in \$119.2 million in total benefits and a benefit-cost ratio of 8.48.

12 Refuse Derived Fuel Processing Facility (RDF)

An RDF processing system prepares MSW by using separation, shredding, screening, air classifying and other equipment to produce a fuel product for either on-site thermal processing, off site thermal processing, or use in another conversion technology that requires a prepared feedstock. The goal of this technology is to derive a more homogeneous fuel product that can be used in specified thermal equipment. The fuel goes by various names, but generally is categorized as RDF.

Post recycling mixed municipal solid waste can be processed by this technology. Facilities can range in size from several hundred tons per day to more than 3,000 tpd.

Some RDF facilities can be classified as a “shred and burn” style, which shred the material and magnetically remove ferrous metals without removing fines. On the other end of the spectrum, some plants are preparing fossil fuel replacement products typically used as a coal substitute.

There are several examples of RDF plants in the U.S. that use varying degrees of preprocessing and RDF production. MSW is very abrasive, which causes wear and tear on all components. All systems are subject to high maintenance costs and require extensive repairs and frequent cleaning to keep the facility online. Normally, processing occurs on one or two shifts with a shift reserved each day for cleaning and maintenance. Therefore, processing systems need to be sized larger than the associated thermal equipment, and storage capacity must be provided both for incoming waste and for RDF to keep the facility running smoothly.

When the thermal facility is not co-located with the RDF processing facility, communications and arrangements need to be established and maintained between the two facilities and on-site storage of RDF is important for both facilities. Figure 12-1 shows an example of stockpiled RDF at a facility in Rennerod, Germany.

RDF technology is a proven technology that is used at a number of plants in the U.S., Europe, and Asia (generally larger plants with capacities greater than 1,500 tpd). Some RDF plants within the U.S. include facilities at Ames, Iowa; Wheelabrator, Virginia; French Island, Wisconsin; Mid-Connecticut; Honolulu, Hawaii; and West Palm Beach, Florida.

Figure 12-1. Example of Stockpiled RDF



Source: HDR photo of Rennerod, Germany Facility

Benefits include the preparation of the MSW into a feedstock that is acceptable by other processes, allowing them to be more effective and efficient, and removal of recyclable and reusable materials for beneficial use. A drawback is that RDF facilities will have some air emissions directly from the processing (dust) as well as from the combustion of the RDF. An economic drawback of RDF is that it produces a solid fuel similar to coal. So, production of the RDF product presumes a local appetite for a coal-substitute to be economically viable. A long term contract to accept the RDF is required to justify the construction of the RDF production facility. Fugitive particulates from the process must be controlled. In addition, other environmental impacts must be mitigated, such as noise and odor. Economics for this type of facility are largely based on the revenues garnered from sale of the RDF product.

Table 12-1 indicates whether RDF Processing would achieve the goals and objectives.

Table 12-1. RDF Processing Goals and Objectives Achieved

Stated Goals and Objectives ¹	Yes/No
Goal #1. Establish a comprehensive, regional solid waste materials management system by 2025 that is implemented in an economically, environmentally, and socially sustainable manner.	Yes
Goal #2. Create a comprehensive solid waste material management plan and implement programs and facilities that reflect the needs and desires of users.	Yes
Goal #3. Develop a set of waste diversion/reduction goals that are adopted and implemented by all jurisdictions in the Wasteshed.	Yes
Goal #4. Develop a strong public education and outreach program that is consistent throughout the Wasteshed.	Yes

¹ See Section 1 for a complete list of Goals and Objectives.

12.1 Facility Needs

The facility requirements for RDF Processing are shown in Table 12-2.

Table 12-2. Facility Requirements for RDF Processing

Method	Feedstock	Building Size (SF)	Capacity (tpy)	Land Area (acres)
RDF Boiler - Initial Facility	MSW	163,000	263,000	14
RDF Boiler - Long-Term Facility (2050)	MSW	168,000	425,000	16
RDF Fuel - Initial Facility	MSW	137,000	263,000	12
RDF Fuel - Long-Term Facility (2050)	MSW	137,000	425,000	13

12.1.1 RDF Facility with Boilers

An RDF production facility is capable of processing most municipal solid waste and single stream and mixed waste MRF facility residuals. This material would be nearly the same as for the Direct Combustion Facility, although the RDF processing line generally will not accept bulky wastes such as carpet, mattresses, larger scrap metal, and compressed gas cylinders, as these types of materials do not shred well or could cause an explosion. Any similar materials received that are identified will be removed from the process line. Those that can be recycled, and would be recycled, and other materials will be taken to the landfill.

The post-recycling available tonnage is potentially 263,000 tpy in 2014 and the potential tonnage in 2050 would be about 425,000 tpy. Most RDF facilities process between one and two shifts per day for 5 to 6 days per week. Assuming production 50 weeks per year, 6 days per week for two 8-hour shifts, the required capacity is about 89 tph.

A single RDF processing line is capable of processing between 50 and 100 tph. It is generally not efficient to downsize a processing line because the equipment still needs to be able to receive and handle the larger components in the waste stream. Thus a single processing line sized for 100 tph with a few special provisions may be a reasonable alternative for this size facility. Shredders and certain other equipment components require high maintenance and can be damaged in an explosion. For a facility in this size range, a spare shredder is recommended. Provisions should also be made to allow the active shredder to slide out of the processing line and the spare be installed in a short turnaround schedule. In this manner, if a shredder fails and needs to be cleaned out and overhauled, it can be replaced with only a short process line outage. After the spare shredder is slid into place, the unit requiring service can be overhauled in the maintenance shop under controlled conditions.

The facility should also maintain a higher inventory of spare parts, belting, and keep more maintenance capability available during processing periods in order to increase reliability. These measures would be expected to be more cost effective than installing two processing lines. Other high maintenance equipment may also be maintained in a similar manner. For instance this might include pelletizers if the waste is processed into a fuel.

If the RDF produced is processed on site, a typical facility will consist of two or three boilers and one turbine generator. Based upon current needs, if two 430 tpd boilers are

installed, a similarly sized unit could be added in the future when capacity is needed. Initial electrical production would require a turbine generator with a net output of about 24 megawatts and the expanded facility would have a net output capacity of about 35 megawatts. Steam sales would be desirable if one or more suitable customers are identified in proximity to the facility.

Some bulky waste and residue and fines will need to be transported to the landfill. The quantity can vary from plant to plant. Residue may consist of only bulky and potentially damaging materials for a simple RDF processing system that does not remove fines from the fuel. If a coal replacement fuel is produced, possibly as much as 25 percent or more fines, non-combustible, wet, and chlorine containing materials might be removed in addition to the bulky and damaging materials.

When the RDF is combusted, ash and spent air pollution control reagents will also need to be transported to a landfill. The quantity could be about thirty percent where few fines and inerts are removed, less if these materials are removed in process. In addition, once the initial facility reaches capacity, for a few years some tonnage would bypass the facility until the additional unit is added.

The processing line will allow for recovery of ferrous metal. The quality of the ferrous may mean that a ferrous shredder or other device is necessary to remove paper, plastic and fabric from the ferrous metal. Nonferrous metal may also be recovered from the RDF. In addition, ferrous and nonferrous metal may be recovered from the ash if the RDF is combusted on site.

12.1.2 RDF/Fuel Production Facility

A facility could also be developed that would only produce a fuel to be shipped to a boiler, incinerator, cement kiln or similar plant nearby if one could be identified. The processing facility would need to achieve the processing requirements of the partner facility. This analysis assumes the partner fuel user is considered a municipal waste combustor and is subject to Section 129 of the Clean Air Act. If a fuel is derived for use in a facility that is considered a boiler that is not subject to Section 129, the processing costs would increase. The RDF production facility would be able to process waste up to the limits of the agreement for delivery of the fuel and thus may not require as much landfilling of excess waste.

If just fuel processing occurs on site, the facility will require approximately 6 to 8 acres. If processing occurs and power production occurs, it will require approximately 10 to 12 acres.

An RDF facility could process nearly all of the post-recycling municipal solid waste with an initial capacity of 263,000 tpy and with the additional unit 425,000 tpy in 2050. The process, however, will reject a certain amount of non-processable materials, the product RDF or fuel will generate ash and process residuals, which is expected to be landfilled. These quantities will vary depending on the system employed but are expected in total to be about 30 percent of the incoming feedstock or about 69,000 tons per year that would need to be landfilled. In addition, the excess tonnage available beyond the capacity of the initial two boilers would need to be landfilled prior to the addition of the third unit. The need for expansion should be evaluated about every 5 years. When the available MSW is about 380,000 tpy, which is anticipated in about 25 years, an expansion boiler and

turbine generator could be added to the facility. The timing for the expansion may occur around the time a contract renewal for the facility would be needed, if a 20-year contract term is provided.

Process Components

An RDF production facility will require scales and scale house with queuing space on site for inbound vehicles. From the scales vehicles will proceed to a large tipping floor where waste will be staged until processed. A front end loader would be used to feed the waste to the processing line. The processing line will consist of the vendor's recommended equipment, but at a minimum will include infeed conveyors, a shredder, sizing equipment, and a ferrous magnet. It may include nonferrous metal recovery, pelletizers, or other equipment to recovery recyclables or to remove undesirable components from the RDF or fuel produced and prepare it for its intended use.

The RDF or fuel may be conveyed directly to or be loaded into trucks to transport to the combustion facility. At the combustion facility, one or two boilers will process the RDF to generate steam. The steam will be used in process or more likely used to generate electricity in a steam driven turbine generator. Associated pumps, condensers, heaters, water treatment systems, piping and associated equipment will be needed for a complete system. Each boiler will require a spray dryer absorber, fabric filter, nitrogen oxide control technology, activated carbon injection for control of mercury, and reagent preparation and handling equipment as part of the air pollution control equipment. An induced fan will deliver the resultant flue gas to the stack.

Ash and spent reagent handling and processing equipment will be used to transport and store the remaining ash prior to removal from the site. Ferrous and nonferrous metal recovery would be provided.

Number/Size of Facility(s) Needed by 2050

- Only one facility may be needed. Expanded capacity can be achieved by increasing RDF processing hours.

Private Infrastructure Available

No RDF processing facilities are currently present in the region.

12.2 Financial Impacts

12.2.1 RDF with Boilers

The estimated financial impacts for implementing the RDF Processing option with boilers are shown in Table 12-3 through Table 12-5.

Table 12-3. RDF with Boilers Capital Cost Estimate Summary

Description	Features	Initial Phase	Total Build-Out
Site Work	Access roads, scales, scale house, utilities	\$3,062,000	\$3,062,000
Facilities	Equipment Install & Commissioning	\$234,429,000	\$323,167,000
Subtotal Costs		\$237,491,000	\$326,229,000
Contingency (25%)		\$59,373,000	\$81,557,000
Soft Costs (11%)	(Design, CM, Permitting, CQA)	\$26,124,000	\$35,885,000
Total		\$322,988,000	\$443,672,000
Annual Capital Cost (20 years, 4% interest)		\$24,954,000	\$34,278,000

Table 12-4. RDF with Boilers Operational Cost Estimate Summary (Total Build-Out)

Item	Description	Annual Estimated Costs
Personnel	85 FTE	\$8,390,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$16,064,000
Subtotal O&M Costs		\$24,454,000
Contingency (10%)		\$2,445,000
Total Annual Operational Costs		\$26,899,000

Table 12-5. RDF with Boilers Infrastructure Option, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton
Facility	\$443,672,000	\$34,278,000	\$81
O&M Costs		\$26,899,000	\$63
Residuals Haul Costs & Disposal		\$3,898,000	\$9
Revenues		\$(11,618,000)	\$(27)
Net Overall Cost	\$443,672,000	\$53,458,000	\$126

¹ Cost estimates are conceptual.

12.2.2 RDF without Boilers

The estimated financial impacts for implementing the RDF Processing option without boilers are shown in Table 12-6 through Table 12-8.

Table 12-6. RDF without Boilers Capital Cost Estimate Summary

Description	Features	Initial Phase	Total Build-Out
Site Work	Access roads, scales, scale house, utilities	\$3,062,000	\$3,062,000
Facilities	Equipment Install & Commissioning	\$114,646,000	\$154,824,000
Subtotal Costs		\$117,708,000	\$157,886,000
Contingency (25%)		\$29,427,000	\$39,471,000
Soft Costs (11%)	(Design, CM, Permitting, CQA)	\$12,948,000	\$17,367,000
Total		\$160,082,000	\$214,725,000
Annual Capital Cost (20 years, 4% interest)		\$12,368,000	\$16,590,000

Table 12-7. RDF without Boilers Operational Cost Estimate Summary (Total Build-Out)

Item	Description	Annual Estimated Costs
Personnel	37 FTE	\$3,643,000
Non-labor (utilities, fuel, materials, supplies, etc.)	Repairs, maintenance, supplies, rental, fuel, legal, insurance, etc.	\$3,901,000
Subtotal O&M Costs		\$7,544,000
Contingency (10%)		\$754,000
Total Annual Operational Costs		\$8,299,000

Table 12-8. RDF without Boilers Infrastructure Option, Summary of Costs,¹ Total Build-Out (2017 \$)

Task	Total Capital Costs	Annual Cost	Cost per Ton
Facility	\$214,725,000	\$16,590,000	\$39
O&M Costs		\$8,299,000	\$20
Residuals Haul Costs & Disposal		\$1,299,000	\$3
Revenues		\$(319,000)	\$(1)
Net Overall Cost	\$214,725,000	\$25,869,000	\$61

¹ Cost estimates are conceptual.

12.3 Programmatic Impacts

The impacts of RDF Processing include:

- Processing municipal solid waste in an RDF facility would result in a decrease in the tons of waste disposed of at landfills, thus extending the life of the landfills.

- The costs for the RDF facility would impact the budgets; however, new revenue may be generated from the production of electricity and recovery of metals, which can help to reduce some of the project costs.
- Residual disposal costs are developed from transfer station haul costs, and landfill disposal fees. Haul costs for RDF processing may be higher due to the nature (bulky materials or other materials not suitable for RDF production) and the small volume of residual materials that are removed when producing the RDF.
- It may be possible to recover some other recyclables within the RDF production process.
- It increases opportunities for public-private partnerships and, depending on whether the County or a private operator is used, could increase employment.
- Put or pay contracts may be required.

12.4 Regulatory, Administrative, and Permitting Requirements

12.4.1 Summary of Federal Regulations

Facilities combusting RDF are generally subject to 40 CFR 60 Section 129 for municipal waste combustors. A specific MACT rule has been developed that would require certain emission limits, operating requirements, reporting requirements, and other provisions that would need to be followed. The facility would need to comply with NSPS provisions found in 40 CFR Part 60, Subpart Eb. The facility would also need to obtain a number of permits including a Title V operating permit.

If the processing facility is specially designed, and meets certain requirements of Section 241 of the Clean Air Act, it may be possible that a Non-Hazardous Secondary Material fuel can be produced that may be combusted as a solid fuel substitute for coal or other solid fuel. Requirements include limitations on the fuel ash and moisture content, a minimum heating value, and limits on the chlorine content, as well as certain other requirements. If these measures are achieved, the fuel produced may be processed in a facility that is not subject to Section 129 and complies with the Boiler MACT requirements 40 CFR Part 63 Subpart DDDDD.

12.4.2 Summary of State of Colorado Solid Waste Regulations

RDF facilities would be considered solid waste incineration facilities under the CDPHE regulations pertaining to General Requirements and Information Concerning all Solid Waste Disposal Sites and Facilities in the State of Colorado in Section 6 CCR 1007-2. Incineration Facilities and any privately operated Solid Waste-to-Energy facilities not contracted to a county and/or municipality are subject to Section 11. Any Solid Waste-to-Energy incineration facilities that are sited and operated by a county and/or municipality are regulated under 6 CCR 1007-4, which was promulgated pursuant to the Solid Waste-to-Energy Incineration Systems Act. These regulations are described in more detail in Section 8.4.2 of this report.

In addition, permitting of solid waste sites and facilities is a joint effort between the local governing body with jurisdiction (county or municipality) and the CDPHE.

- There is no statewide application form for a solid waste CD. People proposing a facility should contact the local governing body that has jurisdiction where the proposed site is to be located.
- The State conducts a comprehensive technical review of applications for a CD as a solid waste site or facility to determine whether the location, design, and operating criteria of the proposed facility are protective of human health and the environment.
- Any technical conditions of approval are listed in the final report will be incorporated as requirements in the CD as issued by the local governing body with jurisdiction.
- In addition to solid waste landfills, CDs are generally required for waste impoundments, water treatment plant sludge disposal sites, medical waste treatment, storage and/or disposal facilities, composting facilities, and on-site disposal of regulated asbestos-contaminated soil.

12.5 Risks/Barriers

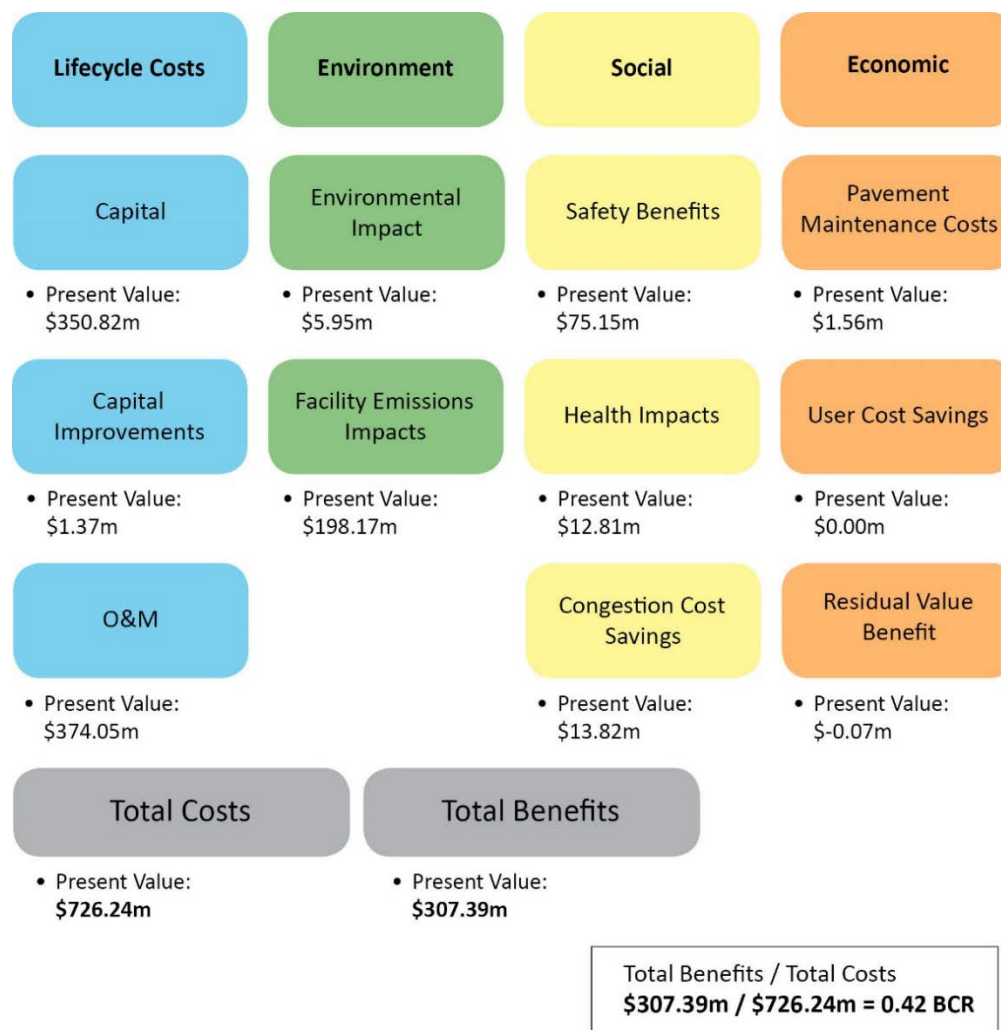
Risks and barriers for implementing an RDF production facility include:

- The capital and operating costs for an RDF production facility are greater than the costs of landfilling the waste.
- An RDF boiler facility will require negotiation of a Power Purchase Agreement for supply of the power to a utility. While one or more local utilities may be willing to consider such a program or an agreement could be reached subject to Public Utility Regulatory Policies Act requirements, electric rates in the area are quite low, negatively impacting economics. There is very low risk that electric rates will drop below current levels. Economics for direct combustion are highly dependent on electrical power revenues.
- Permitting an RDF facility is a long and arduous process. Significant public opposition may make the process difficult and time consuming. Typical timelines often anticipate about 10 years from initial concept to a commissioned facility.
- Extensive financing is necessary for the facility.
- Identifying a facility site location on suitable land with reasonable access to transportation corridors, proximity to the population centers and power interconnection point, and utilities to support the facility can be difficult.
- An RDF production facility would need to partner with and negotiate a fuel supply contract with a nearby interested solid fuel fired cement kiln or industrial boiler that is willing and able to accept the RDF fuel produced. Terms of the agreement may significantly impact the price necessary to cover fuel production costs.
- As for all solid waste facilities, issues such as odor management, vectors, litter, dust, traffic, and noise must be addressed for neighboring properties.

12.6 Sustainable Return on Investment

The proposed RDF Processing Facility is anticipated be located at approximately the same location as the existing Larimer County Landfill. An average distance of 15 miles (roundtrip) was used in the analysis to calculate vehicle-miles traveled for waste trucks and automobiles. Fifty-five (55) trucks and 489 “mom & pop” customers were assumed daily for analysis. Utilizing this infrastructure specific vehicle information along with the previously discussed sustainability benefit factors, the BCR for the RDF Processing Facility was modeled and is depicted in the following figure.

Figure 12-2. RDF Processing Facility Sustainability Benefit Factors



Some of the RDF Processing Facility findings include:

- The O&M costs associated with the RDF processing facility include annual operations and transfer haul costs totaling \$30.8 million annually. It is anticipated that a \$3.0 million capital improvement investment will be required after 12 years.

- The SROI analysis compares the RDF processing facility to the Base Case. With a 4 percent discount rate, a \$726.2 million investment would result in \$307.4 million in total benefits and a benefit-cost ratio of 0.42.

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13 Implementation Activity Schedule

Planning, permitting, construction, and start-up timeframes can be different for each of the infrastructure options and play a major role in the implementation of a project. Siting and development of waste-related facilities can be involved and complicated and support for these efforts usually requires extensive interaction with regulators, stakeholders and the general public. As such, project schedules for each of the options will take these parameters into account.

13.1 Status Quo

Not Applicable.

13.2 Central Transfer Station

A transfer station can be taken from identified need to an operating facility in about 3 to 5 years if siting, permitting and funding can be arranged. Siting the facility at the existing Larimer County Landfill site should shorten this time frame since this is an active waste management located and reduces certain implementation risk. Design, bidding and construction of this size of facility will take approximately 24 months.

13.3 New County Landfill

For implementation of a new MSW landfill, a refined master site layout and site investigations should begin three to six years before operations are needed. Other activities required for local siting approval and permitting should begin at least 5 years before desired operations. Construction including site excavation of the initial cell and liner construction will take approximately 12 to 15 months to complete.

13.4 Material Recovery Facility (Clean)

A MRF facility can be taken from the identified need to an operating facility in about 5 years or less if siting, permitting, and funding can be arranged. MRFs are generally reasonably well accepted for an industrial waste processing facility. A reasonably developable site within an industrial complex with few nearby residential neighbors, ready access to major transportation routes, reasonable buffer area, with access to water, electricity and other utilities can usually be developed with less opposition. It is advisable to incorporate visitor facilities to accommodate interest from schools and other civic organizations interested in understanding how the facility works and as a means of increasing public acceptance, education and participation.

13.5 Yard Waste Organic Processing Facility

A yard waste organic processing facility can be taken from identified need to an operating facility in about 3 years or less if siting, permitting and funding can be arranged. A reasonably developable site with access to transportation corridors,

proximity to the communities providing the feedstock, few neighbors, and access to water, electricity and other on-site utilities is desirable. A yard waste organic processing facility can usually be developed with little opposition.

13.6 C&D Processing Facility

A C&D processing facility can be taken from identified need to an operating facility in about 3 to 5 years if siting, permitting and funding can be arranged. Siting the facility at the existing Larimer County Landfill site should shorten this time frame. Construction of this size of facility and acquisition of processing equipment will take approximately 18 months. Additional time may be necessary for development of the local markets for recovered materials.

13.7 Energy from Waste Facility Direct Combustion

A Direct Combustion facility generally requires a lengthy lead time getting from a significant conceptual design to a fully commissioned and operable facility. Usually facilities move through an iterative process of determining preliminary sizing, finding potential sites and outlets for power produced. Design moves through conceptual design to full design in stages as more detail is needed. Permitting includes a series of hearings for public input and can take about a year. Time is required for negotiation of a power purchase agreement and for financing. These activities often occur during overlapping periods but can require some iterative processes. Generally a three year construction and commissioning period is required. Overall, it can take about ten years to develop and commission an operating facility.

13.8 Mixed Waste Processing (Dirty MRF)

A Dirty MRF facility will generally take 3 to 5 years from siting, conceptual design, permitting, and equipment purchase to a fully operational facility. Facility construction and acquisition of processing equipment will take approximately 18 months. Additional time may be necessary for the implementation of flow control to the facility and mandatory collection.

13.9 Aerobic Composting Including Food Waste

The Aerobic Composting Including Food Waste Option considers two scenarios for processing materials:

- Aerated Static Pile
- Enclosed Aerated Static Pile

Similar to the yard waste organic processing facility, either option can be taken from identified need to an operating facility in about 3 years or less if siting, permitting and funding can be arranged. A reasonably developable site with access to transportation corridors, proximity to the communities providing the feedstock, few neighbors, and access to water, electricity and other on-site utilities can usually be developed with little opposition.

13.10 Anaerobic Digestion

The Anaerobic Digestion option considers two scenarios for processing materials:

- Dedicated Anaerobic Digestion System
- Source Separated Organics to Wastewater Treatment Plant

Each option can be taken from the identified need to an operating facility in 3 to 5 years if siting, permitting, and funding can be arranged and depending on the complexity of the facility option chosen. Additional time may be needed to develop the take-off agreements for the biogas and the development of markets for the by-products from the process.

13.11 RDF Processing

An RDF Processing Facility generally requires a lengthy lead time getting from a significant conceptual design to a fully commissioned and operable facility. Usually facilities move through an iterative process of determining preliminary sizing, finding potential sites and outlets for power produced. Design moves through conceptual design to full design in stages as more detail is needed. Permitting includes a series of hearings for public input and can take about a year. Time is required for negotiation of a power purchase agreement or for a fuel supply contract and for financing. These activities often occur during overlapping periods but can require some iterative processes. Generally a three year construction and commissioning period is required. Overall, it can take about ten years to develop and commission an operating facility. An RDF fuel production only facility may require less time to complete the process, however contract negotiations would be necessary for fuel sales.

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14 Public-Private Partnership Opportunities

A public-private partnership (PPP) is a cooperative arrangement between a governmental agency and a private sector company for providing a public asset or service. Public-private partnerships take a wide range of forms varying in the extent of involvement of and risk taken by the private party. The terms of a PPP are typically set out in a contract or agreement to outline the responsibilities of each party and clearly allocate risk.

14.1 Status Quo

Not Applicable.

14.2 Central Transfer Station

A number of opportunities for public-private partnerships are available with the Central Transfer Station option. These include partnerships for design, build, ownership and operations of the Transfer Station.

Cape Girardeau, Missouri recently developed a Request for Proposals for a private company to permit, design, build, and operate a transfer station to deal with the City's waste. They were successful in finding a vendor willing to invest with a secured waste stream for 20 years. This arrangement allowed the City to avoid significant capital investment to repair and/or rebuild their existing transfer station.

Other public-private partnerships include hauling and disposal. A significant amount of municipally owned transfer stations utilize private companies to provide trucks and trailers to transfer waste to a final disposal facility.

14.3 New County Landfill

While public-private partnerships are not common with landfill construction and operations due to environmental liability, there are opportunities available for the New County Landfill option to consider. Larimer County could retain ownership of the property and partner with private industry for permitting, construction and operations of the landfill if liability and regulatory issues are resolved by long-term contract.

One example is several years ago Wake County, North Carolina was looking for a waste management system to implement after the closure of their North Wake Landfill. Ultimately Wake County purchased property in the southern portion of the property, permitted it for use as a landfill and worked with the municipalities to develop a solid waste management system that worked for everyone.

The City of Raleigh planned, permitted, and constructed a transfer station to haul waste to the new South Wake Landfill as their contribution. Wake County solicited proposals for a partnership with a private entity for the operation of the South Wake Landfill. This partnership was developed such that Wake County did not have to invest in capital expenditures to develop the landfill. The agreement between Wake County and the

private entity was based on Wake County paying the private entity a tipping fee based on a range of waste volumes.

Responsibilities of the private entity included constructing the landfill, operating the landfill, and permit renewals. Wake County constructed the scale house and maintains operations of the scales collecting the fees. The significant concept of the agreement is that Wake County did not have major capital investments associated with the development of a new landfill site.

14.4 Material Recovery Facility (Clean)

Public-private partnerships are also highly compatible with MRFs. Public-private partnership opportunities range from but are not limited to collection services, ownership and operation of the MRF. Some communities have developed and had success with employing disadvantaged workers in a job training program. Larimer County could own and operate the MRF or is able to partner in various ways for the facility.

14.5 Yard Waste Organic Processing Facility

Establishing a public-private partnership for the Yard Waste Organic Processing Facility option could be beneficial to the Wasteshed Coalition. Facility siting, ownership, permitting, construction and operations are all available opportunities. In addition, development of a market demand for finished compost would be highly compatible to the private sector.

In Yakima County, Washington, the Solid Waste Division issued a Request for Qualifications to compost yard waste that is source separated at the County owned transfer stations and landfills. The County accepted source separated yard waste from commercial curbside haulers and self-haulers for a reduced tipping fee, segregated the material and processed it through a Morbark horizontal grinder. The successful contractor hauled the chipped yard waste from each county site to their privately owned composting facility, composted the materials in windrows and sold the finished product. The County paid the contractor a fee for the haul, based on current monthly fuel pricing, and a composting fee. In addition, the contractor was allowed to utilize a portion of County owned property to grow camelina to process for biofuel.

14.6 C&D Processing Facility

A C&D Processing Facility would be highly compatible with a public-private partnership. Generally, C&D Processing Facilities are developed by the private sector seeking to make a profit on the commodities recovered. While this may not always be the case, and some C&D facilities function to meet landfill diversion goals, they are also typically a private venture. The Wasteshed Coalition could issue a Request for Expression of Interest (REOI) in the pre-project development stage to assess interest in the project from the private sector as a way to initiate a public-private partnership.

In Santa Clara County, California, the municipalities have instituted a local regulatory framework that imposes C&D Recycling diversion on contractors in order to secure building and demolition permits. This regulatory framework has encouraged the private sector to invest in privately owned and operated infrastructure for recycling facilities. One

such facility, Zanker Recycling, processes an extensive amount of mixed C&D debris daily through a 240-foot long C&D sorting conveyor system. The system is utilized to remove a variety of materials; up to 16 products from the typical mixed waste stream. The sorting conveyor system, which includes elevated work-stations, Nihot air separation units, disc-screens and magnets is located above large concrete storage bunkers that hold recovered materials.

When the storage bunkers become full, the materials are routed for additional on-site processing, or loaded and hauled to approved recyclers. Other materials such as mattresses, are processed separately into different products. Residual materials are routed to a landfill for disposal. The sorting system is capable of sorting 60 tons per hour with an average 80% diversion rate. The diversion rate and tons per hour vary depending upon the type of materials sorted.

14.7 Energy from Waste Facility Direct Combustion

Often, public-private partnerships are developed for Energy from Waste Facilities due to the extensive financing and permitting required for this type of facility. The Wasteshed Coalition could own the facility to maintain more control or allow a private contractor to own and operate the facility. Most facilities in the U.S. are operated by the private sector but could be operated by the County, City or a local utility. In addition, the ash and spent reagents would need to be disposed in a monofill which would require special permitting that may be best suited to a private landfill.

The Regions of Durham and York, Ontario, lie just to the north and east of Toronto. For years, much of the solid waste produced in this area has been shipped west to Michigan landfills. Facing a forced closure of the border to waste shipments to Michigan, the Regions began exploring alternatives.

Under Ontario legislation, the Regions of Durham and York completed an individual Environmental Assessment (EA) for the selection of a "preferred" post-diversion residual waste processing system as well as a site for the required facility. This first phase was completed in the fall of 2005 and entailed a full community consultation program together with the completion of technical background reporting. Upon approval of the concept by the Minister of the Environment over the next three years, the environmental work proceeded.

Direct Combustion was identified as the preferred technology and a preferred site was identified and a full suite of site specific environmental studies to confirm the suitability of the preferred technology on the identified site was completed. Technical specifications and procurement related documents were developed resulting in a design-build-operate and maintain contract for a 140,000 metric tonnes per year (500 tons-per-day, U.S.) waste-to-energy facility to be provided by Covanta Energy for 20 years. Numerous hearings and reviews were completed. Once approval was received construction commenced culminating in a commissioning process and acceptance testing in 2015.

14.8 Mixed Waste Processing (Dirty MRF)

As stated above for the Clean MRF Option, public-private partnerships are also highly compatible with Mixed Waste Processing Facilities (Dirty MRF). Public-private

partnership opportunities range from but are not limited to collection services, ownership and operation of the MRF. Some communities have developed and had success with employing disadvantaged workers in a job training program. Larimer County could own and operate the Dirty MRF or is able to partner in various ways for the facility.

14.9 Aerobic Composting Including Food Waste

As stated in the Yard Waste Organic Composting Facility option, establishing a public-private partnership for the Aerobic Composting option could be beneficial to the Wasteshed Coalition. Facility siting, ownership, permitting, construction and operations are all available opportunities. In addition, development of a market demand for finished compost would be highly compatible to the private sector.

14.10 Anaerobic Digestion

A Food Waste AD program has the possibility of being attractive for private infrastructure investment. As outlined in Section 11.2.3 of this report, there are two categories of private infrastructure in this arena:

- Waste haulers offering to include a pre-processing system as a part of their collection program. These systems tend to include mechanical pre-processing systems that can be located inside an existing waste transfer or MRF building. The equipment is used to prepare the material for shipment to either a nearby WWTP for co-digestion, to a dedicated digestion facility capable of accepting the material, or a composter (if the AD facility is down for repairs, or for other reasons).
- AD developers who have a specific type of digestion technology and offer to design, build, and operate a facility under a long-term service agreement. These systems are typically fully integrated and include pre-processing, digestion, effluent, and digestate management, with biogas upgrading to CNG or RNG.

In addition, developing markets for by-products, compost or liquid fertilizers from the process would be highly compatible with the private sector.

14.11 RDF Processing

Similar to Energy from Waste Facilities, often, public-private partnerships are developed due to the extensive financing and permitting required for this type of facility. The Wasteshed Coalition could own the facility to maintain more control or allow a private contractor to own and operate the facility. Permitting an RDF Processing Facility can be a long and arduous process and extensive financing would be needed for such a facility which makes a public-private partnership desirable. In addition, negotiating or partnering with a nearby solid fuel fired cement kiln or industrial boiler for acceptance of the fuel produced would be critical and best suited to a public-private partnership arrangement.

An example project is Excel Energy's French Island Facility in La Crosse County, Wisconsin. The facility is a combination generating plant and resource recovery facility. The plant's two generating units burn wood waste, railroad ties and refuse-derived fuel (RDF) produced on-site at a resource recovery facility built specifically for that purpose. Built in the 1940s as a coal-fired generating facility, French Island's two original units

were converted to process waste wood. Each unit was converted to a fluidized bed boiler, the first of its kind, design to allow processing of sawdust and wood chips that otherwise would have been buried in a landfill. In 1987 the owner, Xcel Energy, built a facility adjacent to the generating plant to process municipal solid waste into RDF making both units capable of burning a blend of waste wood and RDF. The conversion helped maintain reasonable electric rates for customers, while resolving a solid waste disposal problem for La Crosse County. The County of La Crosse and Xcel Energy recently extended their partnership to at least 2032.

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Memo

Date:	Wednesday, January 17, 2018
Project:	North Front Range Regional Wasteshed Planning Study – Phase 2
To:	North Front Range Regional Wasteshed Planning Coalition TAC
From:	Doug DeCesare and Wendy Mifflin, HDR, Inc.
Subject:	Infrastructure Options Summary of Costs

1. Introduction

The purpose of this memorandum is to provide the North Front Range Regional Wasteshed Planning Coalition Technical Advisory Committee (TAC) a summary of costs based on the Infrastructure Options Analysis completed under Task 6.

2. Summary of Infrastructure Options Analysis Costs

Table 2.1 provides a summary of the costs for management of waste in the North Front Range Regional Wasteshed. The data is derived from the Task 6 Infrastructure Options Analysis that includes information on current and projected Larimer County landfill tonnages, current waste diversion and recycling goals and population estimates. In addition, estimated monthly household costs for each Infrastructure Options have been included on the table.

In the future, if tonnages change due to the adoption of more stringent waste recycling and diversion goals, markets change due to commodity pricing and product acceptability, or population growth increases or decreases substantially different from the projections, costs for each Infrastructure Option may increase or decrease and need to be adjusted accordingly.

The following assumptions were used to estimate the monthly household cost:

- Larimer County population estimate from the US Census Bureau – 339,993.
- Larimer County persons per household from the US Census Bureau – 2.49.
- Number of Households in Larimer County – 137,000.
- EPA 2013 estimates that 50% of waste disposed is residential and 50% is commercial. Additionally it is estimated that business and industry may make up 50-75% of the costs.
- Formula for estimating monthly household cost is: annual operational costs/2/137,000 households/12 month for 50% of the cost and annual operational costs*0.25/137,000 households/12 month for 25% of the cost.

Table 2.1 – Summary of Infrastructure Options Costs (\$2017)

Infrastructure Option	Waste Volume Managed (%)	Estimated Operating Cost Per Ton	Estimated Capital Costs	Estimated Operating Costs (per year)	Estimated Monthly Household Cost
Central Transfer Station	100%	\$41 / Ton	\$14.3M	\$9,895,000	\$1.50 - \$3.01
New County Landfill	100%	\$22/Ton	\$13.6M (1 st Phase)	\$11,551,000	\$1.76 - \$3.51
Materials Recovery Facility (MRF) – Clean	10%	(\$6) / Ton – (\$12) / Ton	\$23.7M	(\$473,000)	\$0.0
Yard Waste Open Wind-Row Composting	13%	\$31 / Ton - \$35 / Ton	\$10.6M	\$2,089,000	\$0.32 - \$0.64
Construction & Demolition (C&D) Processing Facility	31%	\$35 / Ton	\$13.7M	\$3,864,000	\$0.59 - \$1.18
Energy From Waste – Direct Combustion	56%	\$110 / Ton	\$313.8M	\$46,808,000	\$7.12 - \$14.24
Mixed Waste Processing/Dirty MRF	56%	\$57 / Ton - \$61 / Ton	\$47.2M	\$8,771,000	\$1.33 - \$2.67
Food Waste/Yard Waste Static Aerated Bin Composting	13%	\$36 / Ton - \$43 / Ton	\$10.6M	\$3,607,000	\$0.55 - \$1.10
Anaerobic Digestion (AD)/Pre-Processing - WWTP	6%	\$77 / Ton - \$82 / Ton	\$11.9M	\$3,604,000	\$0.55 - \$1.10
Refuse Derived Fuel (RDF) Processing	56%	\$126 / Ton	\$322.9M	\$53,458,000	\$8.13 - \$16.26

Memo E
Potential Local Government Options and Policies
(with attachments)

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Memo

Date:	Friday, February 23, 2018
Project:	North Front Range Regional Wasteshed Planning Study – Phase 2
To:	North Front Range Regional Wasteshed Planning Coalition TAC
From:	Doug DeCesare and Wendy Mifflin, HDR, Inc.
Subject:	Potential Local Government Options and Policies

1. Introduction

The North Front Range Regional Wasteshed Planning Coalition Technical Advisory Committee (TAC) has initiated the second phase of its multi-year Regional Wasteshed Planning Study that identifies and analyzes options for developing a future regional solid waste management system. As part of this Study, the TAC is considering potential regulations and policies to be adopted that will enhance the infrastructure options chosen for the regional solid waste management system. The purpose of this memorandum is to provide a summary of potential regulations and policies and recommendations for consideration as infrastructure options are refined for the future Wasteshed solid waste management system.

The TAC asked HDR to evaluate eight potential regulations and policies for further consideration and to include information on the current local regulations and policies that have been adopted for each. The potential regulations and policies evaluated are:

- Hauler Licensing
- Process Control
- Waste Ban (Yard, C&D etc.)
- Free Market
- Flow Control
- Non-Exclusive Franchise
- County-Wide User Fee
- Incentives

2. Regulations and Policies Overview

Hauler Licensing

Hauler Licensing consists of an ordinance or statute that requires waste haulers to obtain a license, issued by government entities, to be able to operate a collection service for multiple waste streams from residents and businesses in the jurisdiction. Outcomes from a hauler licensing program can include: a fair operating environment for all haulers; guaranteed minimum collection safety requirements; access to disposal and recycling data for decision making about future programs and infrastructure; ensures that all transported waste is disposed or recycled in accordance with environmental regulations; and can create financial incentives for recycling and composting.

In the North Front Range Regional Wasteshed, Larimer County and the cities of Fort Collins and Loveland have adopted ordinances implementing hauler licensing. The following Table provides a comparison of local hauler licensing implemented by each municipality.

Table 1 – Overview of Local Hauler Licensing

Municipality	Municipal Code Section	Overview
City of Fort Collins	Chapter 15, Section 411 – Solid Waste Collection and Recycling Services (Appendix H)	<ul style="list-style-type: none"> • PAYT fee structure. • The City designates unlimited single stream recycling at no additional charge to residential customers. • Optional residential yard waste collection. • Designates disposal to the Larimer County Landfill or other State approved disposal site. • Establishes an annual per truck licensing fee.
City of Loveland	Chapter 7, Section 16 – Solid Waste Collection and Recycling (Appendix I)	<ul style="list-style-type: none"> • PAYT fee structure. • The City designates materials to be recycled on a yearly basis. • Designates disposal to the Larimer County Landfill or other State approved disposal site. • Establishes an annual per truck licensing fee.
Larimer County	Chapter 14, Section 121 – Commercial Waste Hauler Licensing (Appendix J)	<ul style="list-style-type: none"> • PAYT fee Structure. • Curbside collection of recyclables in the Urban Growth Areas of the City of Fort Collins and the City of Loveland. • Establishes an annual licensing fee.

In 2016, Boulder County, Colorado, adopted Ordinance #2016-01 (Appendix A) that implemented a hauler licensing policy applicable to all hauling companies that collect, transport or dispose of garbage, recyclables, compostables, construction and demolition waste and landscaping materials in unincorporated Boulder County. There are currently 38 licensed haulers in Boulder County.

The Boulder County hauler licensing ordinance requires the following:

- All haulers must provide volume based collection rates, or Pay-As-You-Throw (PAYT) disposal pricing tiers, based the amount of trash generated and disposed in a landfill.
- Single-stream recycling (all recyclables together in one bin) with unlimited curbside recycling collection must be provided.
- Curbside organics/compost collections provided in certain neighborhoods for food waste, grass clippings, leaves and small tree limbs and branches.
- Construction and demolition material recycling that diverts/recycles waste materials produced in the process of construction, renovation or demolition of structures.
- Segregation and composting of landscaping materials.

- Waste hauler annual reporting of the quantities and types of material hauled in Boulder County.
- Establishes an annual hauler licensing fee of \$50 for the first three vehicles operated and each additional vehicle is \$10.

Table 2 - Hauler Licensing Advantages and Disadvantages

Hauler Licensing	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Provides for a level playing field for trash haulers as all haulers are required to provide similar services. • Allows for the government entity to establish health and safety standards for the collection and disposal of materials. • Haulers set their own rates based on their cost to provide services. • Can reduce waste disposal while increasing recycling and composting. • Allows for the collection of license fees to offset program administration costs. • Requires annual reporting of discarded materials collected by haulers, which allows for tracking of waste type and volume. • Provides a mechanism for a jurisdiction to enact other policies (e.g., minimum processing standards, waste ban, etc.). 	<ul style="list-style-type: none"> • Requires staff to monitor the program, and ensure that all haulers are licensed, reporting and discarding materials as required by ordinance. • Requires annual reporting by haulers. • Is an added fee to waste haulers.

Process Control Ordinance

A Process Control Ordinance is a regulatory tool that obligates waste haulers to provide service which meets minimum standards established by the jurisdiction. Government entities adopt these ordinances for the protection of public health and safety within their communities and to direct the storage, collection, transport and disposal of solid waste to specific standards. Such measures support systems that protect human health and the environment, encourage implementation of diversion programs, and require minimum processing standards for waste materials.

In the North Front Range Regional Wasteshed, the City of Fort Collins, has implemented two Process Control Ordinances one through the Building Department for recycling of construction waste and one in 2017 for food waste from food stores as outlined in the following Table.

Table 3 – Overview of Local Process Control Ordinances

Municipality	Municipal Code Section	Overview
City of Fort Collins	Chapter 5, Section 27, R327 - Construction Waste Management Chapter 12, Section 12-23 – Collection Requirement – Food store food scraps (Appendix H)	<ul style="list-style-type: none">• For buildings or remodels over 2,500 square feet, a construction waste management plan is required that implements the recycling of concrete, masonry, wood, metals and cardboard with compliance certified by the hauler.• Requires food stores that dispose of more than 96 gallons of food scraps per week to haul to a facility, permitted by the State of Colorado, that processes food waste via waste water infrastructure or composting and bans landfill disposal.

In 2002, Alamance County, North Carolina adopted a process control solid waste ordinance to regulate storage, collection, transportation and disposal of solid waste within the jurisdiction (Appendix B). In 2009, the County adopted an additional ordinance targeting certain recyclables for source separation (plastics, glass, metal and all grades of paper) to improve diversion efficiency. The County operates a municipal solid waste landfill and a construction and demolition waste landfill.

The Alamance County process control ordinance requires the following:

- All household waste must be removed from each residence at least once per week.
- Residential garbage may only be stored in 32 gallon receptacle that meet County standards.
- Solid waste is directed to a permitted lined municipal landfill, or an incinerator.
- Requires residency in the County to use the Alamance County Landfill.
- Establishes standards for wastes accepted or denied at the landfill.
- Establishes targeted recyclables.
- Requires licensing from the Health Department for waste haulers as a prerequisite to franchising.
- Establishes franchising requirements for collection, transport, transfer station maintenance and disposal or recycling of solid waste.

Another form of process control can be used to set standards and requirements for waste handling, recycling and disposal during construction and/or demolition as part of the permitting process for development and construction projects. These types of ordinances can extend the life of landfills and help meet waste reduction and recycling goals.

In 2000, The City of San Diego adopted an ordinance that established a construction and demolition (C&D) debris diversion deposit program (Appendix C). The City owns a landfill, which is expected to reach capacity in 2030. Though the City and the private sector encourage voluntary construction and demolition debris diversion it had not been successful and the City was not in compliance with State of

California requirements. The deposit amounts are based on the type and size of construction based on square footage of the project (from \$0.20 to \$0.40 per square foot).

The San Diego process control ordinance for C&D diversion requires the following:

- All applicants for building or demolition permits must complete an application and pay a refundable deposit which demonstrates on-site reuse of C&D materials or that the C&D materials have been taken to a certified recycling facility or other approved donation/ reuse option.
- Deposits are refunded in exchange for proof of satisfactory C&D diversion for the development project.
- The City has adopted diversion rates for all waste materials including C&D to extend the life of the Miramar Landfill and to comply with AB 939 (California Integrated Waste Management Act).
- C&D materials must be hauled to certified recycling/reuse facilities, as established by rules and regulations set by the City.
- Exemptions to the program are also established.

Table 4- Process Control Ordinances Advantages and Disadvantages

Process Control Ordinance	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Allows for a municipality to establish certain levels of health and safety standards for storage, collection and disposal of materials. • Allows for the municipality to direct materials for disposal, recycling or composting to meet minimum standards for processing. • Requires waste haulers to meet or exceed the levels of health and safety standards determined by the municipality along with increased reporting standards. • Can help conserve landfill capacity through increased diversion. • Ensures compliance with potential State rules and regulations for waste handling and diversion. • Can encourage the establishment of certified recycling/composting facilities to accept materials. • Can provide monetary incentives to increase diversion (e.g., C&D waste deposit refund). 	<ul style="list-style-type: none"> • Requires waste to be disposed at certified facilities, which could increase costs. • Potential increase in costs for haulers depending on facility location and processing fees. • Adds additional reporting requirements for haulers. • Limits number of facilities with technological advancements. • Municipalities rely on landfill tip fees to fund programs and as materials are banned other program funding options need to be established.

Waste Ban Ordinance

A Waste Ban Ordinance excludes certain materials from legal disposal into landfills or other disposal facilities, with the intent of directing those materials instead to recycling/recovery facilities, or for other beneficial reuse. A ban can be enacted to prohibit various materials from landfills including organics (food waste or yard waste), construction and demolition debris, cardboard, electronics, tires and other readily recyclable materials.

The City of Fort Collins implemented waste bans for cardboard in 2013 and electronics in 2007 as outlined in the following Table.

Table 5 – Overview of Local Waste Bans

Municipality	Municipal Code Section	Overview
City of Fort Collins	Chapter 12, Section 12-22 - Required Recycling (Appendix H)	<ul style="list-style-type: none"> • Requires electronics to be recycled. • Requires cardboard to be recycling.

In 2012, the Alameda County Waste Management Authority in California adopted an ordinance that prohibits certain recyclable and compostable materials from the Alameda County landfills (Appendix D). The ordinance was prompted, in part, by a 2008 waste characterization study which found that 60% of solid waste going to landfills from Alameda County was readily recyclable or compostable.

The Alameda County waste ban ordinance requires the following:

- Corrugated cardboard, newspaper, white paper, mixed paper, glass food and beverage containers, metal food and beverage cans, HDPE and PET bottles, food waste and compostable paper are prohibited from landfill disposal.
- Businesses, multi-family homes and property owners shall not discard targeted materials such that they will be disposed of in a landfill.
- Those self-hauling waste to the landfill must also adhere to the rules for separation and waste bans for targeted materials.
- Source separated containers for targeted materials must be provided for service collection.
- All removal services collect and transport source separated covered materials for processing through a high diversion mixed waste processing facility.
- Owners and operators of landfills and transfer stations within Alameda County must separate targeted materials, process them through a high diversion mixed waste processing facility, file quarterly reports and submit a compliance plan.
- Licensed haulers must comply with the ordinance, and in addition, conduct customer outreach and education regarding the ordinance.
- Allows for inspection of facilities and records by the County.
- Establishes penalties for non-compliance, and allows for opt-in and opt-out by member agencies to the Authority.

Table 6 - Waste Ban Ordinance Advantages and Disadvantages

Waste Ban Ordinance	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Prevents the landfill disposal of specific, easily recycled material. • Can conserve landfill space through increased diversion. 	<ul style="list-style-type: none"> • Requires enforcement of the ban ordinance by the government entity. • Waste bans are only viable for materials with readily available processing facilities and end markets.

<ul style="list-style-type: none"> • Provides environmental and social benefits through reduction in air and water pollution, energy conservation and greenhouse gas emissions. • Enhanced economic development from materials processing and distribution. • Ensures compliance with potential State rules and regulations on diversion. 	<ul style="list-style-type: none"> • Municipalities rely on landfill tip fees to fund programs and as materials are banned other program funding options need to be established.
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Free Market Waste Disposal

Free Market Waste Disposal is a competitive, open market system in which waste collection and disposal is unregulated by local government entities and waste haulers are free to take waste to the disposal facility of their choice. The North Front Range Regional Wasteshed currently utilizes an open market system that allows haulers to establish their own collection rates, allows customers to choose their service provider for collection and disposal service, and does not regulate where waste is to be disposed.

Table 7- Free Market Waste Disposal Advantages and Disadvantages

Free Market Waste Disposal	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Customers have a choice of service providers. • Multiple haulers, including local/independent haulers, can provide service. • Haulers compete to provide service, which can be good for pricing. • Is the default system if no other regulations are enacted. 	<ul style="list-style-type: none"> • A government entity has very little control of collection services, the level of service and rates. • Multiple large vehicles traveling on the same streets which increases the risk to public safety, increased emissions and more wear and tear on roads. • No guarantee of a customer base for a hauler. • Little to no control of disposal to a municipally-owned landfill, which can create capacity issues and early closing of facilities. • Free market conditions rarely lead to significant recycling or composting as customers must pay extra for diversion services. • Can result in higher operating costs for haulers and higher prices for customers due to inefficiencies in collection.

Flow Control

Solid Waste Flow Control consists of legal provisions and ordinances that designate the places where municipal solid waste is taken for processing, treatment, and/or disposal. Flow Control guarantees a revenue source for capital and operating costs of facilities and can also supplement program costs for public education, household hazardous waste collection, and waste reduction and recycling programs.

In Washington State, local governments enter into Interlocal Agreements for cooperative management of solid waste in each jurisdiction. As an example, King County, Washington has entered into an Interlocal Agreement (Appendix E) with each city within the county boundaries, excluding the City of Seattle which handles municipal solid waste separately. These interlocal agreements provide for the cooperative handling of municipal solid waste, collaboratively maintaining and updating a comprehensive solid waste management plan, establishing goals for waste reduction and recycling and designating the system operator for funding and environmental liabilities.

The King County Interlocal Agreements contain the following provisions:

- The County is designated as the operating authority for transfer, processing, and disposal facilities including closure and post-closure responsibilities for the landfills.
- The County serves as the planning authority for the parties.
- The County maintains all financial policies to guide the system's operations and investments.
- The Cities provide for solid waste collection services within their corporate limits.
- The Cities designate the County system for disposal of all waste and require that waste be directed to facilities as authorized in the Comprehensive Solid Waste Management Plan, except for waste that is eliminated through recycling or prevention activities.
- The County is designated to set the disposal rates, establish operating rules for disposal, and the use of system revenues.
- Establishes environmental liability for the system related to clean-up of contaminated property and establishes a protocol to set aside disposal rates to cover these costs.
- Establishes an advisory committee that allows the parties to discuss and seek resolution to system issues and concerns.
- Outlines the requirements for preparation and adoption of the Comprehensive Solid Waste Management Plan.

Table 8 - Flow Control Advantages and Disadvantages

Flow Control	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Ensures financing for existing and future facilities. • Can provide for supplementary waste management services such as household hazardous waste collection, waste reduction and recycling programs and community education and outreach. • Provides a mechanism to cover costs to meet regulatory requirements, planning, and public participation activities. • Protects health, safety and the welfare of the citizens with greater control and oversight of solid waste management activities. • Protects natural resources by allowing the municipalities to designate disposal and recycling sites that meet required environmental standards. 	<ul style="list-style-type: none"> • Requires monitoring of the system to ensure that waste is brought to designated facilities. • Can impact current collection if a hauler has a current contract to direct waste to a designated facility. • Creates a monopoly for trash disposal.

Non-Exclusive Franchise

A Non-Exclusive Franchise is a system in which a municipality allows solid waste collection services to be provided by multiple private waste haulers within a service area and requires haulers to enter into a non-exclusive franchise agreement rather than applying for a hauler license. Although the Non-Exclusive Franchise agreement and hauler licensing serve similar purposes, the means of achieving each is different through either an agreement or an application. Municipalities choose to implement a non-exclusive franchise system when the open market system is unable to meet customer and service demands due to changes in Federal or State laws, changing public attitudes toward protecting the environment and customer desires for enhanced recycling and diversion programs.

In 2011, the City of Pasadena, California, established a non-exclusive solid waste collection franchise agreement for any company engaging in the business of collection, transporting, disposing, and recycling of solid waste within the city limits (Appendix F). Pasadena has 23 franchised haulers as of January 2018. A monthly report is required from each franchisee with a fee established at 23.066% of gross receipts, for Pasadena accounts collected, plus any liquidated damages assessed for non-compliance.

The Pasadena the non-exclusive franchise agreement requires the following:

- The term of each franchise is a maximum of five years and is granted at the sole discretion of the City Manager.
- Franchise fees are established on a yearly basis.
- Monthly reporting and payment of franchise fees are required.
- Requires the franchisee to dispose of solid waste at a permitted facility.
- Requires recycling services to all customers with minimum once per week collection.
- Requires educational and informational literature be distributed to customers.
- Requires recycling diversion rates of 75% per month diversion for construction and demolition debris, 60% per month diversion for all other solid waste with liquidated damages or exemptions for non-compliance.
- Franchisee must maintain a complete listing of all vehicles with the City and operate those vehicles in compliance with emissions standards.
- Establishes insurance requirements for franchisees.

Table 9 - Non-Exclusive Franchise Advantages and Disadvantages

Non-Exclusive Franchise	
Advantages	Disadvantages
<ul style="list-style-type: none">• Improves customer service by requiring standardized service.• Residents can have a choice of which hauler they utilize.• Gives a municipality the option to establish services levels and incentives.• Gives a municipality the control to direct collection services, disposal and recycling requirements.• Can enhance recycling efforts and participation by requiring separate collection of materials.	<ul style="list-style-type: none">• Multiple large vehicles traveling on the same streets which increases the risk to public safety, increased emissions and more wear and tear on roads.• Higher risk of non-compliance with a larger number of franchises.

<ul style="list-style-type: none"> Haulers compete to provide services which is good for pricing. 	
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County-Wide User Fee

County-Wide User Fees are established to recover the cost of siting, operating and closing solid waste facilities and are generally imposed county-wide through property tax assessment. These user fees can be used to pay for costs incurred for building and (potentially) for operating publicly-owned disposal or recovery facilities.

In 2011, Evans County, Georgia approved an ordinance that established an annual assessment and collection of user fees to pay for all costs associated with the collection and disposal of solid waste (Appendix G). The annual user fee is assessed against each residential dwelling and each owner of a commercial property in the amount of \$152.00 per year.

The Evans County ordinance has the following requirements:

- Provides for the definition of a residential dwelling and/or commercial unit.
- Establishes a fee to be collected annually on the property tax assessment.
- Authorizes the County Assessor as the administrator of the property tax assessment and collection.
- Allows for an exemption if the dwelling or commercial unit is not occupied.

Table 10 - County-Wide User Fee Advantages and Disadvantages

County-Wide User Fee	
Advantages	Disadvantages
<ul style="list-style-type: none"> Guarantees collection of fees through property tax assessment with penalties for non-payment. Provides stable funding for the collection, recycling, and disposal of materials and waste. User fees can be established for a variety of services to recover specific costs to provide services. 	<ul style="list-style-type: none"> All units are charged using the same assessment fee which is not based on disposal or recycling tonnages. Places an added assessment on property taxes.

Incentives

Incentives are programs that use economic tools to reward users that decrease the amount of waste produced and disposed or users that recycle or compost as a reduction method. Local governments can adopt policies including ordinances, contracts and franchises, solid waste facility permits, zoning regulations, reduced fees, source separation discounts, Pay-As-You-Throw garbage rates and volume based discounts in order to reward those who reduce, reuse or recycle waste.

All of these methods can be incorporated into the above potential regulations and policies that the TAC is considering as they move forward with selection of future waste handling methods and facilities in the North Front Range Wasteshed.

3. Key Findings and Recommendations

Key Findings

The following summarizes key findings resulting from review of potential local government options and policies:

- Currently, there are limited controls, policies and regulations in place in the Wasteshed to guarantee that waste is directed to sustainable infrastructure that supports the goals and objectives that the Coalition has established to enhance waste reduction and diversion.
- It is common practice for municipalities and local government to employ some method of regulatory control, whether it be through ordinances, policies or procedures to ensure waste is handled in an environmentally responsible manner.
- Due to the competitive nature of the waste industry, local governments can be subject to the risk of rising costs if regulatory control is not established.
- Regulatory control protects the health, safety and the welfare of the citizens by providing greater control and oversight of solid waste management activities and protects natural resources by allowing the municipalities to designate disposal and recycling sites that meet required environmental standards.

Recommendations

Given the Tier 1 infrastructure options that have been recommended by the Technical Advisory Committee (New County Landfill, Central Transfer Station, C&D Processing Facility, and Yard Waste Composting/Food Waste) for the future solid waste management system, the existing waste market, and the anticipated capture rates utilizing the projected waste generation in the five zones of the Wasteshed, the following recommendations are offered for consideration to achieve a successful solid waste management system that serves the citizens of the Wasteshed:

- The majority of municipal solid waste is generated within Zones 1 and 2 in the Wasteshed which primarily consists of the City of Loveland and City of Fort Collins, respectively. The City of Loveland currently provides waste collection services to over 90% of the residents within the city while in the City of Fort Collins waste collection is offered through an open market system utilizing private waste haulers. The City of Loveland disposes of municipal solid waste at the current Larimer County Landfill. Waste disposal within Zone 2 is subject to the private waste hauler's choice in waste disposal facilities which will greatly depend on hauling distance and competitive tipping fees. Zones 3, 4, and 5 of the Wasteshed are generally serviced by Larimer County's convenience centers and the Town of Estes Park's transfer station. The waste generated in these zones will most likely continue to be serviced

by Larimer County and their associated facilities. It is recognized that support of flow control may be a challenge within the Wasteshed and with Zones 1 and 2 generating much of the municipal solid waste, it is recommended to initiate a competitive tipping fee rate structure to capture appreciable volume in these zones.

- Construction and demolition debris makes up a large percentage of materials being disposed of at the Larimer County Landfill. In order to increase diversion, lengthen the life of disposal facilities, and achieve the goals and objectives set forth by the Coalition, it is recommended to develop and implement process control ordinances along with hauler licensing to direct mixed construction and demolition debris to an indoor processing facility that strives to recycle and/or reuse a significant portion of the waste (greater than 60%) and develop end markets for the materials. The processing facility would most likely include both manual and mechanical means of source separation and processing. With end market development, consideration must be given to other on-site reprocessing services that could utilize or beneficially re-use source separated products such as fines and other inert materials, clean wood, wallboard and carboard.
- It is common for yard waste to be collected separately from other waste materials which makes it easier to divert waste to a central composting facility. A significant amount of yard waste is generated within the Wasteshed with a portion going to existing compost facilities. However, the remaining portion of yard waste continues to be disposed of in landfills. A yard waste ban is recommended to deter the disposal of yard waste into landfills as the yard waste materials may be utilized in composting operations to create favorable end use products.
- Another waste stream identified that can be diverted from disposal is food waste. Food waste can be used in composting facilities and anaerobic digesters. Collection of food waste is typically the largest hurdle in developing facilities to handle food waste. It is recommended that the Coalition consider a hauler licensing or process controls ordinance that will detail a food waste recycling/diversion program for implementation over time. Much consideration should be given to the development of collection opportunities for Commercial and industrial food waste first which will likely be the easier waste stream to capture for increased diversion. It is recommended that the Coalition develop a timeline for identifying food waste customers and developing a collection system consistent within the Wasteshed.
- Single stream recycling is an important part of a solid waste management system's intent to divert waste. Larimer County includes a materials recovery transfer facility that handles a portion of the single stream recycling materials in the Wasteshed. However, with the current market trends and relatively low volume of recyclables, a fully functional materials recovery facility would not be sustainable. The Wasteshed could benefit from increased volume and recycling participation with new private/public relationships arriving at more stable and competitive rates for market ready products that can meet all new contamination thresholds. As such, it is recommended through hauler licensing that all single stream recycling materials be directed to the Larimer County materials recovery transfer facility.

- Next steps to accomplish the recommendations above may include:
 - Draft policy language should be developed for process controls, waste bans, and hauler licensing that will yield specific results associated with waste diversion, reduction, and recycling. Once drafted, the policies/codes should be vetted through each of the Coalition's government entities for comment.
 - Subsequent to vetting the draft policies/codes to each of the Coalition's governing entities, the TAC should work together to refine final policies/codes to achieve consistency amongst the members of the Coalition. During this period an education program should be developed to assist with conveying the goals and objectives of the final policies/codes.

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**REVISIONS TO THE BOULDER COUNTY
HAULER LICENSING ORDINANCE**

ORDINANCE NO. 2016-1

**AN ORDINANCE FOR THE LICENSING OF THOSE PROVIDING
COLLECTION AND/OR TRANSPORTION OF DISCARDED MATERIALS WITHIN THE
UNINCORPORATED AREA OF BOULDER COUNTY**

WHEREAS, boards of county commissioners are empowered by C.R.S. section 30-15-401(1)(a)(II) to inspect vehicles proposed to be operated in the conduct of transporting ashes, trash, waste, rubbish, garbage (referred to hereinafter as "landfill materials"), or industrial waste products or any other discarded materials; and

WHEREAS, boards of county commissioners are empowered by C.R.S. section 30-15-401(1)(a)(IV) to regulate the activities of persons collecting and transporting such materials within the unincorporated area by requiring each such person to secure a license from the County and charging a fee therefore; and to require adherence to such reasonable standards of health and safety as the board may prescribe and to prohibit any such person from commercially collecting or disposing of such materials without a license and when not in compliance with such standards of health and safety as may be prescribed by the board; and

WHEREAS, the Colorado legislature has expressly endorsed "local efforts ...focused toward the reduction of the volume ...of the waste stream ...through source reduction, recycling, composting, and similar waste management strategies." and also recognizes that "improper disposal of solid wastes poses significant public health risks and environmental hazards." Section 30-20-101, C.R.S.

WHEREAS, boards of county commissioners are empowered by C.R.S. section 30-15-401(1)(a)(VI) to require every person providing transportation of discarded materials to and from disposal sites to have, before commencing such operations, in such motor vehicle a motor vehicle liability insurance policy or evidence of such policy issued by an insurance carrier or insurer authorized to do business in the state of Colorado in the amounts required by 30-15-401(1)(a)(VI); and

WHEREAS, persons or companies providing transportation of landfill materials, or industrial waste products or any other discarded materials including electronic devices, recyclable materials, construction and demolition waste, architectural paint, landscaping materials and compostable materials within Boulder County, through their collection and transportation activities are able to supply the County with information necessary for long-term solid waste management planning and therefore should be required to submit annual information about their hauling activities to the County; and

WHEREAS, the County desires to encourage waste reduction, in order to further the waste diversion goals supported by the County; and

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

WHEREAS, it is the intent of this Ordinance to: (1) reduce the volume of waste, recyclables and compostables entering the waste stream and landfills; (2) encourage the recycling of certain discarded materials; (3) obtain information for the tracking and planning of waste diversion; and (4) to protect the health, safety and welfare of the public; and

WHEREAS, the County desires to encourage cities and towns within the County to enact ordinances to accomplish the same goals in incorporated areas of the County, and utilize this document as a model; and

WHEREAS, cities and towns within the County may consent to have this ordinance apply within their boundaries, as provided in section 30-15-401(8), C.R.S.

NOW, THEREFORE BE IT ORDAINED BY THE COUNTY COMMISSIONERS OF THE COUNTY OF BOULDER AS FOLLOWS:

SECTION 1: DEFINITIONS

A. For the purpose of this Ordinance, the following words, terms, and phrases will have the following meanings:

1. The term “Architectural Paint” shall mean interior and exterior architectural coatings sold in containers of 5 gallons or smaller, as defined in C.R.S. §25-17-403.
2. The “Boulder County Recycling Center” shall mean the material recovery facility (MRF) owned by Boulder County located at 1901 63rd St., Boulder, CO.
3. The term “Commercial Customer” shall mean any premises where a commercial, industrial, or institutional business or enterprise is undertaken, including, without limitation, retail establishments, restaurants, hospitals, manufacturing factories, schools, day care centers, office buildings, nursing homes, clubs, churches, and public facilities that receive Regular or Periodic Landfill Materials Collection service.
4. The term “Compostable Materials” shall mean Discarded Materials from any residential or commercial source that are collected separately for the purpose of such materials being composted, or otherwise processed into soil amendment, fertilizer, mulch, sludge, biogas, fuel, or electricity.
5. The term “Construction and Demolition or C&D Materials” shall mean the waste materials produced in the process of construction, renovation, or demolition of structures (including buildings, bridges and roads). In addition, it includes the materials generated as a result of natural disasters. Components of C&D material include materials or debris such as asphalt, concrete, dimensional lumber,

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

fiberboard, plywood, ferrous metals, non-ferrous metals, asphalt shingles, cardboard, carpet, brick, wallboard, plastic, and cardboard.

6. The term “Discarded Materials” shall mean all putrescible and non-putrescible solid wastes discarded from any residential or commercial sources including Recyclable Materials, Compostable Materials, Construction and Demolition (C&D) Materials, Electronic Device, Architectural Paint, Reuse Materials, Landscaping Materials, and Industrial Waste. The term “Discarded Materials” shall exclude liquid wastes, sewage, sewage sludge, septic tank or cesspool pumpings; discarded or abandoned vehicles or parts of; residential appliances containing chlorofluorocarbon refrigerants; materials used as fertilizers or for other productive purposes, household hazardous wastes, and hazardous materials as defined in the rules and regulations adopted pursuant to the Hazardous Materials Transportation Act, 49 U.S.C. §§ 5101-5127.
7. The term “Electronic Device” (referred to hereinafter as “e-scrap”) shall mean waste electronic devices including television sets, central processing units (CPUs), computer monitors, peripherals, printers, fax machines, laptops, notebooks, ultra books, net books, electronic tablets, digital video disc (DVD) players, video cassette recorders (VCRs), radios, stereos, video game consoles and video display devices with viewing screens greater than four inches diagonally as defined in C.R.S. §25-17-302(3)(a).
8. The term “Hauler” shall mean person or company that provides the collection transportation and/or disposal of Discarded Materials for another, for a fee, or for no fee, except as exempted in Section 2B below.
9. The term “Landfill Materials” shall mean Discarded Materials from Residential, Commercial and Multi-Family Customers, excluding Recyclable Materials and/or Compostable Materials that have been source-separated for collection.
10. The term “Landscaping Materials” shall mean organic material such as grass clippings, leaves, twigs, branches, and other garden refuse.
11. The term “Multi-family Customer” shall mean a residential structure or mobile home park with two or more residential units that receive Regular or Periodic Landfill Materials Collection service in a centralized collection area.
12. The term “Periodic Landfill Materials Collection” shall mean the regular, or on-call collection of landfill materials from Residential, Commercial or Multi-Family Customers, on a schedule of less often than once every five weeks.

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

13. The term “Regular Landfill Materials Collection” shall mean the regular collection of landfill materials from Residential, Commercial or Multi-Family Customers, on a schedule of more often than once every five weeks.
14. The term “Residential Customer” shall mean all residential single-family structures that receive Regular or Periodic Landfill Materials Collection service.
15. The term “Recyclable Materials” shall mean Discarded Materials from any residential or commercial source that are collected separately for the purpose of such materials being re-processed into new or different products or packaging materials, provided that such materials have been designated in subsection 6B of this Ordinance as recyclable.
16. The term “Reuse Materials” shall mean Discarded Materials from any residential or commercial source that are collected separately for the purpose of reusing in the same or different way after reclaiming or reprocessing.

SECTION 2: LICENSE REQUIRED

A. No person or entity shall operate as a Hauler within the unincorporated area of Boulder County, Colorado, or any municipality which consents to the application of this ordinance within its jurisdiction, without a current Annual Hauler License for such activity.

B. Exemptions. The following persons or entities shall not be subject to this ordinance.

1. A civic, community, benevolent or charitable nonprofit organization collecting, transporting and marketing recyclables solely for the purpose of raising funds for a civic, community, benevolent or charitable activity.
2. A property owner or agent thereof who transports Discarded Materials left by a tenant upon such owner's property, so long as such property owner is not compensated for such collection service on a regular or continuing basis;
3. Demolition or construction contractors or landscaping companies that produce and transport less than one ton annually of Discarded Materials.

SECTION 3: LICENSING PROCESS

A. The application for a Hauler License shall be submitted to the Boulder County Resource Conservation Division on a completed Boulder County Hauler Licensing Program Application and Self-Certification Form.

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

SECTION 4. IMPLEMENTATION STANDARDS

A. The Boulder County Resource Conservation Division, shall set standards for the implementation of the Hauler Licensing Program including the amount of license fees, the area of Boulder County subject to unlimited residential recycling requirements, schedule for requiring collection of residential compostable materials and area of the county to be covered by this requirement, and the designation of Recyclable Materials.

SECTION 5: LICENSE FEES

A. The Boulder County Resource Conservation Division shall issue a Hauler License upon the applicant satisfying the requirements herein, and upon full payment of an annual license fee, as specified in the Hauler Licensing Implementation Standards issued by the Resource Conservation Division. All license fees shall be paid in full and shall accompany the application for such license. The amount of the license fee shall be based on the actual cost of administering the Hauler Licensing Program.

SECTION 6: LICENSEE REQUIREMENTS

A. Annual Reporting

All haulers will submit annual reports for Discarded Materials collected from the unincorporated areas of Boulder County or any municipality which consents to the application of this ordinance within its jurisdiction, without a current Annual Hauler License for such activity.

Annual reports will include the following information:

- Weight (in tons) of the following:
 - Discarded Materials
 - Landfill Materials
 - Total Landfilled C&D Materials
 - Total Recycled C&D Materials
 - Recyclable Materials (by commodity or aggregated into commingled containers; mixed paper; single stream (commingled containers combined with mixed paper))
 - Compostables
 - E-scrap
 - Landscaping Materials
 - Architectural Paint

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

- Reuse Materials
 - Other information deemed necessary as waste diversion reports are further developed
- Name and final destination facility(s) of landfill, recycling, composting, C&D, e-scrap, architectural paint, reuse materials, and/or landscape materials

Reports shall be submitted to the Boulder County Resource Conservation Division by January 31, each year, via Boulder County's ReTRAC software or other software designated by Boulder County.

B. Designation of Recyclable Materials

Changes to the list of designated Recyclable Materials shall be proposed by the Resource Conservation Division to the Board of County Commissioners, after notice to the Resource Conservation Advisory Board (RCAB) and representatives of the licensed Haulers operating within the unincorporated county before they can be added to the Implementation Standards.

C. Service for Multi-family Customers and Commercial Customers

Haulers who collect Discarded Materials including Recyclable Materials and Compostable Materials from Multi-family Customers and/or Commercial Customers shall offer such services with a frequency as is necessary to prevent overflow from the collection containers utilized for the collection and preparation of such material by such Multi-family and Commercial Customers.

D. Recycling service for residential customers

Haulers that provide Regular or Periodic Landfill Materials Collection services to Residential Customers shall also provide to these customers weekly or bi-weekly collection of recyclables and shall charge a single rate for Landfill Materials Collection and collection of unlimited amounts of recyclable material.

Each Hauler may provide household recycling containers for the collection and preparation of recyclables to all residential customers. Such Haulers may also establish such reasonable and industry-accepted requirements, rules, or regulations for the separation and preparation of Recyclable Materials as are necessary to provide for the orderly collection of Recyclables Materials. Except for materials not properly prepared for recycling, Haulers may not dispose of Recyclable Materials set out for collection by their customers by any means other than delivery to a lawfully operating recyclables processing facility.

In the event the Hauler elects to perform collection of waste, including Recyclable Materials, through subcontractors or agents, such agency relationship shall not relieve the Hauler of responsibility for compliance with the provisions of this subsection or any rule promulgated hereunder.

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

All Recyclable Materials placed for collection shall be owned by and be the responsibility of the customer until the materials are collected by the Hauler. No person other than the person placing the Recyclable Materials for collection or that person's hauler shall take physical possession of any Recyclable Materials separated from landfill materials, set out in the vicinity of the curb, and plainly marked for Recyclable Material collection.

E. Compost service for residential customers

Haulers that provide Regular or Periodic Landfill materials Collection services to Residential Customers in the urbanized areas, identified as Region 5 on the Boulder County Resource Conservation Division Waste Hauler Ordinance Regions map provided yearly to licensed haulers, shall also provide to these customers weekly or bi-weekly collection of a minimum of 96 gallons Compostable Material and shall charge a single rate for Landfill materials Collection and collection of Recyclable and Compostable Material.

Each Hauler may provide household compost collection containers for the collection of Compostable Material to all residential customers. Such Haulers may also establish such reasonable and industry-accepted requirements, rules, or regulations for the separation and preparation of Compostable Material as are necessary to provide for its orderly collection. Except for materials not properly prepared for composting, Haulers may not dispose of Compostable Material set out for collection by their customers by any means other than delivery to a lawfully operating compostables processing facility.

In the event the Hauler elects to perform collection of waste, including Compostable Material, through subcontractors or agents, such agency relationship shall not relieve the Hauler of responsibility for compliance with the provisions of this subsection or any rule promulgated hereunder.

All Compostable Material placed for collection shall be owned by and be the responsibility of the customer until the materials are collected by the Hauler. No person other than the person placing the compostable materials for collection or that person's hauler shall take physical possession of any compostable materials separated from landfill materials, set out in the vicinity of the curb, and plainly marked for compostable material collection.

F. Volume-based rates

Haulers that provide Regular or Periodic Landfill Materials Collection services to their Residential customers shall charge these customers for this service on the basis of the volume of the Landfill Materials containers subscribed to by the customer for Regular or Periodic Landfill Materials collection by the Hauler.

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In order to encourage waste reduction by offering smaller volume collection, each Hauler shall establish a single standardized price to be charged for the collection of a base volume of 32, 64 and 96 gallons, which are the typical volumes of Garbage can or cart used by a Residential Customers. No hauler may sell only one volume of service. Each hauler shall charge an incremental standardized price for each base volume unit of Landfill Material subscribed to or placed by the customer, whichever is more, regardless of the number of containers placed by the customer for collection.

Each Residential Customer shall be afforded the opportunity to subscribe to service limited to 32 gallons only, 64 gallons only, or 96 gallons only. The provisions of this subsection shall not be construed as prohibiting any Hauler from also establishing rules and regulations regarding the safe maximum weight of containers of Landfill Materials and/or Recyclable Materials or Compostable Materials. A Hauler may refuse to collect any Landfill Materials container which is overloaded or which contains a volume of Landfill Materials greater than the rated or specified volume of such container or shall account for and bill the customer for the collection of such excess Landfill Materials.

Special pickups for bulky items are permitted at an additional fee.

G. Flat monthly fee

In addition to the volume-based rates, Haulers may establish a flat monthly fee that may be charged to Residential Customers regardless of whether Landfill Materials, Recyclable or Compostable Materials are placed by the customer for collection during the month. The flat monthly fee may be charged for the purpose of covering the combined fixed operational costs for collecting Landfill Materials and Recyclable Materials and Compostable Materials.

The fee shall not exceed the monthly volume-based rate charged, assuming the collection of only one standard Landfill Materials container (approximately 32 gallons) per week. All bills for services provided by such contractor to Residential Customers shall clearly identify both the flat monthly fee and any volume-based fees charged to the customer for the collection of Landfill Materials.

Nothing herein shall prevent or prohibit such Hauler from charging additional fees for providing services in addition to collection of Landfill Materials, Recyclable Materials or Compostable Materials.

H. Multi-family and Commercial volume-based rates

Haulers that provide Landfill Materials Collection, Recycling Collection, and/or Compost Collection services to their Multi-family and Commercial customers shall charge these customers for this service on the basis of the volume of the containers subscribed to by the customer for collection by the Hauler.

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

A Hauler may refuse to collect any Landfill Materials container which is overloaded or which contains a volume of Landfill Materials greater than the service subscribed to or specified volume of such container or shall account for and bill the customer for the collection of such excess Landfill Material.

Special pickups for bulky items are permitted at an additional fee.

I. Notification of new customers

Hauler shall notify New Residential Customers in writing that the service includes the collection of Recyclable Materials, which materials are designated for recycling collection in subsection 6B, and of such rules and regulations as have been established by the Hauler for the orderly collection or Recyclable Materials as authorized by subsection 6E regarding the acceptable weight and volume for the collection of Recyclable Materials.

Haulers shall also notify new Residential Customers that the service includes the collection of Compostable Materials pursuant to Section 6J.

J. Disposition of Recyclable Materials

All Recyclable Materials placed for collection shall be owned by and be the responsibility of the customer until the materials are collected by the Hauler. No person other than the person placing the Recyclable Materials for collection or that person's hauler shall take physical possession of any Recyclable Materials separated from Landfill Materials, set out in the vicinity of the curb, and plainly marked for recyclable material collection.

Each Hauler shall haul all the customer's Recyclable Materials to the Boulder County Recycling Center, a publicly owned facility located at 1901 63rd Street Boulder, Colorado 80301, or to another recycling facility, at the discretion of the hauler.

K. County to Supply Information

The County may produce an educational flyer about recycling and waste reduction opportunities in Boulder County. Haulers shall copy and distribute this flyer, not to exceed one sheet of paper in length, to all their Residential, Multi-Family and Commercial customers, at no charge to the County.

SECTION 7: ELECTRONICS COLLECTION LANDFILL BAN

A. In accordance with section 25-17-301 to 308, C.R.S., the "Electronics Recycling Job Act," haulers are prohibited from knowingly collecting the following electronic equipment for landfill disposal:

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

Waste electronic devices include television sets, central processing units (CPUs), computer monitors, peripherals, printers, fax machines, laptops, notebooks, ultra books, net books, electronic tablets, digital video disc players, video cassette recorders and video display devices with a screen greater than four inches.

Haulers may not collect electronics from industry, businesses, governmental agencies, institutions and schools unless the material is being managed under the Universal Waste Rule (Colorado Hazardous Waste Regulations 6 CCR 1007-3 Part273)

SECTION 8: AUDIT, PENALTIES FOR NON-COMPLIANCE

A. It shall be a violation of this Hauler Licensing Ordinance 2016-1 for any person, firm or entity to engage in any commercial waste hauling within the unincorporated area of Boulder County without first having obtained a license for said operation. Each separate Periodic Landfill Materials Collection service or each separate collection from a Residential, Multi-family or Commercial Customer of Discarded Materials conducted without a license shall constitute a separate violation. Any such violation shall be punishable by a fine of not more than five hundred dollars (\$500.00) for each separate violation.

B. Any other violation of this Waste Hauler Licensing Ordinance 2016-1 shall be punishable by a fine of not more than five hundred dollars (\$500) for each separate violation and/or may result in the suspension or revocation of the license.

C. Each Hauler shall make its records available for audit by the County at a location within the Denver metropolitan area during regular business hours when requested by the County in order to allow it to verify Hauler compliance with the provisions of this Ordinance. Among other records, each Hauler shall make available for review all customer invoices, scale tickets and similar documents reflecting actual pricing to customers, as well as final destination of materials collected. All information that is confidential pursuant to the provisions of the Colorado Open Records Act, § 24-72-201, et seq., C.R.S., shall be treated as such.

D. Law enforcement personnel may use the Penalty Assessment Procedure described in C.R.S. section 16-2-201 for violations of this Hauler Licensing Ordinance 2016-1. This statute permits an arresting officer to issue a penalty assessment notice and release an alleged violator upon the terms of the notice or take the alleged violator before a county court judge. The penalty assessment notice shall be a summons and complaint, and shall contain the identification of the person, firm or entity which has violated this Ordinance. The penalty assessment notice shall also specify the offense, the applicable fine, and require that the alleged violator pay the fine or appear to answer the charge at a specified time and place.

REVISIONS TO THE BOULDER COUNTY HAULER LICENSING ORDINANCE

E. No enforcement action for a violation of this Hauler Licensing Ordinance 2016-1 shall be taken more than one calendar year after the date on which said violation occurred.

SECTION 9: SAVINGS CLAUSE

A. If any section, clause, sentence or part of this ordinance is adjudged by any court of competent jurisdiction to be invalid, such invalidity shall not affect, impair or invalidate the other provisions of this ordinance which can be given effect without such invalid provision.

SECTION 10: REPEAL OF ORDINANCE 95-2

This ordinance shall be known as and be referred to as the "**Commercial Waste Hauler Licensing Ordinance 2016-1.**" Commercial Waste Hauler Licensing Ordinance 2007 -01 is hereby repealed and re-enacted as Commercial Waste Hauler Licensing Ordinance 2016-1 herein.

SECTION 11: EFFECTIVE DATE

This ordinance shall be effective thirty days after publication and adoption on second reading.

INTRODUCED, READ AND ADOPTED ON FIRST READING November 10 2016,
and ordered published in the Times-Call.



THE BOARD OF COMMISSIONERS
OF THE COUNTY OF BOULDER, COLORADO

Elise Jones, Chair

(RECUSED)

Cindy Domenico, Vice Chair

ATTEST:

Clerk to the Board

Deb Gardner, Commissioner

**REVISIONS TO THE BOULDER COUNTY
HAULER LICENSING ORDINANCE**

ADOPTED ON SECOND AND FINAL READING on November 29, 2016.



THE BOARD OF COMMISSIONERS
OF THE COUNTY OF BOULDER, COLORADO

Cindy Domenico
Cindy Domenico, Vice Chair

ATTEST:

Debra S. Lacey
Clerk to the Board

CERTIFICATE

I hereby certify that the foregoing Ordinance 2016-1 was introduced, read and adopted on first reading at the regular meeting of the Board of County Commissioners of the County of Boulder on November 10, 2016, and the same was published in full in the Times-Call, a newspaper of general circulation published in Boulder County, on November 16, 2016, and thereafter was adopted on second and final reading at a regular meeting of the Board of County Commissioners of the County of Boulder on November 29, 2016.

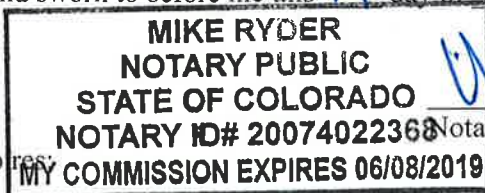
Patricia Hall
Clerk and Recorder

State of Colorado)
)ss.
County of Boulder)

Subscribed and sworn to before me this 14th day of December, 2016.

(SEAL)

My Commission Expires:



Notary Public

ALAMANCE COUNTY
SOLID WASTE ORDINANCE
AMENDED

BOARD OF COMMISSIONERS FOR THE COUNTY OF ALAMANCE DOTH ORDAIN:

Section I. PURPOSE

Be it ordained by the Alamance County Board of Commissioners that the following regulations for the protection of the public health and safety are hereby adopted pursuant to authority granted by Section 136 of Chapter 153A of the General Statutes of North Carolina, and shall, among other things, govern the storage, collection, transporting, and disposal of solid waste in Alamance County.

Section II. DEFINITIONS

The following definitions apply in the interpretation and enforcement of this ordinance:

A. Areas requiring daily coverage: Areas designated for the disposal of solid waste, and which necessitate a daily covering of soil or other material as approved by the State.

B. Board: Board of Commissioners of Alamance County.

C. Bulky waste: The remains of, or pieces and parts of, large items of solid waste such as household appliances, furniture, automobiles, large auto parts, machinery, trees, stumps, or other tree remnants greater than six inches in diameter and other oversized or nonputrescible solid waste, both combustible and noncombustible, whose large size precludes or complicates their handling by normal solid waste collections, processing or disposal methods.

D. Buy-back Center: A commercial venture consisting of the purchase or repurchase from the public of Target Recyclables or other recyclable materials for resale or reuse at a location where Residential Generators and Commercial Generators bring Target Recyclables or other recyclable materials to the center.

E. Charitable organization: An organization as defined in Section 501(c)(3) of the Internal Revenue Code which is primarily set up for the purposes of receiving and redistributing donated goods.

F. Collection: The act of removing solid waste, residential household garbage or recyclable material from a point of generation to a central storage point or to a disposal site, and from a central storage point to a disposal site.

G. Commercial Generator: Any generator of Target Recyclables located in Alamance County other than a Residential Generator, and includes but is not limited to businesses, institutions, and public entities.

H. Commercial Hauler: Any Person, whether or not for hire or profit, which collects and/or transports Target Recyclables and/or Solid Waste originated from a location other than the Person's residence or place of business. The operation of a Buy-back Center shall not be deemed activities of a Commercial Hauler. Excluded from this definition is any eleemosynary organization.

I. Commercial solid waste: Solid waste generated by stores, offices, restaurants, warehouses, and other non-manufacturing activities.

J. Construction and demolition waste: Solid waste including, but not limited to, waste building materials, packaging, and rubble resulting from construction, remodeling, repair, or demolition operations on pavements, houses, commercial buildings, or other structures, but not including inert debris, land-clearing debris, or yard trash.

K. Debris: Means the remains of, or pieces and parts of destroyed buildings, automobiles, machinery, furniture and other nonputrescible solid wastes, combustible and noncombustible.

L. DEHNR: Department of Environment, Health and Natural Resources of North Carolina.

M. Garbage: All putrescible waste, including food waste, animal offal and carcasses, and recognizable industrial by-products, but excluding sewage and human waste, and shall mean and include all such substances from all public and private establishments except residences.

N. Hazardous waste: A solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may:

a. Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or

b. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

O. Health Director: The director of the Alamance County Health Department, or his authorized representative.

P. Industrial solid waste: All garbage and refuse from other than residential establishments.

Q. Inert debris: Solid waste solely consisting of material that is virtually inert and is likely to retain its physical and chemical structure under expected conditions of disposal.

R. Institutional solid waste: Solid waste generated by educational, health care, correctional, and other institutional facilities.

- S. Land-clearing debris: Solid waste generated solely from land clearing activities.
- T. Medical waste: Any solid waste which is generated in the diagnosis, treatment or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals, but does not include any hazardous waste, radioactive waste, or those substances excluded from the definition of solid waste.
- U. Person: Any individual, partnership, corporation, company, association, governmental unit or agency, or other legal entity.
- V. Premises: A definite portion of real estate including land with its appurtenances, a building, or part of a building.
- W. Radioactive waste: Any waste that emits ionizing radiation spontaneously.
- X. Rubbish: Nonputrescible solid wastes. Rubbish consists of both combustible and noncombustible materials, such as, paper, cardboard, tin cans, yard waste, wood, glass, bedding, crockery, metals and similar objects and materials.
- Y. Refuse: All non-putrescible waste, including ashes.
- Z. Residential Generator: An individual household, dwelling, apartment, or other place of residence located in Alamance County, which produces Target Recyclables.
- AA. Residential household garbage: All putrescible waste, including food waste, and non-putrescible waste both combustible and non-combustible, originating from residences, including paper, cardboard, plastic or metal food or household chemical containers, wood objects, glass, bedding, crockery, metals, and other similar objects or materials, but specifically excluding bulky waste, animal offal and carcasses.
- BB. Scrap Metal: Discarded steel, ferrous, copper and other metallic articles generated from residential, commercial, and industrial sources such as bedsprings, machinery, auto parts, lighting fixtures, shelving units and similar units.
- CC. Scrap Tire: A tire that is no longer suitable for its original, intended purpose because of wear, damage or defect.
- DD. Solid waste: Hazardous or non-hazardous garbage, residential household garbage, yard trash, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, domestic sewage and sludges generated by the treatment thereof in sanitary sewage collection, treatment and disposal systems, and other material that is either discarded or being accumulated, stored or treated prior to being discarded, or has served its original intended use and is generally discarded, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, institutional, commercial, and agricultural operations, and from community activities. The term does not include: (a) fowl and animal fecal waste; (b) solid or dissolved material in (i) domestic sewage and sludges generated by the treatment thereof

in sanitary sewage collection, treatment, and disposal systems which have a design capacity of more than 3,000 gallons or which discharge effluents to the surface waters; (ii) irrigation return flows; and (iii) wastewater discharges and the sludges incidental thereto and generated by the treatment thereof which are point sources subject to permits granted under section 402 of the Water Pollution Control Act, as amended (P.L. 92-500), and permits granted under G.S. 143-215.1 by the Environmental Management Commission; (c) oils and other liquid hydrocarbons controlled under Article 21A of Chapter 143, North Carolina General Statutes; (d) any source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954 as amended (42 U.S.C § 2011), or radioactive material as defined by the North Carolina Radiation Protection Act, G.S. 104E-1 through G.S. 104E-23; or (e) mining refuse covered by the North Carolina Mining Act, G.S. 74-46 through 74-68, and regulated by the North Carolina Mining Commission. Solid waste shall include for the purpose of this ordinance the definitions: Bulky waste, Commercial solid waste, Construction and Demolition waste, Debris, Garbage, Hazardous waste, Industrial solid waste, Inert debris, Institutional solid waste, Land clearing debris, Medical waste, Residential household garbage, Rubbish, Scrap metal, Scrap tires, White goods, and Yard trash.

EE. Solid waste disposal site: A location permitted by DEHNR at which solid waste is disposed of by incineration, lined municipal solid waste landfill, construction/demolition landfill, or other approved method.

FF. Solid waste receptacle: Large metal container, commonly known as a dumpster, used for the temporary storage of solid waste and capable of being automatically emptied into collecting vehicles or transported to the county landfill.

GG. Target recyclables: As to Residential Generators means newspapers, corrugated cardboard, aluminum cans, food and beverage glass bottles and glass jars which are either clear or brown in color; and as to Commercial Generators means in addition to these items listed office paper (including computer paper and shredded office paper).

HH. White goods: Inoperative and discarded refrigerators, ranges, water heaters, freezers, and other similar domestic and commercial large appliances.

I I. Yard trash: Solid waste solely consisting of vegetative matter resulting from landscaping maintenance, including grass clippings.

Section III. REMOVAL, STORAGE, AND DISPOSAL OF WASTE

A. No owner, occupant, tenant, or lessee of any property shall deposit, store, or permit to accumulate any solid waste upon his property that is not stored or disposed of in a manner prescribed by this ordinance.

B. The owner, occupant, tenant, or lessee of any property shall remove or cause to be removed all residential household garbage from his property at least once each week (7-day period) or before harborage of such waste creates a health hazard, whichever period is shorter.

C. Residential household garbage shall be stored only in a container that is durable, rust resistant, non-absorbent, watertight, and easily cleaned, with a close-fitting, fly-tight cover in place, rodent proof, with adequate handles or bails to facilitate handling. The capacity of the container may not exceed 32 gallons. Solid waste receptacles, as defined by this ordinance, may also be used for storage provided they meet the requirements of this subsection. The number of containers shall be adequate to store one week's accumulation of residential household garbage. Each container shall be kept clean so that no odor or other nuisance condition exists. Garbage bags, the capacity of which shall not exceed 32 gallons, are a permissible residential household garbage container.

D. No owner, occupant, tenant, or lessee of a building or dwelling, shall place or leave, or cause to be placed or left, outside a building or dwelling any solid waste for longer than two weeks; however, solid waste that provides substantial risk that the same would provide food or harborage for rodents, attract, feed or provide for breeding of flies, mosquitoes, or vermin, or in any manner that would create a health, fire, or safety hazard shall be removed immediately.

E. No owner, occupant, tenant, or lessee of a building or dwelling or any other person shall burn solid waste except as permitted by local, state, and federal regulations, laws and ordinances. The burning of vegetative matter from land clearing is prohibited within 1,000 feet of another residence.

F. No owner, occupant, tenant, or lessee of a building or dwelling shall bury or submerge in water any solid waste material that is not permitted by proper and legal solid waste management and disposal practices.

G. No owner, occupant, tenant, or lessee of a building or dwelling may leave outside the building or dwelling, in a place accessible to children, any abandoned or unattended icebox, refrigerator or other receptacle that has an airtight door without first removing the door (G.S. 14-318.1)

H. Solid waste shall be disposed of in one of the following ways:

1. In a lined municipal solid waste (MSW) landfill approved by the DEHNR.
2. In an incinerator that has all required local, state, and federal air pollution control permits.
3. If by an individual, and if generated at his residence on his property, in a manner approved by the health director and any other appropriate authority.
4. By any other method, including reclamation and recycling processes, that has been approved by DEHNR.

I. In addition to the methods listed in Section III (F) above, only residential household garbage may be disposed of in solid waste receptacles provided by the county at the landfill.

J. Construction and demolition waste may be disposed of at solid waste disposal sites approved by DEHNR.

K. Medical, hazardous, and radioactive waste shall be disposed of according to written procedures approved by the DEHNR.

L. Any person collecting and transporting solid waste generated on his property for disposal at an approved disposal site shall comply with Sections VI (F)(1) and (2) of this ordinance concerning vehicles and containers.

M. Any person licensed and franchised to collect residential household garbage shall not be required to pick up more than three (3) containers of garbage, each container to be no larger than 32 gallons, in accordance with Section VII (H).

N. All solid waste receptacles and transfer trailers containing solid waste shall be removed for disposal to a solid waste disposal site at least once each week.

Section IV. LINED MUNICIPAL SOLID WASTE LANDFILL

A. The lined municipal solid waste landfill and solid waste receptacles of Alamance County may be used only for the disposal of solid waste generated in Alamance County by any person who is a resident of Alamance County during regular hours of operation of the landfill and solid waste receptacles. (1) In order to determine residency in Alamance County, the landfill attendant is authorized to ask for identification. Anyone refusing to provide the information requested will be denied use of the solid waste facilities. Solid waste and residential household garbage shall be disposed of at the landfill in the manner and according to the procedures required by the landfill manager or his representative. (2) Anyone not disposing of their waste at the landfill as directed by the management shall be subject to administrative penalties for costs or damages incurred as provided in Section VIII of this ordinance.

B. The following waste shall not be accepted at the landfill:

a. Radioactive waste (except as specifically approved by the State Radiation Branch on a case-by-case basis);

b. Medical waste (except as provided in SECTION III (I));

c. Wet sludge;

d. Live ashes;

e. Hazardous waste; provided, however, non friable asbestos may be disposed of in the lined municipal solid waste landfill upon approval by the State of North Carolina and in a manner approved by the landfill manager;

- f. Solid waste generated outside of the boundaries of Alamance County;
- g. Soils of an unknown point or origination which have not met state requirements for waste determination testing and analysis;
- h. Whole tires;
- i. Target recyclables;
- j. Yard trash

C. Diseased dead animals shall be placed in heavy-duty plastic bags. The bags shall be sealed and plainly marked as to contents and disease. The landfill manager reserves the right to refuse acceptance of certain diseased animals.

D. A tipping fee shall be charged to all users of the landfill. This tipping fee charge or total charge shall be based on the number of tons of material brought for disposal, except that there may be a minimum fee. The Board shall adopt a schedule of fees from time to time, which shall be effective until amended or replaced.

E. A tipping fee shall not be charged on certain material as designated by the Board. Charitable organizations shall not be charged a tipping fee for those donated items unusable as a part of their operation. The North Carolina Department of Transportation shall not be charged a fee for disposing of roadside garbage.

F. A surcharge equal to the applicable tipping fee or Twenty-five Dollars (\$25.00), whichever is greater, shall be assessed against any person who empties loads containing any amount of target recyclables into the lined municipal solid waste landfill, solid waste receptacles, construction/demolition cell, or any other area of the landfill not specifically designated for recyclables. This surcharge shall be assessed in addition to any applicable tipping fee. This surcharge shall not be assessed against the North Carolina Department of Transportation or charitable organizations.

G. No material shall be removed from the landfill premises or solid waste receptacles without permission of the landfill manager.

H. No lead acid batteries, used motor oil or white goods shall be disposed of at the lined municipal solid waste landfill, solid waste receptacles, construction/demolition cell, or any other area of the landfill not specifically designated for the aforementioned materials.

Section V. SOLID WASTE RECEPTACLES

A. Solid waste receptacles located at the landfill are maintained for the convenience of county residents/property owners on land owned or leased by the county. Solid waste shall be deposited in solid waste receptacles only in accordance with the provisions of this ordinance.

B. All solid waste shall be deposited inside the solid waste receptacles. No solid waste shall be left at the solid waste disposal site outside the receptacles.

C. Commercial, industrial and institutional solid waste shall be deposited in solid waste receptacles only with the permission of the landfill manager.

D. The following waste shall not be deposited in solid waste receptacles:

1. Hazardous waste;
2. Liquid solid waste;
3. Medical waste;
4. Radioactive waste;
5. Bulky waste;
6. Tires;
7. Construction and demolition waste;
8. Burning or smoldering material, or any other material that would create a fire hazard;
9. Solid waste generated outside of the boundaries of Alamance County;
10. Dead animals;
11. Target recyclables.

E. No person shall climb on or into a receptacle, or damage any receptacle.

F. The landfill attendant will direct only vehicles with small amounts of waste (1/2 ton size pickup truck or trailer or less) to use the solid waste receptacles for disposal of residential household garbage. At no time are the solid waste receptacles to be used to dispose of any waste other than residential household garbage. Permission to use the solid waste receptacles located at the landfill shall be obtained from the landfill manager.

Section VI. LICENSING

A. No person shall engage in the storage, collection, transporting, and/or disposal of solid waste recyclables in Alamance County for a fee except under a license issued by the Health Director pursuant to this Ordinance. All Commercial Haulers shall obtain a license from the health director pursuant to this ordinance. Licensing is a prerequisite to holding a franchise. However, issuance of a license does not insure the granting of a franchise by the Board. A solid

waste or recyclable license shall not authorize a licensee to engage in the collection of residential household garbage or recyclable material that has been separated at the curb. A separate license shall be required for each type of collection.

B. Application for a license to engage in solid waste, residential household garbage or recyclable material collection shall be filed with the health director on forms approved by the health director and shall include payment of an application fee as set by the Board. Charitable groups or other eleemosynary organizations shall not be required to pay an application fee. The applicant shall furnish the following information:

1. Name and address of the applicant and whether a sole proprietorship, corporation, or partnership, with disclosure of the ownership interests;
2. A list of the equipment possessed, available, or to be obtained by the applicant, including number and type of solid waste receptacles or other containers used for the storage or collection of solid waste, residential household garbage or recyclable material, and number and type of vehicles used for the transportation and disposal of solid waste, residential household garbage or recyclable material. Each vehicle shall be identified by vehicle number assigned by the applicant, make, model, and license tag number;
3. Number of employees the applicant expects to use in the business;
4. Experience of the applicant in solid waste, residential household garbage or recyclable material collection;
5. Balance sheet or equivalent financial statement as of the close of the applicant's last business year, showing the net worth of the business;
6. Areas of the County the applicant expects to serve.

C. Before issuing a license pursuant to this section, the health director shall inspect or cause to be inspected all facilities and equipment the applicant plans to use in the solid waste, residential household garbage or recyclable material collection business.

D. 1. The health director may issue the applicant a license only when he finds that the applicant's facilities, equipment, and proposed operating methods are in compliance with this ordinance and applicable regulations of the commission for Health Services and that the applicant will perform solid waste, residential household garbage or recyclable material collection in an efficient and sanitary manner.

2. If the health director denies an applicant a license, the applicant may request a hearing before the Alamance County Board of Health. The Board of Health shall keep summary minutes of the hearing and within one week after the hearing shall give the applicant written notice of its decision either granting the license or affirming the health director's denial of the license. The applicant may appeal the Board of Health's decision to the Board of Commissioners by giving written notice of appeal to the County Manager within ten days of

receipt of the board of Health's decision following the hearing. After a hearing on the appeal, the Board of Commissioners shall either affirm the denial or direct the health director to issue the license.

3. A license shall be valid for a period of one year from the date of issuance.

E. Licensee shall submit information as requested by the health director pertinent to the solid waste, residential household garbage or recyclable material collection operation. Each licensee shall maintain an accurate and complete log of the licensee's collection and transportation activities indicating the daily route of each vehicle, points of collection, times of collection, driver of the vehicle, and times of disposal of the solid waste, residential household garbage or recyclable material at the landfill. Each licensee shall promptly make available to the health director upon request any and all daily log information concerning the collection, transportation and disposal of solid waste, residential household garbage or recyclable material pursuant to this section.

F. 1. Vehicles and containers used for the collection and transportation of solid waste, residential household garbage or recyclable material shall be covered, leakproof, durable, and easily cleanable. They shall be cleaned as often as necessary to prevent a nuisance and insect breeding and shall be maintained in good repair. Vehicles and containers shall display in letters at least three inches high the name and address of the licensee, the vehicle number assigned by the licensee, and the capacity (cubic yardage) of the vehicle.

2. Vehicles and containers used for the collection and transportation of solid waste, residential household garbage or recyclable material shall be loaded and moved in a manner such that the contents will not fall, leak, or spill, and shall be securely covered to prevent the blowing of material. If spillage or leakage should occur, the material shall be recovered immediately by the licensee and returned to the vehicle or container, and the area properly cleaned.

G. When the health director finds that a licensee has violated this ordinance, the conditions of his license, or any provision of the Alamance County Recycling Ordinance or the Alamance County Solid Waste Plan, he shall give the licensee written notice of the violation and inform him that if another violation occurs within thirty days, or, in the case of a continuing violation, if it is not corrected within ten days, his license shall be revoked. If another violation occurs within the thirty day period, or if the continuing violation is not corrected within ten days, the health director shall give the licensee written notice of either the revocation of his license or the intent to revoke his license, the reasons for revocation, and notice of opportunity for a hearing. The licensee shall have ten days in which to request a hearing of the health director. If the licensee does not respond within the ten-day period, the license shall be revoked immediately by giving written notice of revocation to the licensee. Upon receipt of the notice of revocation, the licensee shall stop collecting, transporting, or disposing of solid waste, residential household garbage or recyclable material. If the licensee does respond within the ten-day period, the license may not be revoked until after the revocation hearing. The health director may reinstate a revoked license after the revocation has been in effect for thirty days if he finds that the conditions causing the violation have been corrected. A licensee whose license has been revoked

may appeal the revocation to the Board by giving written notice of appeal to the county manager within ten days of receiving notice of revocation from the health director. After a hearing on the appeal, the Board shall either affirm the revocation or direct the health director to reinstate the license. For the purposes of this section, the disposal of solid waste, residential household garbage or recyclable material at the landfill by a licensee in violation of Section IV (B) or Section V (D) of this ordinance shall constitute a continuing violation until such waste or recyclable material has been removed from the landfill by the licensee.

H. No license issued pursuant to this ordinance shall be assignable.

I. The health director is authorized and empowered to inspect facilities, equipment, or operating methods of any person collecting, transporting, and disposing of solid waste, residential household garbage or recyclable material.

Section VII. FRANCHISING

A. No person shall engage in the business of storage, collection, transporting, transfer station, and/or disposal of solid waste or recyclables unless he holds a franchise issued by the Board of Commissioners of Alamance County authorizing him to collect, transport, maintain transfer station, and dispose of solid waste or recyclables and describing the area for which the franchise is issued. The Board may also issue franchises for the collection of recyclable materials. A solid waste or recyclable franchise shall not authorize the franchisee to engage in the collection of residential household garbage or recyclable material or any other solid waste that has been separated at the curb. A separate franchise shall be required for each type of collection.

B. No person shall be issued a franchise by the Board unless he holds a license to engage in the business of solid waste, residential household garbage or recyclable material collection issued by the health director, in accordance with Section VI of these regulations.

C. Application for a franchise shall be filed with the board through a letter to the County Manager and shall include a copy of the applicant's license application to the health director, payment of the application fee set by the Board, and any other information the Board deems pertinent.

D. The Board shall grant a franchise only upon a finding that the chosen applicant has been licensed to render service to all persons generating solid waste, residential household garbage or recyclable material within the franchise area, that the applicant is more likely to provide efficient and continuing service in the franchise area than any other applicant for the same franchise area, and that the grant of a franchise to the applicant will best serve the interests of Alamance County in providing for the county-wide collection of solid waste, residential household garbage, and recyclable material.

E. The Board shall determine the area for which a franchise is granted. During the term of any franchise to collect solid waste, residential household garbage, or recyclable material from private residences and until suspension or revocation of such franchise, all other persons shall be prohibited from engaging in the business of solid waste, residential household garbage, or recyclable material collection from residential generators in the area delineated in such franchise.

F. The Board shall approve maximum fees charged by solid waste, residential household garbage, or recyclable material collectors before granting a franchise. Fee schedules may be amended by the Board from time to time.

G. A franchise shall be for a term of five years, unless otherwise approved by the Board. Any person who has been granted a franchise to collect, transport, and dispose of solid waste, residential household garbage or recyclable material in delineated areas in Alamance County shall be, subject to the provisions and requirements of this ordinance, awarded a renewal of franchise over any new applicants for the same or substantially same franchise area for a maximum of one renewal, at which time the franchise shall be reviewed and awarded to the best qualified applicant.

H. Granting of a franchise shall be conditioned upon the franchisee's service to every customer in the franchise area in such a manner that the franchisee does not cause the customer to be in violation of this ordinance. A solid waste, residential household garbage, or recyclable material collector franchised under this ordinance shall present to each customer a schedule of his fees as authorized by this ordinance, to be charged. Residential household garbage shall be removed from the customer's premises at least once a week, provided the customer is no more than thirty days in arrears in payment of the required collection fees. However, the franchisee shall not be required to pick up more than three (3) containers of garbage, each container to be no larger than 32 gallons. The Franchisee shall not be required to pick up bulky items, large metal items including white goods, tires, or yard waste. Any person generating more than three containers per week shall be responsible for proper disposal in accordance with these regulations. All recyclable material and solid waste, other than residential household garbage, shall be removed two times per month with at least two weeks between scheduled collection days.

I. The Board may grant temporary franchises for the collection, transportation, or disposal of solid waste, residential household garbage, or recyclable material to provide service in the event of abandonment of an existing franchise or for other cause.

J. All disputes regarding the granting of a franchise and disagreements concerning franchised areas shall be determined by the Board.

K. The franchise cannot be sold, assigned, or transferred in any way without the specific written approval of the County.

L. A solid waste, residential household garbage, or recyclable material collector granted a franchise under this ordinance shall give one hundred and twenty (120) days written notice to the Board before abandoning the franchise.

M. Each franchisee shall comply with all provisions of the Alamance County Solid Waste Plan.

N. The Board may terminate or suspend upon notice and hearing all or any portion of a franchise for any of the following reasons:

1. Loss of the franchisee's license to operate as a solid waste, residential household garbage, or recyclable material collector;
2. Failure of the franchisee to comply with the authorized fee schedules;
3. Failure of the franchisee to render prompt and effective service to persons within his service area;
4. Failure of the franchisee to comply with any provision of this ordinance or applicable regulations of the DEHNR;
5. Failure of the franchisee to comply with any provision of the Alamance County Solid Waste Plan; or
6. Violation of the Alamance County Recycling Ordinance.
7. Failure to comply with the franchise agreement.

O. Each franchisee for recyclable materials shall:

1. Maintain an office located in Alamance County;
2. Furnish a suitable container for each Residential Unit; and
3. Furnish an education and awareness program to each of the franchisee's customers.

Section VIII. PENALTIES

A. Any person violating this ordinance shall be guilty of a misdemeanor punishable by a fine not to exceed five hundred dollars (\$500.00) or imprisonment for not more than thirty (30) days, or both. Each day's violation shall be treated as a separate offense.

B. Any violation under the provisions of this ordinance may subject the offender to a civil penalty for the costs to the County to correct such violation in the interest of the public health, safety and welfare. Such penalty shall be assessed by the health director and shall be supported by a written statement of costs incurred by the County to correct such violation or a civil penalty not to exceed one thousand dollars (\$1,000.00). Such penalty shall be paid within ten days of notification to the offender. If the offender does not pay the penalty within ten days

after receiving notice, such penalty shall be recovered by the County in a civil action in the nature of debt.

C. For the purposes of this ordinance, collection, transportation, and disposal of solid waste, residential household garbage and recyclable material in a manner which knowingly constitutes unauthorized encroachment upon an area delineated in any franchise granted hereunder shall be deemed a violation under this ordinance and may subject the offender to the criminal penalties provided herein. Unauthorized encroachment in an area covered by a franchise granted hereunder, whether knowing or innocent, shall be subject to correction by the civil remedies provided by this section.

D. Any violation of this ordinance shall subject the offender to judicial enforcement of this ordinance by an appropriate equitable remedy issuing from a court of competent jurisdiction, or by mandatory or prohibitory injunction and order of abatement issuing from the General Court of Justice and commanding the offender to correct or cease the violation.

Section IX. SEVERABILITY

If any sentence, clause, paragraph, subsection, or section of these regulations shall be adjudged invalid and of no effect, such decisions shall not affect the main portions of these regulations.

Section X. EFFECTIVE DATE

This ordinance as amended shall be effective on and after April 1, 2002.

* * * * *

The foregoing amended ordinance was approved by the Board of Commissioners for the County of Alamance during regular session on April 1, 2002. See Minute Book 36, Page 30.

**Article 6: Collection, Transportation and Disposal of
Refuse and Solid Waste****Division 6:
Construction and Demolition Debris Diversion Deposit Program**
(“*Construction and Demolition Debris Diversion Deposit Program*”
added 10-10-2000 by O-19420 N.S.)
(Amended 12-18-2007 by O-19694 N.S; effective 1-17-2008.)**§66.0601 Findings**

The Council of the City of San Diego finds and declares that:

- (a) The City operates the Miramar Landfill, which is currently the only active municipal landfill in the City. The Miramar Landfill currently is expected to close by 2030. Preserving landfill capacity at the Miramar Landfill in order to extend the useful life of the Miramar Landfill for the citizens of the City is a paramount concern.
- (b) The City has made and continues to make progress in meeting the waste *diversion* requirements imposed by AB 939, but additional efforts, particularly in the *diversion* of *construction and demolition debris*, will assist the City in continuing to meet the AB 939 goal of *diverting* 50% of its waste from landfill *disposal*, and achieving the *diversion* goals identified in the City’s Zero Waste Plan.
- (c) Studies show that approximately 25% of the waste generated in the City of San Diego delivered for *disposal* is *construction and demolition debris*, which could be *diverted* from landfill *disposal*.
- (d) Efforts by the City and the private sector to encourage voluntary *construction and demolition debris diversion* have not been as successful as the City had hoped and additional efforts are necessary to ensure continued compliance with AB 939 requirements.

- (e) *Construction and demolition debris diversion* deposit programs in other jurisdictions in the State, similar to the one implemented by this Division, have proven successful in increasing *diversion of construction and demolition debris* and have been favorably received by the California-Department of Resources Recycling and Recovery, formerly known as the California Integrated Waste Management Board.

(Added 10-10-2005 by O-19420 N.S.; effective 1-17-2008.)

(Amended 12-18-2007 by O-19694 N.S.; effective 1-17-2008.)

(Amended 1-30-2014 by O-20341 N.S.; effective 3-1-2014.)

(Amended 5-23-2016 by O-20643 N.S.; effective 6-22-2016.)

§66.0602 Purpose of Construction and Demolition Debris Diversion Deposit Program

The purpose of this Division is to establish the Construction and Demolition Debris Diversion Deposit Program. This program is intended to increase the *diversion of construction and demolition debris* from landfill *disposal*, conserve the capacity and extend the useful life of the Miramar Landfill, and avoid the potential financial and other consequences to the City of failing to remain in compliance with *AB 939* requirements.

(Added 10-10-2005 by O-19420 N.S.; effective 1-17-2008.)

(Amended 12-18-2007 by O-19694 N.S.; effective 1-17-2008.)

§66.0603 Definitions

All defined terms in this Division appear in *italics* and are found in sections 11.0210, 66.0102, and 113.0103 of this Code, except for the terms Building Permit and Demolition/Removal Permit which refer to those terms respectively as used in the Land Development Code and which, consistent with the Land Development Code, are not italicized in this Division. In addition, whenever the following words or phrases are used in this Division, they mean:

AB 939 means the California Integrated Waste Management Act, codified at California Public Resources Code sections 40000 et seq.

Certified recycling facility means a recycling, composting, materials recovery or reuse facility which accepts *construction and demolition debris* and which has been certified by the *Director* pursuant to rules promulgated by the *Director*.

Construction and demolition debris means the waste building materials, packaging, and rubble resulting from construction, remodeling, repair, alteration, and/or demolition operations on pavements, houses, commercial buildings, and other *structures* and may include, but is not limited to, concrete, asphalt, wood, metals, bricks, dirt, rocks, and other inert waste.

Director means the Director of the Environmental Services Department (and its successor) or the designee of the Director of the Environmental Services Department (and its successor).

Disposal means the final deposition of *solid waste* at a permitted landfill.

Diversion or *Divert* means the reduction or elimination of *solid waste* from landfill *disposal*.

Hazardous waste has the same meaning as set forth in section 66.0102 of this Code.

Solid Waste means all putrescible and nonputrescible solid, semisolid, and liquid wastes, including, but not limited to, garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, *construction and demolition debris*, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. *Solid Waste* does not include hazardous waste, hazardous substances or medical wastes, as those terms are defined in this Chapter 6 or in State or Federal law.

Waste Management Form Part I means the form prepared by the City Manager on which an *applicant* for a Building Permit or Demolition/Removal Permit shall provide information including, but not limited to, the types and amounts of *construction and demolition debris* the *applicant* anticipates the *development* will generate and the expected *construction and demolition debris diversion* the *applicant* expects to achieve for that *development*.

Waste Management Form Part II means the form prepared by the City Manager on which the *applicant* for a Building Permit or Demolition/Removal Permit shall provide information including, but not limited to, the name and address of the *person* to whom a deposit refund, if any, shall be issued, as well as documentary evidence in a form satisfactory to the *Director* demonstrating the *construction and demolition debris diversion* the *applicant* achieved for the *development*.

(Added 10-10-2005 by O-19420 N.S; effective 1-17-2008.)

(6-2016)

§66.0604 Submittal of Waste Management Form and Diversion Deposit

The following requirements apply to all Building Permits or Demolition/Removal Permits issued by the City of San Diego:

- (a) All *applicants* for a Building Permit or a Demolition/Removal Permit, including the City of San Diego, shall submit a properly completed *Waste Management Form Part I* with the Building Permit or Demolition/Removal Permit application, in accordance with the requirements set forth in the Land Development Manual; and
- (b) All *applicants*, including the City of San Diego, shall pay a refundable deposit at the time the Building Permit or Demolition/Removal Permit is issued; and
- (c) No Building Permit or Demolition/Removal Permit shall be issued unless the *applicant* has submitted a properly completed *Waste Management Form Part I* and paid the required deposit.

(Added 10-10-2005 by O-19420 N.S; effective 1-17-2008.)

(Amended 12-18-2007 by O-19694 N.S; effective 1-17-2008.)

(Amended 5-23-2016 by O-20643 N.S.; effective 6-22-2016.)

§66.0605 Establishment of Construction and Demolition Debris Diversion Deposits

The City Council shall establish by resolution a schedule of *construction and demolition debris diversion* deposits applicable to Building Permits and to Demolition/Removal Permits. The schedule shall be reviewed and adjusted periodically to ensure the purposes of this Division are met.

(Added 10-10-2005 by O-19420 N.S; effective 1-17-2008.)

§66.0606 Entitlement to Refund of Diversion Deposit

- (a) An *applicant* is eligible for a refund of the deposit paid pursuant to Section 66.0604(b) provided the *applicant* submits the following directly to the *Director* within 180 days of the final inspection date for the *development* for which the deposit was paid:

- (1) A properly completed *Waste Management Form Part II*, in accordance with the requirements set forth in the Land Development Manual, which demonstrates the *construction and demolition debris diversion* the *applicant* achieved for the *development*.
- (2) Evidence satisfactory to the *Director* that the *construction and demolition debris* generated by the *development* was *diverted*, at the applicable *diversion* rate set forth in Section 66.0606(d) below, by one or more of the following methods:
 - (a) on-site reuse of the *construction and demolition debris*;
 - (b) acceptance of the *construction and demolition debris* by a *certified recycling facility*; or
 - (c) other donation or reuse of the *construction and demolition debris* acceptable to the *Director*.

For a commercial *development*, such as a shopping center, with a master developer which manages solid waste generated by the *development* as a whole and which has multiple commercial or retail tenants who may construct their own tenant improvements, the evidence satisfactory to the *Director* described in section 66.0606(a)(2) may include receipts from a *certified recycling facility(ies)* showing the cumulative weight or volume of *construction and demolition debris diverted* from the *development* within the 30 calendar days prior to the final inspection date referred to in section 66.0606(a)

- (b) *Construction and demolition debris* shall be measured by weight or by volume, whichever is most accurate and practicable. To the extent practicable, all *construction and demolition debris* shall be weighed on a scale.
 - (1) For *construction and demolition debris* which is weighed, the *applicant* shall use a scale which is in compliance with all federal, state, and local regulatory requirements for accuracy and maintenance of such scale.
 - (2) For *construction and demolition debris* for which measurement by weight is not practicable, the *applicant* shall measure by volume and convert the volumetric measurements to weight using the standardized rates established in the City Construction and Demolition Debris Conversion Rate Tables.

- (3) The *Director* reserves the right, when appropriate, to establish standard weights for various types of *construction and demolition debris* items based upon accepted average weights for such items. These standard weights shall be listed in the City Construction and Demolition Debris Conversion Rate Tables.
- (c) Refunds will be based on proof, satisfactory to the *Director*, of the *construction and demolition debris diversion* the *applicant* achieved for the *development* for which the deposit was paid.
- (d) If the *Director* determines the *applicant* is entitled to a refund, the amount of the refund shall be in the same proportion to the deposit paid by the *applicant* as the *diversion* rate achieved for the *development* is to the applicable *diversion* rate set forth below:
- (1) For Building Permits or Demolition/Removal Permits issued on July 1, 2008 through June 30, 2016, the *diversion* rate shall be 50% by weight of the total *construction and demolition debris* generated by the *development*.
- (2) For Building Permits or Demolition/Removal Permits issued on July 1, 2016 and up to, but not including, the actual effective date of Section 66.0606(d)(3), the *diversion* rate shall be 65% by weight of the total *construction and demolition debris* generated by the *development*.
- (3) For Building Permits or Demolition/Removal Permits issued on or after the actual effective date of Section 66.0606(d)(3), the *diversion* rate shall be 75% by weight of the total *construction and demolition debris* generated by the *development*. The actual effective date of Section 66.0606(d)(3) is the earliest date upon which all of the following is met:
- (A) A *certified recycling facility*, which accepts mixed *construction and demolition debris* and has a permitted daily tonnage capacity of at least 1,000 tons, is operating within 25 miles of 202 “C” Street in San Diego and has operated at a 75% *diversion* rate for three consecutive calendar year quarters; and
- (B) The City has given the public 30 calendar days’ advance notice that such a *certified recycling facility* is available.

- (e) Notice under this Division may be given by placing a display advertisement of at least one-eighth page in a newspaper of general daily circulation within the City.
- (f) The *Director* shall determine whether a *certified recycling facility* has reached a certain *diversion* rate.
- (g) The *Director* shall refund a deposit paid or collected in error.
- (h) If a Building Permit or Demolition/Removal Permit, for which a deposit has been paid, is subsequently cancelled, abandoned or expires before work on the *development* has commenced, the *Director* shall refund the deposit paid by the *applicant* upon the *applicant's* submittal to the *Director* of satisfactory proof of the cancellation, abandonment or expiration of the permit.
- (i) The *Director* shall issue the refund to the *applicant* within the time established by City Council resolution.
- (j) In no event shall the refund be in an amount greater than the deposit paid by the *applicant*.

(Added 10-10-2005 by O-19420 N.S.; effective 1-17-2008.)

(Amended 12-18-2007 by O-19694 N.S.; effective 1-17-2008.)

(Amended 1-30-2014 by O-20341 N.S.; effective 3-1-2014.)

(Amended 5-23-2016 by O-20643 N.S.; effective 6-22-2016.)

§66.0607 Certified Recycling Facilities

- (a) After at least one public hearing, the *Director* shall establish rules and regulations for certifying facilities inside or outside the City for purposes of this Division including, but not limited to, criteria for determining the *diversion* rate achieved by the facility and for verifying that the facility has obtained all applicable permits and licenses. The *Director* shall publish in the official City newspaper a notice of the adoption or amendment of these rules and regulations. The *Director* shall certify facilities in accordance with those rules and regulations.

- (b) Within ten working days after publication of the notice adopting the proposed rules and regulations pursuant to Section 66.0607(a), any person in disagreement with the proposed rules and regulations may request in writing to the *Director* that proposed rules and regulations be considered by the City Manager or designee. The proposed rules and regulations shall be considered by the City Manager or designee, who shall issue a written decision respecting the proposed rules and regulations within thirty days of the *Director's* receipt of the written request. The decision of the City Manager or designee with respect to the rules and regulations shall be final.

(Added 10-10-2005 by O-19420 N.S; effective 1-17-2008.)

(Amended 12-18-2007 by O-19694 N.S; effective 1-17-2008.)

§66.0608 Diversion Deposit Program Exemptions

- (a) The following activities, alone or in combination with one another, are exempt from this Division, except if the activity or activities is/are undertaken in conjunction with *development* which otherwise is subject to this Division:
- (1) Roofing projects.
 - (2) Installation, replacement, or repair of a *retaining wall*.
 - (3) Installation, replacement, or repair of a carport, patio cover, balcony, trellis, or fireplace.
 - (4) Installation, replacement, or repair of a deck.
 - (5) Installation, replacement, or repair of a *fence*.
 - (6) Installation, replacement, or repair of a swimming pool or a spa.
 - (7) Installation, replacement, or repair of a pre-fabricated accessory, such as a *sign* or an antenna, which does not require modification to the *structure* to which the accessory is attached.
 - (8) Installation, replacement, or repair of storage racks.
 - (9) Installation, replacement, or repair of a shade structure (commercial), awning, or canopy.

- (10) Installation or replacement of a pre-fabricated modular building or mobile home, with or without a patio enclosure or cover.
 - (11) Installation, replacement, or repair of partitions only.
 - (12) Installation, replacement, or repair of siding, stucco, or veneer.
 - (13) Installation or repair of seismic tie-downs.
 - (14) Installation, replacement, or repair of skylights, windows, doors, stair flights, or poles.
 - (15) Modification, alteration, or repair of facades.
 - (16) Re-pipe repairs.
 - (17) Foundation repairs, including caissons and piles.
 - (18) *Development* which requires only an electrical permit, only a plumbing permit, or only a mechanical permit.
 - (19) *Development* which requires a Building Permit that does not require plans.
- (b) The following activities are exempt from this Division:
- (1) *Development* which is expected to generate only *hazardous waste* and/or *hazardous substances*.
 - (2) *Development* for which the *construction and demolition debris* deposit is less than \$200 as calculated by the Development Services Department or its successor.

(Added 10-10-2005 by O-19420 N.S; effective 1-17-2008.)

(Amended 12-18-2007 by O-19694 N.S; effective 1-17-2008.)

(Amended 1-30-2014 by O-20341 N.S.; effective 3-1-2014.)

(6-2016)

§66.0609 Unrefunded Diversion Deposits and Accrued Interest

A deposit which is not refunded or claimed in accordance with this Division is the property of the City. For purposes of each and every deposit and all interest accrued thereon, the relationship between the *applicant* and the City is that of debtor-creditor, respectively. All interest accruing on each deposit is the property of the City, and the *applicant* shall have no claim upon the interest. \

(Added 10-10-2005 by O-19420 N.S; effective 1-17-2008.)

§66.0610 Use of Diversion Deposits and Accrued Interest

All deposits and accrued interest thereon shall be deposited into the Recycling Fund created pursuant to section 66.0135 of this Code. All deposits and accrued interest thereon shall be used solely and exclusively for the following purposes:

- (a) payment of deposit refunds, as determined by the *Director*;
- (b) payment of administrative costs of the Construction and Demolition Debris Diversion Program established by this Division;
- (c) payment of costs of programs designed to encourage *diversion* of *solid waste* from landfill *disposal*;
- (d) payment of costs of programs designed to develop or improve the infrastructure to *divert solid waste* from landfill *disposal*; or
- (e) payment of costs to develop or improve infrastructure to *divert solid waste* from landfill *disposal*.

(Added 10-10-2005 by O-19420 N.S; effective 1-17-2008.)

ORDINANCE 2012-1

AN ORDINANCE REQUIRING ACTIONS TO REDUCE LANDFILLING OF RECYCLABLE AND ORGANIC SOLID WASTES FROM BUSINESSES, MULTI-FAMILY RESIDENCES, AND SELF HAULERS

The Board of the Alameda County Waste Management Authority (“Authority”) ordains as follows:

SECTION 1 (Enactment)

The Board of the Authority does hereby enact this Ordinance in full consisting of Section 1 through Section 15.

SECTION 2 (Findings)

- (a) The purpose of this Ordinance is to reduce the amount of recyclable and organic solid wastes deposited in landfills from businesses, multi-family residences, and self haulers.
- (b) The Authority has the power to adopt ordinances necessary to carry out the purposes of the Joint Exercise of Powers Agreement for Waste Management (“JPA”). The JPA provides the Authority the power, duty, and responsibility to prepare, adopt, revise, amend, administer, enforce and implement the County Integrated Waste Management Plan (“CoIWMP”), and Section 5.m of the JPA specifically enumerates the power to adopt ordinances necessary to carry out the purposes of the JPA.
- (c) The prohibition of certain recyclable and compostable materials at Alameda County landfills is necessary to carry out the purposes of the JPA and implement the CoIWMP, including the following goals and policies. Goal 2 of the CoIWMP calls on the Authority and its member agencies to “achieve maximum feasible waste reduction” and to “reduce the amount of waste disposed at landfills through improved management and conservation of resources.” Objective 2.1 is to “achieve countywide waste reduction of 75 percent by 2010.” Objective 2.4 is to reduce the amount of readily recyclable and compostable materials originating in Alameda County and deposited in landfills to no more than 10% of total materials originating in Alameda County and landfilled by 2020.
- (d) The State of California through its Integrated Waste Management Act of 1989, Assembly Bill 939 (AB 939), required that each local jurisdiction significantly increase its diversion of discarded materials from landfills to 50% by December 31, 2000, and thereafter maintain or exceed that diversion rate.
- (e) The Waste Reduction and Recycling Act of 1990 (Measure D), a charter amendment passed by the voters of Alameda County, established the Alameda County Source Reduction and Recycling Board and the policy goal of reducing

the total tonnage of landfilled materials generated in Alameda County by 75% by a date to be chosen by the Recycling Board and to thereafter establish a date (or dates) to reduce, recycle, and compost further quantities of discarded materials. In 2003, the Recycling Board and Authority approved 2010 as the date by which 75% diversion was to be obtained. In July 2010 the Recycling Board and Authority approved a year 2020 objective to reduce the amount of readily recyclable and compostable materials originating in Alameda County and deposited in landfills to no more than 10% of total materials originating in Alameda County and landfilled.

- (f) The California Department of Resources Recycling and Recovery was developing a mandatory commercial and multifamily recycling regulation as part of implementing statewide efforts to reduce greenhouse gas (GHG) emissions pursuant to AB 32. The steps required to supply recycled materials to industry (i.e., collection, processing and transportation) use less energy than the steps to supply virgin materials (i.e., extraction, refining, processing, and transportation). These energy savings reduce GHG emissions.
- (g) The use of composted organics (plant debris, food and compostable paper) reduces the need for chemical fertilizers and pesticides, which are energy intensive to manufacture and transport. The use of compost also conserves water in landscapes, and can help mitigate the decline in soil quality in California and Alameda County expected to result from climate change.
- (h) The State of California has adopted legislation (AB 341) that requires multi-family property owners and businesses that generate more than 4 cubic yards of solid waste service per week to provide recycling collection service unless physical space to do so does not exist.
- (i) The Countywide Waste Characterization Study conducted in 2008 found that about 60% of solid waste originating in Alameda County and disposed in landfills was readily recyclable or compostable. Significant quantities of recyclable and compostable materials continue to be landfilled (around 700,000 tons in 2008). Recycling or composting this material will aid the Cities in Alameda County and the County in achieving the GHG reduction goals contained within their Climate Action Plans, create jobs at processing facilities, and implement the CoIWMP, AB 939, AB 32, and Measure D.
- (j) There are permitted facilities available that can effectively recycle cans, bottles and all recyclable paper grades discarded in Alameda County, or compost food and food-soiled paper, thereby achieving the goals and objectives cited above. Facilities that can also extract energy from organic waste through anaerobic digestion prior to composting are being developed or investigated by numerous parties.
- (k) The Authority prepared the Mandatory Recycling and Single Use Bag Reduction Ordinances Environmental Impact Report, which considered two separate projects

and included the environmental review required by the California Environmental Quality Act for this Ordinance. The Authority certified those portions of the EIR relevant to this Ordinance.

SECTION 3 (Definitions)

The following definitions govern the use of terms in this Ordinance:

- (a) “Alameda County” means all of the territory located within the incorporated and unincorporated areas of Alameda County.
- (b) “Authority” means the Alameda County Waste Management Authority created by the Joint Exercise of Powers Agreement for Waste Management (JPA).
- (c) “Authority Representative” means any agent of the Authority designated by the Authority or the Enforcement Official to implement this Ordinance, including Member Agency employees, the County Local Enforcement Agency or private contractors hired for purposes of monitoring and enforcement.
- (d) “Business” means any commercial or public entity, including but not limited to: proprietorship, firm, partnership, association, venture, trust, or corporation that is organized as a for-profit or nonprofit entity. Business includes, but is not limited to, industrial or manufacturing, restaurant, retail, office, hotels, shopping centers, theaters and government entities, but for purposes of this Ordinance, does not include Multi-Family Buildings.
- (e) “Compliance Plan” means the plan required pursuant to Section 7 of this Ordinance.
- (f) "Composting" means the controlled biological decomposition of organic Solid Waste that is kept separate from the Refuse stream, or that is separated at a centralized facility.
- (g) "Covered Jurisdiction" means a Member Agency of the JPA that has not opted out of coverage under this Ordinance pursuant to Section 12 of this Ordinance.
- (h) “Covered Material” means corrugated cardboard, newspaper, white paper, mixed recyclable paper, recyclable food and beverage glass containers, metal (aluminum and steel) food and beverage cans, HDPE (high density polyethylene) bottles and PET (polyethylene terephthalate) bottles, and discarded food and compostable paper, that are Recyclable. Per the definition of Recyclables in Section 3(u) of this Ordinance, unmarketable processing residuals are not Covered Materials. A particular Covered Material becomes subject to this Ordinance pursuant to the Implementation Schedule in Section 13 of this Ordinance.
- (i) “Deposit in Landfill(s)” or “Deposited in Landfill(s)” means final deposition of Solid Waste, in landfills permitted by the State of California, above liners (or above the permitted base of the landfill if a liner is not required) and below final

cover within the permitted fill area. Any Solid Waste used to create a foundation layer for final cover in excess of three (3) feet on average shall be considered “Deposited in Landfill(s)” unless a greater thickness of foundation layer is specifically required by the Regional Water Quality Control Board.

- (j) “Enforcement Official” means the Executive Director of the Authority or his or her authorized designee.
- (k) “Executive Director” means the individual appointed by the Authority Board to act as head of staff and perform those duties specified by the Authority Rules of Procedure and by the Board.
- (l) “High Diversion Mixed Waste Processing Facility” is a Mixed Waste Processing Facility that: (i) Recycles Covered Materials except as provided in Subsection (l)(ii) of this Section; (ii) results in Solid Waste Deposited in Landfills containing no more than ten percent (10%) by weight of the Covered Materials from Solid Waste Originating in Alameda County Covered Jurisdictions from collection locations that do not have Source Separated Recycling service; and (iii) has complied with Section 8(g) of this Ordinance.
- (m) “Landfill” means a state and locally permitted facility in California that accepts Solid Waste for burial.
- (n) “Member Agency” means a party to the JPA. Current member agencies are the County of Alameda, the Cities of Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, Union City, and the Castro Valley and Oro Loma Sanitary Districts. The service areas of each Member Agency for the purpose of Section 12 of this Ordinance are:
 - (1) The legal boundaries of each of the Castro Valley and Oro Loma Sanitary Districts
 - (2) The legal boundaries of each of the 14 incorporated municipalities within Alameda County, except those portions of the Cities of Hayward and San Leandro that are within the boundaries of the Oro Loma Sanitary District.
 - (3) The unincorporated sections of the County not included within the above.
- (o) "Mixed Waste Processing Facility" means a processing facility that separates Covered Materials from Solid Waste.
- (p) "Multi-Family Building" means a structure with five or more residential dwelling units.
- (q) “Operator” means a Person that has received approval from the State of California and local government agencies with applicable land use authority or health regulatory authority to operate a Landfill or Transfer Station.

- (r) “Person” includes an individual, firm, limited liability company, association, partnership, political subdivision, government agency, municipality, industry, public or private corporation, or any other entity whatsoever.
- (s) “Primary Enforcement Representative” is the chief executive of a Covered Jurisdiction or a qualified designee who will coordinate with the Authority regarding implementation of the Ordinance. A qualified designee shall have at least two years of municipal code enforcement experience or have undergone at least the level one municipal code compliance training program of the California Association of Code Enforcement Officers, or equivalent training program approved by the Enforcement Official.
- (t) “Property Owner” means the Person or Persons that hold title to a property as shown on the most recent assessment roll.
- (u) “Recycling” means the process of collecting, sorting, cleansing, treating, and reconstituting Solid Wastes and returning them to the economic mainstream in the form of raw materials that can be sold in competitive markets and satisfy all applicable Federal, State and local standards for such materials. Recycling includes Composting so long as the compost or soil amendment created by Composting can be sold in competitive markets and satisfies all applicable Federal, State and local standards for such materials. “Recyclables” are materials that can undergo Recycling. A “Recycled” material is one that has undergone Recycling.
- (v) “Refuse” means Solid Waste that is neither Covered Materials, nor Recyclable materials that are acceptable to a Member Agency for co-placement in containers for Covered Materials within its service area.
- (w) “Regulated Hauler” means a Person that collects Solid Waste (other than Solid Waste generated by a permitted building project) originating in Alameda County for Deposit in Landfill(s) or Recycling facilities and does so under a contract, franchise agreement or permit with a Covered Jurisdiction or the Authority.
- (x) “Self Hauler” means a Person who delivers Solid Waste to a Landfill or a Transfer Station, but is not a Regulated Hauler or a Transfer Station Operator.
- (y) “Solid Waste” means all materials of any kind or nature as defined in Public Resources Code section 40191.
- (z) “Solid Waste Originating in Alameda County” means all Solid Waste discarded within Alameda County unless it was brought into the County for Recycling. To have “originated” within a particular jurisdiction means the Solid Waste was discarded in that jurisdiction unless it was brought into that jurisdiction for Recycling.
- (aa) “Source Separated” means to have undergone the process of removing Recyclable materials from other Solid Waste, by or for the Waste Generator on

the premises at which the Recyclable materials were generated, for the purpose of Recycling.

- (bb) “Transfer Station” means a facility in California that is permitted by the State of California as a transfer station and considered as a transfer station under 14 Code of Regulations section 17402, or as that section may be amended.
- (cc) “Waste Generator” means a Person who produces Solid Waste.

SECTION 4 (Restrictions on Waste Generators in Covered Jurisdictions)

- (a) Businesses that are Waste Generators in Covered Jurisdictions shall not discard Covered Materials such that they will be Deposited in Landfill(s). They shall comply with this requirement by either: (i) separating Covered Materials from other Solid Wastes for collection in separate Recycling containers, or (ii) providing for all Solid Waste to be taken to and processed through a High Diversion Mixed Waste Processing Facility.
- (b) Businesses that are Waste Generators in Covered Jurisdictions shall not place Refuse in containers designated for Covered Materials.
- (c) Waivers of these restrictions may apply pursuant to Section 10 of this Ordinance.
- (d) These restrictions are implemented in phases pursuant to Section 13 of this Ordinance.

SECTION 5 (Restrictions on Property Owners and their Agents in Covered Jurisdictions)

Each Property Owner of a Business or Multi-Family Building shall be responsible for the following:

- (a) Provide container(s) for Source Separated Covered Materials and other Source Separated Recyclable materials at the same location as the Property Owner provides container(s) for Solid Waste collection, unless all Solid Waste from the property is taken to and processed through a High Diversion Mixed Waste Processing Facility. The container(s) shall:
 - (1) Be of sufficient number and size to hold the Recyclable and Refuse quantities reasonably anticipated to be generated at the location;
 - (2) Bear prominent signage on or near the containers clearly describing the proper segregation and storage of Recyclable and Refuse materials.
- (b) Provide for Solid Waste removal service that ensures that Source Separated Covered Materials generated at its property are collected and transported to facilities that Recycle the Covered Materials or that all Solid Wastes are taken to and processed through High Diversion Mixed Waste Processing Facilities.

- (c) Provide information at least annually for tenants, employees and contractors of Waste Generator obligations under this Ordinance (if any) to keep Covered Materials separate from Refuse (when applicable) and the location of containers and the rules governing their use at each property. This same information shall also be provided to new tenants no later than 14 days after such tenants move in and no less than 14 days before tenants move out, unless a tenant does not provide 14 or more days notice to the Property Owner before leaving.
- (d) Notwithstanding the foregoing, if a Property Owner enters into a written agreement with another party (such as a property manager, tenant, or other party that contracts for Solid Waste removal), to manage or obtain Solid Waste collection services, then that party as well as the Property Owner shall be responsible for compliance with this Ordinance.
- (e) Waivers of these restrictions may apply pursuant to Section 10 of this Ordinance.
- (f) These restrictions are implemented in phases pursuant to Section 13 of this Ordinance.

SECTION 6 (Restrictions on Self Haulers of Solid Waste originating in Alameda County)

- (a) No Self Hauler shall Deposit in Landfill(s) Covered Materials originating from within Alameda County or deliver such materials to Landfills or Transfer Stations such that such Covered Materials will eventually be Deposited in Landfill(s), unless the Covered Materials are deposited in Landfills or Transfer Stations that are in compliance with Section 7 of this Ordinance, or in the case of Landfills or Transfer stations outside Alameda County but within California, unless the Landfills or Transfer Stations voluntarily comply with Section 7 of this Ordinance.

SECTION 7 (Requirements for Landfills and Transfer Stations in Alameda County)

- (a) Owners and Operators at Landfills and Transfer Stations in Alameda County shall require any Self Hauler who brings a load of Solid Waste containing Covered Materials originating from within Alameda County to a Landfill or Transfer Station in Alameda County to: (1) separate Covered Materials from Refuse or (2) deposit that load such that it will be processed through a High Diversion Mixed Waste Processing Facility or (3) ensure the Self-Hauler pays a price at least 10% over the usual tipping fee that would normally apply to that Self-Hauler. Owners and Operators at Landfills and Transfer Stations in Alameda County shall provide quarterly reports to Authority that list the dates and volumes or weights of every load of Solid Waste containing Covered Materials charged the higher price described in item (3).
- (b) Every owner or Operator of a Landfill or Transfer Station in Alameda County shall submit a Compliance Plan to the Authority that describes the actions to be

taken to comply with this Ordinance and help prevent Deposit in Landfill(s) of Covered Materials from Self Haulers. Previously approved Compliance Plans under Authority Ordinance 2008-01 may be amended to address the requirements of this Section.

- (c) The Compliance Plan shall include the following:
 - (1) Methods for discouraging Covered Materials from Self Haulers from being Deposited in Landfills.
 - (2) Methods for assisting the Authority in identifying Waste Generators that violate this Ordinance, including recording practices to be followed when noncompliance is observed.
 - (3) Procedures for complying with the requirements of Section 7(a) of this Ordinance, including posted pricelists.
 - (4) Load checking programs to prevent the acceptance of Covered Materials from Self Haulers. This program shall at a minimum provide for:
 - (1) the number of random load checks to be performed;
 - (2) recording of load checks; and
 - (3) training of personnel in the recognition, proper handling, and disposition of Covered Material.
 - (5) Description of efforts the facility will take to install informative signage regarding the Covered Material ban at facility entrances and at waste receiving areas. The signage shall consist of permanent visible signs, prominently displayed, clearly indicating that Covered Material is prohibited from being Deposited in Landfills or delivered such that it will be Deposited in Landfills. These signs shall be in place within 30 days of approval of the Compliance Plan.
 - (6) Description of employee training efforts to comply with this Ordinance.
 - (7) Additional information reasonably requested by the Authority as necessary to determine compliance with the Ordinance and how best to achieve compliance with the Ordinance.
 - (8) Identification of any impediments to and suggestions relating to the ongoing implementation of this Ordinance.
- (d) Every owner or Operator of a Landfill or Transfer Station in Alameda County shall submit its proposed Compliance Plan to the Enforcement Official no later than 60 days after adoption of this Ordinance.

- (e) The Enforcement Official will review the Compliance Plan for adequacy and make a determination as to its adequacy within 30 days of receiving the Compliance Plan. Adequacy determinations shall be based on the inclusion of all elements required in Section 7(c) of this Ordinance and on the inclusion of all reasonable measures to effectively discourage Covered Materials from Self Haulers from being Deposited in Landfill(s). Proposed Compliance Plans shall be revised and resubmitted within 30 days after notice by the Enforcement Official that a proposed Plan is inadequate in one or more specific ways.
- (f) Each Landfill and Transfer Station in Alameda County shall have an approved Compliance Plan in place no later than 60 days after approval of its Compliance Plan by Authority, but in no event later than January 1, 2013.
- (g) Every owner or Operator of a Landfill or Transfer Station in Alameda County shall submit an annual report detailing the steps taken during the course of the prior year to comply with its Compliance Plan. Each annual report shall be due by the end of July for the previous 12 month period between July 1 and June 30th.
- (h) Owners or Operators of Landfills and Transfer Stations in Alameda County shall update or revise the existing Compliance Plan if the Enforcement Official determines that revision is necessary to achieve compliance with this Ordinance.
- (i) Failure to comply with an approved Compliance Plan shall constitute a violation of this Ordinance.

SECTION 8 (Requirements for Regulated Haulers and Mixed Waste Processing Facilities)

- (a) Regulated Haulers collecting Solid Waste, Refuse, or Source Separated Recyclables from within Covered Jurisdictions shall comply with either Section 8(b) or 8(c) below. Section 8(b) shall apply to any Regulated Hauler that notifies Authority in writing that it has elected to comply with subsection (b) of Section 8 of this Ordinance. Section 8(c) shall apply in the absence of such written notification. All Regulated Haulers shall submit the information set forth in either Section 8(b) or 8(c), and the information set forth in Section 8(d) of this Ordinance to the Covered Jurisdiction and to the Authority no less frequently than once per year and more frequently if requested by the Covered Jurisdiction, unless otherwise specified in Sections 8(b) through 8(d) of this Ordinance.
- (b) This subsection applies to Regulated Haulers who elect to integrate customer outreach and education about this Ordinance, and identification of possible violators, into their customer service procedures. Such Regulated Haulers shall:
 - (1) Include in bill inserts or other regular customer service communications with customers written materials provided by Authority (after approval of such material by the Primary Enforcement Representative from the relevant Covered Jurisdiction or other designee of the chief executive of the Covered Jurisdiction) with respect to this Ordinance, and shall send

such information in a manner specified by Authority (e.g., certified mail, return receipt requested; regular mail; overnight mail, etc.). Authority shall reimburse Regulated Haulers for the reasonable incremental cost of handling and postage for such written communications.

- (2) Require that customer service staff of the Regulated Hauler participates in training provided by Authority with respect to compliance with Sections 4 and 5 of this Ordinance. Require customer service staff of the Regulated Hauler to attempt to assist customers with compliance with Sections 4 and 5 of this Ordinance. If after initial good faith efforts to assist customers, additional assistance is still required, the Regulated Hauler may refer customers to Authority or Covered Jurisdiction staff.
 - (3) Provide names, addresses, and customer contact information for accounts serviced that the Regulated Hauler has reason to believe may be in violation of Section 4 or 5 of this Ordinance on a quarterly basis commencing January 1, 2013.
- (c) This subsection applies to Regulated Haulers who elect not to integrate customer outreach and education about this Ordinance, and identification of possible violators, into their customer service procedures pursuant to Section 8(b) of this Ordinance. Such Regulated Haulers shall:
 - (1) Provide a list of all Business and Multi-Family Building accounts in Covered Jurisdictions that will become subject to Phase 1 of this Ordinance by April 1, 2012, and a list of all Business and Multi-Family Buildings accounts in Covered Jurisdictions subject to Phase 2 by February 1, 2014.
 - (2) For each account on the lists, provide the name of the account, contact, phone number, service address, billing address, Solid Waste (including Recyclables) service information, including number, type and size of containers and days of service, and the name and location where Recyclables are delivered for processing. Specify which accounts, if any, are being served by High Diversion Mixed Waste Processing Facilities.
- (d) Regulated Haulers shall provide the name of, location of, and total quantities of Solid Waste (including Recyclables) delivered to each Mixed Waste Processing Facilities (if any) in California used by the Regulated Hauler to assist Waste Generators and Property Owners in complying with this Ordinance.
- (e) Regulated Haulers shall not transport Solid Waste from collection locations (within Covered Jurisdictions) that do not have Source Separated Recycling service to Mixed Waste Processing Facilities that are not High Diversion Mixed Waste Processing Facilities unless the Authority has granted a waiver pursuant to Section 10 of this Ordinance or a Mixed Waste Processing Facility is making an effort satisfactory to the Enforcement Official to qualify as a High Diversion

Mixed Waste Processing Facility per Section 8 (g). .

- (f) If the Regulated Hauler believes any information required in this Section is confidential, it may submit such information with a request that it be maintained as confidential under the Public Records Act (Government Code section 6250 et al.), specifically identifying the information that it considers confidential and the legal basis for such conclusion.
- (g) Mixed Waste Processing Facilities that want to qualify as High Diversion Mixed Waste Processing Facilities under this Ordinance shall comply with the following:
 - (1) Submit to the Authority a proposal for the protocol it will use to determine whether it is satisfying the performance standards in Ordinance Section 3(l)'s definition of High Diversion Mixed Waste Processing Facilities for Solid Waste from collection locations (within Covered Jurisdictions) that do not have Source Separated Recycling service.
 - (2) The Enforcement Official, after consultation with the Primary Enforcement Representatives (or other designee of the chief executive of each of the Covered Jurisdictions) from the Covered Jurisdictions that have Solid Waste processed at the Mixed Waste Processing Facility, will review and respond to the proposed protocol within 30 days of receiving the proposal, and shall approve the protocol if found that the protocol will effectively determine whether the facility satisfies the performance standards set out in Section 3(l) of the Ordinance for Solid Waste from collection locations (within Covered Jurisdictions) that do not have Source Separated Recycling service. Proposed protocol shall be revised and resubmitted within 30 days after notice by the Enforcement Official that a proposed protocol will not effectively determine whether the facility satisfies the performance standards set out in Section 3(l) of the Ordinance.
 - (3) Once the Authority has approved the proposed protocol, the Mixed Waste Processing Facility shall submit initial documentation, as well as documentation annually, demonstrating that, in accordance with the approved protocol, it meets the performance standards in 3(l) of this Ordinance for Solid Waste from collection locations (within Covered Jurisdictions) that do not have Source Separated Recycling service.

SECTION 9 (Inspections by Authority Representatives within Covered Jurisdictions)

- (a) Authority Representatives are authorized to conduct inspections of loads of Solid Waste originating in Covered Jurisdictions and brought to Landfills, Transfer Stations, Mixed Waste Processing Facilities, or any other facility receiving Solid

- Waste or Refuse located in Alameda County, subject to the following: (i) inspections cannot reasonably interfere with operations of the facility, (ii) inspector must wear appropriate safety equipment acceptable to the operator of the facility, and (iii) inspector may not conduct inspections in areas deemed to be unsafe by safety regulations or regulators or in locations where the facility operator prohibits walking or standing by its employees.
- (b) Authority Representatives are authorized to conduct inspections, without notice, for compliance with this Ordinance by Waste Generators and Property Owners located in Covered Jurisdictions, subject to applicable laws.
 - (c) Authority Representatives are authorized to conduct inspections, at random or otherwise, of all Solid Waste at the point of collection or transfer or Deposit in Landfill(s), subject to the following: (i) inspections cannot reasonably interfere with operations of the facility, (ii) inspector must wear appropriate safety equipment acceptable to the operator of the facility, and (iii) inspector may not conduct inspections in areas deemed to be unsafe by safety regulations or regulators or in locations where the facility operator prohibits walking or standing by its employees.
 - (d) Authority Representatives are authorized to conduct any other inspections or investigations as reasonably necessary to further the goals of this Ordinance, subject to applicable laws.

SECTION 10 (Waivers)

- (a) The Enforcement Official shall consult with the Primary Enforcement Representative from the jurisdiction of the waiver applicant prior to making any decision regarding a request for a waiver under this Ordinance.
- (b) Emergency Waiver. If the Enforcement Official determines that any type of Covered Material cannot feasibly be Recycled for a limited time period due to emergency conditions, then the Enforcement Official may permit that component of Covered Materials to be Deposited in Landfill(s) for that limited time period.
- (c) De Minimus Waiver. The Enforcement Official may waive some or all of the requirements of Sections 4 or 5, as appropriate, at a collection location if documentation satisfactory to the Enforcement Official is provided that Covered Materials comprise, on an on-going and typical basis, less than 10% by weight of Solid Waste taken to Landfill(s) from that collection location.
- (d) Physical Space Waiver. The Enforcement Official may waive some or all of the requirements of Sections 4 or 5, as appropriate, if documentation satisfactory to the Enforcement Official is provided that physical space limitations prevent full compliance with these Sections. A Waste Generator or Property Owner seeking this waiver must provide documentation from service providers, licensed architects or engineers, or building officials from a Covered Jurisdiction that demonstrates that the Waste Generator or Property Owner does not have adequate

space for containers for Covered Material and cannot obtain collection services that direct Solid Waste to High Diversion Mixed Waste Processing Facilities.

- (e) **Financial Hardship Waiver.** The Enforcement Official may waive some or all of the requirements of Sections 4 or 5, as appropriate, if documentation satisfactory to the Enforcement Official is provided that compliance with the Ordinance would create a financial hardship for a Property Owner. Hardship exists when implementation of this Ordinance will increase Solid Waste collection service bills for a particular collection location by more than 30% per typical billing period as compared with the cost of Solid Waste collection services in the absence of this Ordinance and State laws requiring recycling services at Businesses and Multi-Family Buildings. Hardship also exists when the sum of the change in billing described in the previous sentence plus the amortized costs of Solid Waste enclosures or other physical modifications necessary to house additional containers collected by truck, if such construction is required by Federal, State, or Local laws or regulations, exceeds 30% of the cost of Solid Waste collection services in the absence of this Ordinance and State laws requiring recycling services at Businesses and Multi-Family Buildings. Eligible construction costs shall be amortized over an appropriate period for such costs based on Internal Revenue Service or alternative authoritative guidance or standards. The financial hardship calculation shall take into consideration the cost savings potential of decreasing Refuse or Solid Waste service levels, and opportunities to reduce Solid Waste bills through changes in service providers, when that is legal within the relevant Covered Jurisdiction(s). The Enforcement Official may require compliance with some, but not all, requirements of this Ordinance if necessary to limit the increase in eligible costs to less than 30%.
- (f) **Unavailable Service Waiver.** The Enforcement Official may waive some or all of the requirements of Sections 4 or 5, as appropriate, if documentation satisfactory to the Enforcement Official is provided that neither separate collection for Covered Materials nor the service of a High Diversion Mixed Waste Processing Facility is available.
- (g) **Compliance Schedule Waiver.** Any Waste Generator or Property Owner (or Covered Jurisdiction on behalf of Waste Generators or Property Owners in its service area) may seek a waiver from the Enforcement Official by presenting evidence that more time is needed to fully implement a compliant program, and by providing a complete written proposal stating when full compliance will be achieved. If a compliance schedule waiver is granted, the Waste Generator or Property Owner or Covered Jurisdiction shall demonstrate on an on-going basis its good faith efforts to comply by the compliance date(s) stated in the approved waiver.
- (h) **Covered Materials in public litter containers** (e.g., on streets or in parks), street sweepings, or in Solid Waste collected when illegal dumping is cleaned up, are not subject to this Ordinance.

SECTION 11 (Enforcement)

- (a) An enforcement action under Sections 4, 5, or 8 of this Ordinance shall not be taken in any Covered Jurisdiction without written approval from the Primary Enforcement Representative of that Covered Jurisdiction. The Primary Enforcement Representative shall provide approval or disapproval of a proposed enforcement action in a timely manner.
- (b) Violation of any provision of this Ordinance shall constitute grounds for assessment of a notice of violation and fine by an Authority Representative in accordance with Government Code § 53069.4 or as the code shall subsequently be amended or reorganized. Where an enforcement action is necessary to enforce this Ordinance, the Enforcement Official will typically issue a notice of violation as authorized in this subsection prior to taking the actions authorized pursuant to section 11(c) or 11(d) of this Ordinance. A separate notice of violation and fine may be imposed for each day on which a violation occurs. The fine shall not exceed the amounts detailed for misdemeanors in Section 11(d) of this Ordinance. The notice of violation shall list the specific violation and fine amount and describe how to pay the fine and how to request an administrative hearing to contest the notice of violation. The fine shall be paid within 30 days of the notice of violation and shall be deposited prior to any requested hearing. A hearing, held by a hearing officer, will be held only if it is requested within 30 days of the notice of violation. Evidence may be presented at the hearing. The Executive Director, or its designee, shall conduct the hearing and issue a final written order. If it is determined that no violation occurred, the amount of the fine shall be refunded within 30 days. The Authority shall serve the final order on the Person subject to the notice of violation by overnight, certified or first class mail.
- (c) Violation of any provision of this Ordinance may be enforced by a civil action including an action for injunctive relief.
- (d) Violation of any provision of this Ordinance shall constitute a misdemeanor punishable by a fine not to exceed \$500 for the first violation, a fine not to exceed \$750 for the second violation within one year and a fine not to exceed \$1000 for each additional violation within one year. Violation of any provision of this Ordinance may also be enforced as an infraction punishable by a fine not to exceed \$100 for the first violation, a fine not to exceed \$200 for the second violation within one year and a fine not to exceed \$500 for each additional violation within one year. There shall be a separate offense for each day on which a violation occurs.
- (e) Enforcement pursuant to this Ordinance may be undertaken by the Authority through its Enforcement Official, counsel, or any Authority Representative. In any enforcement action, the Authority shall be entitled to recover its attorneys' fees and costs from any Person who violates this Ordinance.

- (f) Enforcement of Phase 1 of this Ordinance (as set forth in Section 13 of this Ordinance) shall not occur before July 1, 2012. Enforcement of Phase 2 of this Ordinance shall not occur before July 1, 2014. Prior to those dates, the Authority will conduct outreach and educational efforts regarding the requirements of the Ordinance. From July 1, 2012 to December 31, 2012 for Phase 1, and from July 1, 2014 to December 31, 2014 for Phase 2, enforcement will consist of warnings rather than enforcement action. Enforcement action will be taken, as needed, after January 1, 2013 for Phase 1 and after January 1, 2015 for Phase 2.
- (g) Property Owners will not be held responsible for violations of this Ordinance by Waste Generators, and Waste Generators shall not be held responsible for violations of this Ordinance by Property Owners, unless they are the same person, and so long as they cooperate with the Enforcement Official and Authority Representatives as necessary to clarify responsibility for violations. Failure to cooperate in determining responsibility as described above is a violation of this Ordinance.
- (h) Regulated Haulers will not be held responsible for violations of this Ordinance by High Diversion Mixed Waste Processing Facilities, and High Diversion Mixed Waste Processing Facilities shall not be held responsible for violations of this Ordinance by Regulated Haulers, unless they are the same person, and so long as they cooperate with the Enforcement Official and Authority Representatives as necessary to clarify responsibility for violations.

SECTION 12 (Local Regulation and Opt-Out and Opt-In Provisions)

- (a) Local Regulation. Nothing in this Ordinance shall be construed to prohibit any Member Agency from enacting and enforcing ordinances and regulations regarding the collection, transport, storage, processing, and Deposit in Landfill(s) of Solid Waste within its jurisdiction, including more stringent requirements than those in this Ordinance.
- (b) Opt-Out Provision. Any Member Agency by a resolution of its governing body may, prior to March 2, 2012, choose to exclude its service area from Sections 4, 5, and 8, Phase 1 of this Ordinance. Any Member Agency by a resolution of its governing board may, prior to January 1, 2014, choose to exclude its service area from Sections 4, 5, and 8, Phase 2 of this Ordinance.
- (c) Opt-In Provision. Any Member Agency that chooses to exclude its service area from either Phase 1 or Phase 2 may request of the Authority by a resolution of its governing board to be re-included in coverage of the Ordinance at any subsequent time. Such coverage under the Ordinance, however, shall not occur unless it is accepted in writing by the Enforcement Official or the Authority Board, and shall become effective only on the date specified in such written acceptance. Such acceptance shall not be unreasonably withheld or delayed.
- (d) Dispute Resolution. In the event of a dispute between the Authority and a

Covered Jurisdiction regarding the implementation of this Ordinance, either party may request a meeting, in which case the Enforcement Official and the Primary Enforcement Representative for the Covered Jurisdiction (or other designee of the chief executive of the Covered Jurisdiction) shall meet to discuss implementation of the Ordinance's provisions. After such meeting, the parties may agree to enter into mediation to resolve any disputes between the parties related to implementation of the Ordinance. In addition, after meeting to seek to resolve any disputes between the parties and possible mediation, the Authority Board or the governing body of the Covered Jurisdiction, with at least 30 days public notice, may by resolution choose to exclude the service area of the Covered Jurisdiction from Sections 4, 5, and 8 of this Ordinance.

SECTION 13 (Implementation Schedule)

(a)

Phase Number: Effective Date	Entities Subject to Ordinance	Covered Materials
Phase 1: July 1, 2012	Business Property Owners and Business Waste Generators within Covered Jurisdictions with 4 cubic yards or more of Solid Waste (excluding Recyclables and Solid Waste generated under a permitted building project) collection service per week on an average basis as of November 1, 2011 or any later date. Multi-Family Building Property Owners within Covered Jurisdictions. Self-Haulers transporting Solid Waste originating in Alameda County. Regulated Haulers operating within Covered Jurisdictions.	Corrugated cardboard, newspaper, white paper, mixed recyclable paper, recyclable food and beverage glass containers, metal (aluminum and steel) food and beverage cans, HDPE and PET bottles
Phase 2: July 1, 2014	All Business and Multi-Family Building Property Owners and Business Waste Generators within Covered Jurisdictions. Self-Haulers transporting Solid Waste originating in Alameda County. Regulated Haulers operating within Covered Jurisdictions.	Covered Materials in Phase 1, plus discarded food and Compostable paper.

(b) A Covered Jurisdiction may add discarded food and Compostable paper, or other Recyclable materials, to the list of Covered Materials for all or a subset of the entities subject to the Ordinance at any time if requested by three or more Covered Jurisdictions. Such coverage under the Ordinance, however, shall not

occur unless it is accepted in writing by the Enforcement Official or the Authority Board, and shall become effective only on the date specified in such written acceptance. Such acceptance shall not be unreasonably withheld or delayed.

SECTION 14 (Severability)

If any provision of this Ordinance or its application to any situation is held to be invalid, the invalidity shall not affect other provisions or applications of this Ordinance which can be given effect without the invalid provision or application, and to this end the provisions of this Ordinance are declared to be severable.

SECTION 15 (Notice and Verification)

This Ordinance shall be posted at the Authority Office after its second reading by the Board for at least thirty (30) days and shall become effective thirty (30) days after the second reading.

Passed and adopted this 25th day of January, 2012 by the following vote:

AYES: Biddle, Carson, Cutter, Freitas, Green, Henson, Kaplan, Keating, Landis,
Natarajan, Sullivan, Tam, Turner, West, Wile, Wozniak

NOES: Sadoff

ABSTAINING:

ABSENT:

I certify that under the penalty of perjury that the foregoing is a full, true and correct copy of the ORDINANCE NO. 2012-1.



GARY WOLFF
EXECUTIVE DIRECTOR

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AMENDED AND RESTATED SOLID WASTE INTERLOCAL AGREEMENT

This Amended and Restated Solid Waste Interlocal Agreement ("Agreement") is entered into between King County, a political subdivision of the State of Washington and the City of Bellevue, a municipal corporation of the State of Washington, hereinafter referred to as "County" and "City" respectively. Collectively, the County and the City are referred to as the "Parties." This Agreement has been authorized by the legislative body of each jurisdiction pursuant to formal action as designated below:

King County: Ordinance No. 17677

City: 9327

PREAMBLE

- A. This Agreement is entered into pursuant to chapter 39.34 RCW for the purpose of extending, restating and amending the Solid Waste Interlocal Agreement between the Parties originally entered into in ____ (the "Original Agreement"). The Original Agreement provided for the cooperative management of Solid Waste in King County for a term of forty (40) years, through June 30, 2028. The Original Agreement is superseded by this Amended and Restated Agreement, as of the effective date of this Agreement. This Amended and Restated Agreement is effective for an additional twelve (12) years through December 31, 2040.
- B. The Parties intend to continue to cooperatively manage Solid Waste and to work collaboratively to maintain and periodically update the existing King County

Comprehensive Solid Waste Management Plan (Comprehensive Plan) adopted pursuant to chapter 70.95 RCW.

- C. The Parties continue to support the established goals of Waste Prevention and Recycling as incorporated in the Comprehensive Solid Waste Management Plan, and to meet or surpass applicable environmental standards with regard to the Solid Waste System.
- D. The County and the Cities agree that System-related costs, including environmental liabilities, should be funded by System revenues which include but are not limited to insurance proceeds, grants and rates;
- E. The County, as the service provider, is in the best position to steward funds System revenues that the County and the Cities intend to be available to pay for environmental liabilities; and
- F. The County and the Cities recognize that at the time this Agreement goes into effect, it is impossible to know what the ultimate environmental liabilities could be; nevertheless, the County and the Cities wish to designate in this Agreement a protocol for the designation and distribution of funding for potential future environmental liabilities in order to protect the general funds of the County and the Cities.
- G. The County began renting the Cedar Hills Landfill from the State of Washington in 1960 and began using it for Disposal of Solid Waste in 1964. The County acquired ownership of the Cedar Hills Landfill from the State in 1992. The Cedar Hills Landfill remains an asset owned by the County.
- H. The Parties expect that the Cedar Hills Landfill will be at capacity and closed at some date during the term of this Agreement, after which time all Solid Waste under this Agreement will need to be disposed of through alternate means, as determined by the

Cities and the County through amendments to the Comprehensive Solid Waste Management Plan. The County currently estimates the useful life of the Cedar Hills Landfill will extend through 2025. It is possible that this useful life could be extended, or shortened, by System management decisions or factors beyond the control of the Parties.

- I. The County intends to charge rent for the use of the Cedar Hills Landfill for so long as the System uses this general fund asset and the Parties seek to clarify terms relative to the calculation of the associated rent.
- J. The County and Cities participating in the System have worked collaboratively for several years to develop a plan for the replacement or upgrading of a series of transfer stations. The Parties acknowledge that these transfer station improvements, as they may be modified from time-to-time, will benefit Cities that are part of the System and the County. The Parties have determined that the extension of the term of the Original Agreement by twelve (12) years as accomplished by this Agreement is appropriate in order to facilitate the long-term financing of transfer station improvements and to mitigate rate impacts of such financing.
- K. The Parties have further determined that in order to equitably allocate the benefit to all System Users from the transfer station improvements, different customer classes may be established by the County to ensure System Users do not pay a disproportionate share of the cost of these improvements as a result of a decision by a city not to extend the term of the Original Agreement.
- L. The Parties have further determined it is appropriate to strengthen and formalize the advisory role of the Cities regarding System operations.

The Parties agree as follows:

I. DEFINITIONS

For purposes of this Agreement the following definitions shall apply:

“Cedar Hills Landfill” means the landfill owned and operated by the County located in southeast King County.

“Cities” refers to all Cities that have signed an Amended and Restated Solid Waste Interlocal Agreement in substantially identical form to this Agreement.

"Comprehensive Solid Waste Management Plan" or “Comprehensive Plan” means the Comprehensive Solid Waste Management Plan, as approved and amended from time to time, for the System, as required by chapter 70.95.080 RCW.

“County” means King County, a Charter County and political subdivision of the State of Washington.

"Disposal" means the final treatment, utilization, processing, deposition, or incineration of Solid Waste but shall not include Waste Prevention or Recycling as defined herein.

“Disposal Rates” means the fee charged by the County to System Users to cover all costs of the System consistent with this Agreement, all state, federal and local laws governing solid waste and the Solid Waste Comprehensive Plan.

"Divert" means to direct or permit the directing of Solid Waste to Disposal sites other than the Disposal site(s) designated by King County.

"Energy/Resource Recovery" means the recovery of energy in a usable form from mass burning or refuse-derived fuel incineration, pyrolysis or any other means of using the heat of combustion of Solid Waste that involves high temperature (above 1,200 degrees F) processing. (chapter 173.350.100 WAC).

"Landfill" means a Disposal facility or part of a facility at which Solid Waste is placed in or on land and which is not a land treatment facility.

“Metropolitan Solid Waste Advisory Committee” or “MSWAC” means the advisory committee composed of city representatives, established pursuant to Section IX of this Agreement.

"Moderate Risk Waste" means waste that is limited to conditionally exempt small quantity generator waste and household hazardous waste as those terms are defined in chapter 173-350 WAC, as amended.

“Original Agreement” means the Solid Waste Interlocal Agreement first entered into by and between the Parties, which is amended and restated by this Agreement. “Original Agreements” means collectively all such agreements between Cities and the County in substantially the same form as the Original Agreement.

“Parties” means collectively the County and the City or Cities.

"Recycling" as defined in chapter 70.95.030 RCW, as amended, means transforming or remanufacturing waste materials into usable or marketable materials for use other than landfill Disposal or incineration.

“Regional Policy Committee” means the Regional Policy Committee created pursuant to approval of the County voters in 1993, the composition and responsibilities of which are prescribed in King County Charter Section 270 and chapter 1.24 King County Code, as they now exist or hereafter may be amended.

"Solid Waste" means all putrescible and nonputrescible solid and semisolid wastes including but not limited to garbage, rubbish, ashes, industrial wastes, swill, commercial waste, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged materials, discarded commodities and recyclable materials, but shall not include dangerous, hazardous, or extremely hazardous waste as those terms are defined in chapter 173-303 WAC, as amended; and shall further not include those

wastes excluded from the regulations established in chapter 173-350 WAC, more specifically identified in Section 173-350-020 WAC.

"Solid Waste Advisory Committee" or "SWAC" means the inter-disciplinary advisory forum or its successor created by the King County Code pursuant to chapter 70.95.165 RCW.

"System" includes King County's Solid Waste facilities used to manage Solid Wastes which includes but is not limited to transfer stations, drop boxes, landfills, recycling systems and facilities, energy and resource recovery facilities and processing facilities as authorized by chapter 36.58.040RCW and as established pursuant to the approved King County Comprehensive Solid Waste Management Plan.

"System User" or "System Users" means Cities and any person utilizing the County's System for Solid Waste handling, Recycling or Disposal.

"Waste Prevention" means reducing the amount or type of waste generated. Waste Prevention shall not include reduction of already-generated waste through energy recovery, incineration, or otherwise.

II. PURPOSE

The purpose of this Agreement is to foster transparency and cooperation between the Parties and to establish the respective responsibilities of the Parties in a Solid Waste management System, including but not limited to, planning, Waste Prevention, Recycling, and Disposal.

III. DURATION

This Agreement shall become effective as of November 6, 2018, and shall remain in effect through December 31, 2040.

IV. APPROVAL

This Agreement will be approved and filed in accordance with chapter 39.34 RCW.

V. RENEGOTIATION TO FURTHER EXTEND TERM OF AGREEMENT

5.1 The Parties recognize that System Users benefit from long-term Disposal arrangements, both in terms of predictability of System costs and operations, and the likelihood that more cost competitive rates can be achieved with longer-term Disposal contracts as compared to shorter-term contracts. To that end, at least seven (7) years before the date that the County projects that the Cedar Hills Landfill will close, or prior to the end of this Agreement, whichever is sooner, the County will engage with MSWAC and the Solid Waste Advisory Committee, among others, to seek their advice and input on the Disposal alternatives to be used after closure of the Cedar Hills Landfill, associated changes to the System, estimated costs associated with the recommended Disposal alternatives, and amendments to the Comprehensive Solid Waste Management Plan necessary to support these changes. Concurrently, the Parties will meet to negotiate an extension of the term of the Agreement for the purpose of facilitating the long-term Disposal of Solid Waste after closure of the Cedar Hills Landfill. Nothing in this Agreement shall require the Parties to reach agreement on an extension of the term of this Agreement. If the Parties fail to reach agreement on an extension, the Dispute Resolution provisions of Section XIII do not apply, and this Agreement shall remain unchanged.

5.2 Notwithstanding any other provision in this Agreement to the contrary, the Parties may, pursuant to mutual written agreement, modify or amend any provision of this Agreement at any time during the term of said Agreement.

VI. GENERAL OBLIGATIONS OF PARTIES

6.1 King County

6.1.a Management. The County agrees to provide Solid Waste management services, as specified in this Section, for Solid Waste generated and collected within the City, except waste eliminated through Waste Prevention or waste recycling activities. The County agrees to dispose of or designate Disposal sites for all Solid Waste and Moderate Risk Waste generated and/or collected within the corporate limits of the City which is delivered to the System in accordance with all applicable Federal, State and local environmental health laws, rules, or regulations, as those laws are described in Subsection 8.5.a. The County shall maintain records as necessary to fulfill obligations under this Agreement.

6.1.b Planning. The County shall serve as the planning authority for Solid Waste and Moderate Risk Waste under this Agreement but shall not be responsible for planning for any other waste or have any other planning responsibility under this Agreement.

6.1.c Operation. King County shall be or shall designate or authorize the operating authority for transfer, processing and Disposal facilities, including public landfills and other facilities, consistent with the adopted Comprehensive Plan as well as closure and post-closure responsibilities for landfills which are or were operated by the County.

6.1.d Collection Service. The County shall not provide Solid Waste collection services within the corporate limits of the City, unless permitted by law and agreed to by both Parties.

6.1.e Support and Assistance. The County shall provide support and technical assistance to the City consistent with the Comprehensive Solid Waste Management Plan for a Waste Prevention and Recycling program. Such support may include the award of grants to support programs with System benefits. The County shall develop educational materials related to Waste Prevention and Recycling and strategies for maximizing the usefulness of the educational materials and will make these available to the City for its use. Although the County will not be required to provide a particular level of support or fund any City activities related to Waste Prevention and Recycling, the County intends to move forward aggressively to promote Waste Prevention and Recycling.

6.1.f Forecast. The County shall develop Solid Waste stream forecasts in connection with System operations as part of the comprehensive planning process in accordance with Article XI.

6.1.g Facilities and Services. The County shall provide facilities and services pursuant to the Comprehensive Solid Waste Management Plan and the Solid Waste Transfer and Waste Management plan as adopted and County Solid Waste stream forecasts.

6.1.h Financial Policies. The County will maintain financial policies to guide the System's operations and investments. The policies shall be consistent with this Agreement and shall address debt issuance, rate stabilization, cost containment, reserves, asset ownership and use, and other financial issues. The County shall primarily use long term bonds to finance transfer System improvements. The policies shall be developed and/or revised through

discussion with MSWAC, the Regional Policy Committee, the County Executive and the County Council. Such policies shall be codified at the same time as the Comprehensive Plan updates, but may be adopted from time to time as appropriate outside the Comprehensive Plan process.

6.2 City

6.2.a Collection. The City, an entity designated by the City or such other entity as is authorized by state law shall serve as operating authority for Solid Waste collection services provided within the City's corporate limits.

6.2.b Disposal. The City shall cause to be delivered to the County's System for Disposal all such Solid Waste and Moderate Risk Waste which is authorized to be delivered to the System in accordance with all applicable Federal, State and local environmental health laws, rules or regulations and is generated and/or collected within the corporate limits of the City and shall authorize the County to designate Disposal sites for the Disposal of all such Solid Waste and Moderate Risk Waste generated or collected within the corporate limits of the City, except for Solid Waste which is eliminated through Waste Prevention or waste Recycling activities consistent with the Comprehensive Solid Waste Management Plan. No Solid Waste generated or collected within the City may be Diverted from the designated Disposal sites without County approval.

6.3 JOINT RESPONSIBILITIES.

6.3.a Consistent with the Parties' overall commitment to ongoing communication and coordination, the Parties will endeavor to notify and coordinate with each other on the development of any City or County plan, facility, contract, dispute, or other Solid Waste issue that could have potential significant impacts on the County, the System, or the City or Cities.

6.3.b The Parties, together with other Cities, will coordinate on the development of emergency plans related to Solid Waste, including but not limited to debris management.

VII. COUNTY SHALL SET DISPOSAL RATES

AND OPERATING RULES FOR DISPOSAL; USE OF SYSTEM REVENUES

7.1 In establishing Disposal Rates for System Users, the County shall consult with MSWAC consistent with Section IX. The County may adopt and amend by ordinance rates necessary to recover all costs of the System including but not limited to operations and maintenance, costs for handling, processing and Disposal of Solid Waste, siting, design and construction of facility upgrades or new facilities, Recycling, education and mitigation, planning, Waste Prevention, reserve funds, financing, defense and payment of claims, insurance, System liabilities including environmental releases, monitoring and closure of landfills which are or were operated by the County, property acquisition, grants to cities, and administrative functions necessary to support the System and Solid Waste handling services during emergencies as established by local, state and federal agencies or for any other lawful solid waste purpose, and in accordance with chapter 43.09.210 RCW. Revenues from Disposal rates shall be used only for such purposes. The County shall establish classes of customers for Solid Waste management services and by ordinance shall establish rates for classes of customers.

7.2. It is understood and agreed that System costs include payments to the County general fund for Disposal of Solid Waste at the Cedar Hills Landfill calculated in accordance with this Section 7.2, and that such rental payments shall be established based on use valuations provided to the County by an independent-third party Member, Appraisal Institute (MAI) certified appraiser selected by the County in consultation with MSWAC.

7.2.a A use valuation shall be prepared consistent with MAI accepted principles for the purpose of quantifying the value to the System of the use of Cedar Hills Landfill for Disposal of Solid Waste over a specified period of time (the valuation period). The County shall establish a schedule of annual use charges for the System's use of the Cedar Hills Landfill which shall not exceed the most recent use valuation. Prior to establishing the schedule of annual use charges, the County shall seek review and comment as to both the use valuation and the proposed payment schedule from MSWAC. Upon request, the County will share with and explain to MSWAC the information the appraiser requests for purposes of developing the appraiser's recommendation.

7.2.b Use valuations and the underlying schedule of use charges shall be updated if there are significant changes in Cedar Hills Landfill capacity as a result of opening new Disposal areas and as determined by revisions to the existing Cedar Hills Regional Landfill Site Development Plan; in that event, an updated appraisal will be performed in compliance with MAI accepted principles. Otherwise, a reappraisal will not occur. Assuming a revision in the schedule of use charges occurs based on a revised appraisal, the resulting use charges shall be applied beginning in the subsequent rate period.

7.2.c The County general fund shall not charge use fees or receive other consideration from the System for the System's use of any transfer station property in use as of the effective date of this Agreement. The County further agrees that the County general fund may not receive payments from the System for use of assets to the extent those assets are acquired with System revenues. As required by chapter 43.09.210 RCW, the System's use of assets acquired with the use of other separate County funds (e.g., the Roads Fund, or other funds)

will be subject to use charges; similarly, the System will charge other County funds for use of System property.

VIII. LIABILITY

8.1 Non-Environmental Liability Arising Out-of-County Operations. Except as provided in this Section, Sections 8.5 and 8.6, the County shall indemnify and hold harmless the City and shall have the right and duty to defend the City through the County's attorneys against any and all claims arising out of the County's operations during the term of this Agreement and settle such claims, provided that all fees, costs, and expenses incurred by the County thereby are System costs which may be satisfied from Disposal Rates as provided in Section VII herein. In providing such defense of the City, the County shall exercise good faith in such defense or settlement so as to protect the City's interest. For purposes of this Section "claims arising out of the County's operations" shall mean claims arising out of the ownership, control, or maintenance of the System, but shall not include claims arising out of the City's operation of motor vehicles in connection with the System or other activities under the control of the City which may be incidental to the County's operation. The provisions of this Section shall not apply to claims arising out of the sole negligence or intentional acts of the City. The provisions of this Section shall survive for claims brought within three (3) years past the term of this Agreement established under Section III.

8.2 Cooperation. In the event the County acts to defend the City against a claim under Section 8.1, the City shall cooperate with the County.

8.3 Officers, Agents, and Employees. For purposes of this Section VIII, references to City or County shall be deemed to include the officers, employees and agents of either Party,

acting within the scope of their authority. Transporters or generators of waste who are not officers or employees of the City or County are not included as agents of the City or County for purposes of this Section.

8.4 Each Party by mutual negotiation hereby waives, with respect to the other Party only, any immunity that would otherwise be available against such claims under the Industrial Insurance provisions of Title 51 RCW.

8.5 Unacceptable Waste

8.5.a All waste generated or collected from within the corporate limits of the City which is delivered to the System for Disposal shall be in compliance with the Resource Conservation and Recovery Act (42 U.S.C. § 6901 et seq.) (RCRA), chapters 70.95 and 70.105 RCW, King County Code Title 10, King County Board of Health Rules and Regulations, the Solid Waste Division operating rules, and all other Federal, State and local environmental health laws, rules or regulations that impose restrictions or requirements on the type of waste that may be delivered to the System, as they now exist or are hereafter adopted or amended.

8.5.b For purposes of this Agreement, the City shall be deemed to have complied with the requirements of Subsection 8.5.a if it has adopted an ordinance requiring waste delivered to the System for Disposal to meet the laws, rules, or regulations specified in Subsection 8.5.a. However, nothing in this Agreement is intended to relieve the City from any obligation or liability it may have under the laws mentioned in Subsection 8.5.a arising out of the City's actions other than adopting, enforcing, or requiring compliance with said ordinance, such as liability, if any exists, of the City as a transporter or generator for improper transport or Disposal of regulated dangerous waste. Any environmental liability the City may have for

releases of pollutants or hazardous or dangerous substances or wastes to the environment is dealt with under Sections 8.6 and 8.7.

8.5.c The City shall hold harmless, indemnify and defend the County for any property damages or personal injury caused solely by the City's failure to adopt an ordinance under Subsection 8.5.b. In the event the City acts to defend the County under this Subsection, the County shall cooperate with the City.

8.5.d The City shall make best efforts to include language in its contracts, franchise agreements, or licenses for the collection of Solid Waste within the City that allow for enforcement by the City against the collection contractor, franchisee or licensee for violations of the laws, rules, or regulations in Subsection 8.5.a. The requirements of this Subsection 8.5.d shall apply to the City's first collection contract, franchise, or license that becomes effective or is amended after the effective date of this Agreement.

8.5.d.i If waste is delivered to the System in violation of the laws, rules, or regulations in Subsection 8.5.a, before requiring the City to take any action under Subsection 8.5.d.ii, the County will make reasonable efforts to determine the parties' responsible for the violation and will work with those parties to correct the violation, consistent with applicable waste clearance and acceptance rules, permit obligations, and any other legal requirements.

8.5.d.ii If the violation is not corrected under Subsection 8.5.d.i and waste is determined by the County to have been generated or collected from within the corporate limits of the City, the County shall provide the City with written notice of the violation. Upon such notice, the City shall take immediate steps to remedy the violation and prevent similar future violations to the reasonable satisfaction of the County which may include but not be

limited to removing the waste and disposing of it in an approved facility; provided that nothing in this Subsection 8.5.d.ii shall obligate the City to handle regulated dangerous waste, as defined in WAC 173-351-200(1)(b)(i), and nothing in this Subsection shall relieve the City of any obligation it may have apart from this Agreement to handle regulated dangerous waste. If, in good faith, the City disagrees with the County regarding the violation, such dispute shall be resolved between the Parties using the Dispute Resolution process in Section XII or, if immediate action is required to avoid an imminent threat to public health, safety or the environment, in King County Superior Court. Each Party shall be responsible for its own attorneys' fees and costs. Failure of the City to take the steps requested by the County pending Superior Court resolution shall not be deemed a violation of this Agreement; provided, however, that this shall not release the City for damages or loss to the County arising out of the failure to take such steps if the Court finds a City violation of the requirements to comply with applicable laws set forth in Subsection 8.5.a.

8.6 Environmental Liability.

8.6.a Neither the County nor the City holds harmless or indemnifies the other with regard to any liability arising under 42 U.S.C. § 9601-9675 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) or as hereafter amended or pursuant to chapter 70.105D RCW (MTCA) or as hereafter amended and any state legislation imposing liability for System-related cleanup of contaminated property from the release of pollutants or hazardous or dangerous substances and/or damages resulting from property contaminated from the release of pollutants or hazardous or dangerous substances (“Environmental Liabilities”).

8.6.b Nothing in this Agreement is intended to create new Environmental Liability nor release any third-party from Environmental Liability. Rather, the intent is to protect the general funds of the Parties to this Agreement by ensuring that, consistent with best business practices, an adequate portion of Disposal Rates being collected from the System Users are set aside and accessible in a fair and equitable manner to pay the respective County and City's Environmental Liabilities.

8.6.c The purpose of this Subsection is to establish a protocol for the setting aside, and subsequent distribution of, Disposal Rates intended to pay for Environmental Liabilities of the Parties, if and when such liabilities should arise, in order to safeguard the Parties' general funds. To do so, the County shall:

8.6.c.i Use Disposal Rates to obtain and maintain, to the extent commercially available under reasonable terms, insurance coverage for System-related Environmental Liability that names the City as an Additional Insured. The County shall establish the adequacy, amount and availability of such insurance in consultation with MSWAC. Any insurance policy in effect on the termination date of this Agreement with a term that extends past the termination date shall be maintained until the end of the policy term.

8.6.c.ii Use Disposal Rates to establish and maintain a reserve fund to help pay the Parties' Environmental Liabilities not already covered by System rates or insurance maintained under Subsection 8.6.c.i above ("Environmental Reserve Fund"). The County shall establish the adequacy of the Environmental Reserve Fund in consultation with MSWAC and consistent with the financial policies described in Article VI. The County shall retain the Environmental Reserve Fund for a minimum of 30 years following the closure of the Cedar Hills Landfill (the "Retention Period"). During the Retention Period, the Environmental Reserve Fund

shall be used solely for the purposes for which it was established under this Agreement. Unless otherwise required by law, at the end of the Retention Period, the County and Cities shall agree as to the disbursement of any amounts remaining in the Environmental Reserve Fund. If unable to agree, the County and City agree to submit disbursement to mediation and if unsuccessful to binding arbitration in a manner similar to Section 39.34.180 RCW to the extent permitted by law.

8.6.c.iii Pursue state or federal grant funds, such as grants from the Local Model Toxics Control Account under chapter 70.105D.070(3) RCW and chapter 173-322 WAC, or other state or federal funds as may be available and appropriate to pay for or remediate such Environmental Liabilities.

8.6.d If the funds available under Subsections 8.6.c.i-iii are not adequate to completely satisfy the Environmental Liabilities of the Parties to this Agreement then to the extent feasible and permitted by law, the County will establish a financial plan including a rate schedule to help pay for the County and City's remaining Environmental Liabilities in consultation with MSWAC.

8.6.e The County and the City shall act reasonably and quickly to utilize funds collected or set aside through the means specified in Subsections 8.6.c.i-iii and 8.6.d to conduct or finance response or clean-up activities in order to limit the County and City's exposure, or in order to comply with a consent decree, administrative or other legal order. The County shall notify the City within 30 days of any use of the reserve fund established in 8.6.c.iii.

8.6.f In any federal or state regulatory proceeding, and in any action for contribution, money expended by the County from the funds established in Subsections 8.6.c.i-iii and 8.6.d. to pay the costs of remedial investigation, cleanup, response or other action required

pursuant to a state or federal laws or regulations shall be considered by the Parties to have been expended on behalf and for the benefit of the County and the Cities.

8.6.g In the event that the funds established as specified in Subsections 8.6.c.i-iii and 8.6.d are insufficient to cover the entirety of the County and Cities' collective Environmental Liabilities, the funds described therein shall be equitably allocated between the County and Cities to satisfy their Environmental Liabilities. Factors to be considered in determining "equitably allocated" may include the size of each Party's System User base and the amount of rates paid by that System User base into the funds, and the amount of the Solid Waste generated by the Parties' respective System Users. Neither the County nor the Cities shall receive a benefit exceeding their Environmental Liabilities.

8.7 The County shall not charge or seek to recover from the City any costs or expenses for which the County indemnified the State of Washington in Exhibit A to the Quitclaim Deed from the State to the County for the Cedar Hills Landfill, dated February 24, 1993, to the extent such costs are not included in System costs.

IX. CITY ADVISORY COMMITTEE

9.1 There is hereby created an advisory committee comprised of representatives from cities, which shall be known as the Metropolitan Solid Waste Advisory Committee ("MSWAC"). The City may designate a representative and alternate(s) to serve on MSWAC. MSWAC shall elect a chair and vice-chair and shall adopt bylaws to guide its deliberations. The members of MSWAC shall serve at the pleasure of their appointing bodies and shall receive no compensation from the County.

9.2 MSWAC is the forum through which the Parties together with other cities participating in the System intend to discuss and seek to resolve System issues and concerns. MSWAC shall assume the following advisory responsibilities:

9.2.a Advise the King County Council, the King County Executive, Solid Waste Advisory Committee, and other jurisdictions as appropriate, on all policy aspects of Solid Waste management and planning;

9.2.b Consult with and advise the County on technical issues related to Solid Waste management and planning;

9.2.c Assist in the development of alternatives and recommendations for the Comprehensive Solid Waste Management Plan and other plans governing the future of the System, and facilitate a review and/or approval of the Comprehensive Solid Waste Management Plan by each jurisdiction;

9.2.d Assist in the development of proposed interlocal Agreements between King County and cities for planning, Waste Prevention and Recycling, and waste stream control;

9.2.e Review and comment on Disposal Rate proposals and County financial policies;

9.2.f Review and comment on status reports on Waste Prevention, Recycling, energy/resources recovery, and System operations with inter-jurisdictional impact;

9.2.g Promote information exchange and interaction between waste generators, cities, recyclers, and the County with respect to its planned and operated Disposal Systems;

9.2.h Provide coordination opportunities among the Solid Waste Advisory Committee, the Regional Policy Committee, the County, cities, private waste haulers, and recyclers;

9.2.i Assist cities in recognizing municipal Solid Waste responsibilities, including collection and Recycling, and effectively carrying out those responsibilities; and

9.2.j Provide input on such disputes as MSWAC deems appropriate.

9.3 The County shall assume the following responsibilities with respect to MSWAC;

9.3.a The County shall provide staff support to MSWAC;

9.3.b In consultation with the chair of MSWAC, the County shall notify all cities and their designated MSWAC representatives and alternates of the MSWAC meeting times, locations and meeting agendas. Notification by electronic mail or regular mail shall meet the requirements of this Subsection;

9.3.c The County will consider and respond on a timely basis to questions and issues posed by MSWAC regarding the System, and will seek to resolve those issues in collaboration with the Cities. Such issues shall include but are not limited to development of efficient and accountable billing practices; and

9.3.d. The County shall provide all information and supporting documentation and analyses as reasonably requested by MSWAC for MSWAC to perform the duties and functions described in Section 9.2.

X. FORUM INTERLOCAL AGREEMENT

10.1 As of the effective date of this Agreement, the *Forum Interlocal Agreement* and *Addendum to Solid Waste Interlocal Agreement and Forum Interlocal Agreement* by and between the City and County continue through June 30, 2028. After 2028 responsibilities assigned to the Forum shall be assigned to the Regional Policy Committee. The Parties agree that Solid Waste System policies and plans shall continue to be deemed regional countywide policies

and plans that shall be referred to the Regional Policy Committee for review consistent with King County Charter Section 270.30 and chapter 1.24 King County Code.

XI. COMPREHENSIVE SOLID WASTE MANAGEMENT PLAN

11.1 King County is designated to prepare the Comprehensive Solid Waste Management Plan (Comprehensive Plan) and this plan shall include the City's Solid Waste Management Comprehensive Plan pursuant to chapter 70.95.080(3) RCW.

11.2 The Comprehensive Plan shall be reviewed and any necessary revisions proposed. The County shall consult with MSWAC to determine when revisions are necessary. King County shall provide services and build facilities in accordance with the adopted Comprehensive Plan.

11.3 The Comprehensive Plans will promote Waste Prevention and Recycling in accordance with Washington State Solid Waste management priorities pursuant to chapter 70.95 RCW, at a minimum.

11.4 The Comprehensive Plans will be prepared in accordance with chapter 70.95 RCW and Solid Waste planning guidelines developed by the Department of Ecology. The plan shall include, but not be limited to:

11.4.a Descriptions of and policies regarding management practices and facilities required for handling all waste types;

11.4.b Schedules and responsibilities for implementing policies;

11.4.c Policies concerning waste reduction, Recycling, Energy and Resource Recovery, collection, transfer, long-haul transport, Disposal, enforcement and administration; and

11.4.d Operational plan for the elements discussed in Item c above.

11.5 The cost of preparation by King County of the Comprehensive Plan will be considered a cost of the System and financed out of the rate base.

11.6 The Comprehensive Plans will be “adopted” within the meaning of this Agreement when the following has occurred:

11.6.a The Comprehensive Plan is approved by the King County Council; and

11.6.b The Comprehensive Plan is approved by cities representing three-quarters of the population of the incorporated population of jurisdictions that are parties to the Forum Interlocal Agreement. In calculating the three-quarters, the calculations shall consider only those incorporated jurisdictions taking formal action to approve or disapprove the Comprehensive Plan within 120 days of receipt of the Plan. The 120-day time period shall begin to run from receipt by an incorporated jurisdiction of the Forum's recommendation on the Comprehensive Plan, or, if the Forum is unable to make a recommendation, upon receipt of the Comprehensive Plan from the Forum without recommendation.

11.7 Should the Comprehensive Plan be approved by the King County Council, but not receive approval of three-quarters of the cities acting on the Comprehensive Plan, and should King County and the cities be unable to resolve their disagreement, then the Comprehensive Plan shall be referred to the State Department of Ecology and the State Department of Ecology will resolve any disputes regarding Comprehensive Plan adoption and adequacy by approving or disapproving the Comprehensive Plan or any part thereof.

11.8 King County shall determine which cities are affected by any proposed amendment to the Comprehensive Plan. If any City disagrees with such determination, then the City can request that the Forum determine whether or not the City is affected. Such

determination shall be made by a two-thirds majority vote of all representative members of the Forum.

11.9 Should King County and the affected jurisdictions be unable to agree on amendments to the Comprehensive Plan, then the proposed amendments shall be referred to the Department of Ecology to resolve any disputes regarding such amendments.

11.10 Should there be any impasse between the Parties regarding Comprehensive Plan adoption, adequacy, or consistency or inconsistency or whether any permits or programs adopted or proposed are consistent with the Comprehensive Plan, then the Department of Ecology shall resolve said disputes.

XII.MITIGATION

12.1 The County will design, construct and operate Solid Waste facilities in a manner to mitigate their impact on host Cities and neighboring communities pursuant to applicable law and regulations.

12.2 The Parties recognize that Solid Waste facilities are regional facilities. The County further recognizes that host Cities and neighboring communities may sustain impacts which can include but are not limited to local infrastructure, odor, traffic into and out of Solid Waste facilities, noise and litter.

12.3 Collaboration in Environmental Review. In the event the County is the sole or co-Lead Agency, then prior to making a threshold determination under the State Environmental Policy Act (SEPA), the County will provide a copy of the SEPA environmental checklist, if any, and proposed SEPA threshold determination to any identifiable Host City (as defined below) and adjacent or neighboring city that is signatory to the Agreement and that may be affected by the

project ("Neighboring City") and seek their input. For any facility for which the County prepares an Environmental Impact Statement (EIS), the County will meet with any identified potential Host City (as defined below) and any Neighboring City to seek input on the scope of the EIS and appropriate methodologies and assumptions in preparing the analyses supporting the EIS. However, nothing in this Section shall limit or impair the County's ability to timely complete the environmental review process.

12.4 Collaboration in Project Permitting. If a new or reconstructed Solid Waste facility is proposed to be built within the boundaries of the City ("Host City") and the project requires one or more "project permits" as defined in chapter 36.70B.020(4) RCW from the Host City, before submitting its first application for any of the project permits, the County will meet with the Host City and any Neighboring City, to seek input. However, nothing in this Section shall limit or impair the County's ability to timely submit applications for or receive permits, nor waive any permit processing or appeal timelines.

12.5 Separately, the County and the City recognize that in accordance with 36.58.080RCW, a city is authorized to charge the County to mitigate impacts directly attributable to a County-owned Solid Waste facility. The County acknowledges that such direct costs include wear and tear on infrastructure including roads. To the extent that the City establishes that such charges are reasonably necessary to mitigate such impacts, payments to cover such impacts may only be expended only to mitigate such impacts and are System costs. If the City believes that it is entitled to mitigation under this Agreement, the City may request that the County undertake a technical analysis regarding the extent of impacts authorized for mitigation. Upon receiving such a request, the County, in coordination with the City and any necessary technical consultants, will develop any analysis that is reasonable and appropriate to identify impacts. The cost for such

analysis is a System cost. The City and County will work cooperatively to determine the appropriate mitigation payments and will document any agreement in a Memorandum of Agreement. If the City and the County cannot agree on mitigation payments, the dispute resolution process under chapter 36.58.080 RCW will apply rather than the dispute resolution process under Section XII of the Agreement.

XIII.DISPUTE RESOLUTION

13.1 Unless otherwise expressly stated, the terms of this Section XIII shall apply to disputes arising under this Agreement.

13.2 Initial Meeting.

13.2.a Either Party shall give notice to the other in writing of a dispute involving this Agreement.

13.2.b Within ten (10) business days of receiving or issuing such notice, the County shall send an email notice to all Cities.

13.2.c Within ten (10) business days of receiving the County's notice under Subsection 13.2.b, a City shall notify the County in writing or email if it wishes to participate in the Dispute Resolution process.

13.2.d Within not less than twenty-one (21) days nor more than thirty (30) days of the date of the initial notice of dispute issued under Subsection 13.2.a, the County shall schedule a time for staff from the County and any City requesting to participate in the dispute resolution process ("Participating City") to meet (the "initial meeting"). The County shall endeavor to set such initial meeting a time and place convenient to all Participating Cities and to the County.

13.3 Executives' Meeting.

13.3.a If the dispute is not resolved within sixty (60) days of the initial meeting, then within seven (7) days of expiration of the sixty (60)-day period, the County shall send an email notice to all Participating Cities that the dispute was not resolved and that a meeting of the County Executive, or his/her designee and the chief executive officer(s) of each Participating City, or the designees of each Participating City (an “executives' meeting”) shall be scheduled to attempt to resolve the dispute. It is provided, however, that the County and the Participating Cities may mutually agree to extend the sixty (60)-day period for an additional fifteen (15) days if they believe further progress may be made in resolving the dispute, in which case, the County’s obligation to send its email notice to the Participating Cities under this Subsection that the dispute was not resolved shall be within seven (7) days of the end of the extension. Likewise, the County and the Participating Cities may mutually conclude prior to the expiration of the sixty (60)-day period that further progress is not likely in resolving the dispute at this level, in which case, the County shall send its email notice that the dispute was not resolved within seven (7) days of the date that the County and the Participating Cities mutually concluded that further progress is not likely in resolving the dispute.

13.3.b Within seven (7) days of receiving the County’s notice under Subsection 13.3.a each Participating City shall notify the County in writing or email if it wishes to participate in the executives' meeting.

13.3.c Within not less than twenty-one (21) days nor more than thirty (30) days of the date of the notice of the executives' meeting issued under Subsection 13.3.a, the County shall schedule a time for the executives' meeting. The County shall endeavor to set such

executives' meeting a time and place convenient to all Participating Cities that provided notice under Subsection 13.3.b and to the County.

13.4. Non-Binding Mediation.

13.4.a If the dispute is not resolved within thirty (30) days of the executives' meeting, then any Participating City that was Party to the executives' meeting or the County may refer the matter to non-binding meditation by sending written notice within thirty-five (35) days of the initial executives' meeting to all Parties to such meeting.

13.4.b Within seven (7) days of receiving or issuing notice that a matter will be referred to non-binding mediation, the County shall send an email notice to all Participating Cities that provided notice under Subsection 13.3.b informing them of the referral.

13.4.c Within seven (7) days of receiving the County's notice under Subsection 13.4.b, each Participating City shall notify the County in writing if it wishes to participate in the non-binding mediation.

13.4.d The mediator will be selected in the following manner: The City(ies) electing to participate in the mediation shall propose a mediator and the County shall propose a mediator; in the event the mediators are not the same person, the two mediators shall select a third mediator who shall mediate the dispute. Alternately, the City(ies) participating in the mediation and the County may agree to select a mediator through a mediation service mutually acceptable to the Parties. The Parties to the mediation shall share equally in the costs charged by the mediator or mediation service. For purposes of allocating costs of the mediator or mediation service, all Cities participating in the mediation will be considered one Party.

13.5 Superior Court. Any Party, after participating in the non-binding mediation, may commence an action in King County Superior Court after one hundred eighty (180) days from

the commencement of the mediation, in order to resolve an issue that has not by then been resolved through non-binding mediation, unless all Parties to the mediation agree to an earlier date for ending the mediation.

13.6 Unless this Section XIII does not apply to a dispute, then the Parties agree that they may not seek relief under this Agreement in a court of law or equity unless and until each of the procedural steps set forth in this Section XIII have been exhausted, provided, that if any applicable statute of limitations will or may run during the time that may be required to exhaust the procedural steps in this Section XIII, a Party may file suit to preserve a cause of action while the Dispute Resolution process continues. The Parties agree that, if necessary and if allowed by the court, they will seek a stay of any such suit while the Dispute Resolution process is completed. If the dispute is resolved through the Dispute Resolution process, the Parties agree to dismiss the lawsuit, including all claims, counterclaims, and cross-claims, with prejudice and without costs to any Party.

XIV. FORCE MAJEURE

The Parties are not liable for failure to perform pursuant to the terms of this Agreement when failure to perform was due to an unforeseeable event beyond the control of either Party (“force majeure”). The term “force majeure” shall include, without limitation by the following enumeration: acts of nature, acts of civil or military authorities, terrorism, fire, accidents, shutdowns for purpose of emergency repairs, industrial, civil or public disturbances, or labor disputes, causing the inability to perform the requirements of this Agreement, if either Party is rendered unable, wholly or in part, by a force majeure event to perform or comply with any obligation or condition of this Agreement, upon giving notice and reasonably full particulars to

the other Party, such obligation or condition shall be suspended only for the time and to the extent practicable to restore normal operations.

XV. MERGER

This Agreement merges and supersedes all prior negotiations, representation and/or agreements between the Parties relating to the subject matter of this Agreement and constitutes the entire contract between the Parties [except with regard to the provisions of the Forum Interlocal Agreement]; provided that nothing in Section XV supersedes or amends any indemnification obligation that may be in effect pursuant to a contract between the Parties other than the Original Agreement; and further provided that nothing in this Agreement supersedes, amends or modifies in any way any permit or approval applicable to the System or the County's operation of the System within the jurisdiction of the City.

XVI. WAIVER

No waiver by either Party of any term or condition of this Agreement shall be deemed or construed to constitute a waiver of any other term or condition or of any subsequent breach whether of the same or a different provision of this Agreement.

XVII. THIRD PARTY BENEFICIARY

This Agreement is not entered into with the intent that it shall benefit any other entity or person except those expressly described herein, and no other such person or entity shall be entitled to be treated as a third-party beneficiary of this Agreement.

XVIII.SURVIVABILITY

Except as provided in Section 8.1, 8.2, 8.3,Section 8.6.c, except 8.6.ciii and Section 8.6d, no obligations in this Agreement survive past the expiration date as established in Section III.

XIX. NOTICE

Except as otherwise provided in this Agreement, a notice required to be provided under the terms of this Agreement shall be delivered by certified mail, return receipt requested or by personal service to the following person:

For the City:

Utility Director
City of Bellevue
PO Box 90012
Bellevue WA 98009-9012


For the County:

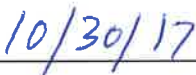
Director
King County Solid Waste Division
201 South Jackson Street, Suite 701
Seattle, Washington 98104

IN WITNESS WHEREOF, this Agreement has been executed by each Party on the date
set forth below:

CITY of

KING COUNTY



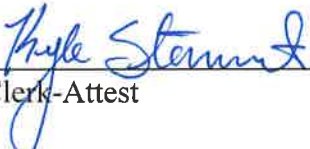
(Mayor/City Manager)


Date

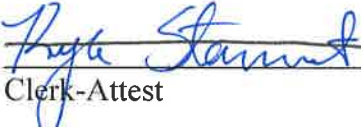


King County Executive


Date



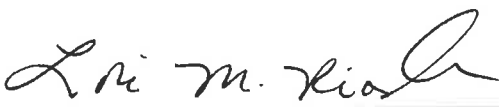
Clerk-Attest

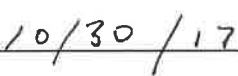


Clerk-Attest


Approved as to form and legality


Approved as to form and legality



City Attorney


Date



Russell Prugh
King County Deputy Prosecuting Attorney


Date

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3598-RES
11/2/2017

CITY OF BELLEVUE, WASHINGTON

RESOLUTION NO. 9327

A RESOLUTION ratifying the City Manager's execution of
the King County Amended and Restated Solid Waste
Interlocal Agreement on October 30, 2017.

THE CITY COUNCIL OF THE CITY OF BELLEVUE, WASHINGTON, DOES
RESOLVE AS FOLLOWS:

Section 1. The City Council hereby ratifies execution of the King County
Amended and Restated Solid Waste Interlocal Agreement on October 30, 2017, a
copy of which has been given Clerk's Receiving No. _____.

Passed by the City Council this 6th day of November, 2017,
and signed in authentication of its passage this 7th day of November,
2017.



Attest:

John Stokes, Mayor

Kyle Stannert, City Clerk

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**NON-EXCLUSIVE SOLID WASTE COLLECTION
FRANCHISE AGREEMENT NO.
CITY OF PASADENA**

THIS AGREEMENT is made and entered into by and between the CITY OF PASADENA ("City"), a municipal corporation, and ("Franchisee"), a Solid Waste Collection Company with its principal place of business at _____.

WHEREAS, pursuant to Chapter 8.61 of the Pasadena Municipal Code, Franchisee has applied to City for a non-exclusive Solid Waste Collection Franchise ("Franchise"); and

WHEREAS, on _____, the City Council held a public hearing for the purpose of hearing persons in favor of or in opposition to the granting of such Franchise; and

WHEREAS, the City Council has determined that Franchisee has demonstrated compliance with Chapter 8.61 of the Pasadena Municipal Code and has agreed to comply with all provisions of that Chapter; and

WHEREAS, it is required that City and Franchisee enter into a non-exclusive Solid Waste Collection Franchise Agreement ("Agreement") in order that Franchisee may perform solid waste collection, transportation, disposal and recycling services in the City of Pasadena;

NOW, THEREFORE, City and Franchisee do hereby agree as follows:

1.0. GRANT OF FRANCHISE. By Ordinance No. _____, City has granted to Franchisee a non-exclusive Solid Waste Collection Franchise authorizing Franchisee to engage in the business of collecting, transporting, disposing and recycling of solid

waste kept, accumulated or produced in the City of Pasadena and to use the public streets and rights of way for such purpose. This grant is pursuant to Franchisee's application for the Franchise, which application is incorporated here at by this reference. Franchisee is subject to the terms and conditions specified in Article XI of the Charter of the City of Pasadena, the provisions of Chapter 5.44 and Chapter 8.61 of the Pasadena Municipal Code, the terms and conditions specified in all related resolutions, and the terms and conditions of this Agreement and the representations and assurances in Franchisee's application for the Franchise.

2.0 TERM OF FRANCHISE. The term of the Franchise granted to Franchisee is from _____ through _____, inclusive. There may be up to four (4) additional renewal terms in the sole discretion of the City Manager, exercised in accordance with this section, for a maximum potential franchise length of five (5) years. The Franchisee has no vested or contract right in any such renewal term. As to any such renewal term, the City Manager may grant the renewal on a finding that the Franchisee is in compliance with the ordinance, the nonexclusive franchise agreement, and all federal, state or local laws and regulations applicable to the operation of the nonexclusive franchise and that the public interest is served by a renewal or (b) grant the renewal, conditionally, on a finding that the Franchisee is essentially in compliance with the ordinance, the nonexclusive franchise agreement, and all federal, state or local laws and regulations applicable to the operation of the nonexclusive franchise and that the public interest is served by a conditional renewal, or (c) may decline to grant any renewal term based on a finding either, (i) that the Franchisee is not in compliance with the ordinance, or with the nonexclusive franchise agreement, or with any federal, state or local law or regulation applicable to the operation of the nonexclusive franchise or, (ii) that the public interest is not served by a renewal because of a change in circumstances

or policy related to solid waste collection or the nonexclusive franchise system. There shall be no other renewals of a nonexclusive franchise. On August 6, 2007, City Council approved an action to close the solid waste franchise system to any new franchisees.

3.0 FRANCHISE FEES.

3.1 During the term of the Franchise, Franchisee shall pay franchise fees to City, which fees shall be assessed from the date on which the ordinance granting this Franchise became effective. Such fees shall be in the amount and manner as set forth in the Resolution adopted by the City Council on May 18, 2009, a true and correct copy of which is attached hereto as Exhibit 1, and in such other amounts as are set forth in any subsequent resolutions that may be adopted by the City Council at any time during the term of the Agreement.

3.2 Franchisee shall timely pay all required franchise fees to:

Department of Public Works/SMIWM Division
Attn: Carmen Rubio-Program Coordinator II
City of Pasadena
P.O. Box 7115
Pasadena, California 91109-9866

Each payment shall be accompanied by a written statement, verified by the Franchisee or a duly authorized representative of the Franchisee, showing in such form and detail as the Director of the Department of Public Works may prescribe, the calculation of the franchise fee payable by the Franchisee and such other information as the Director of the Department of Public Works may require as material to a determination of the amount due.

3.3 The first payment of the franchise fees under this renewal term will be due on _____, and payments shall be due on the first day of every month thereafter. Specifically, fees on Franchisee's revenue shall be due and payable on the first day of the second month after the close of the month in which revenue was received. For example, the franchise fee for the month of July is due on September 1.

3.4 When Franchisee remits franchise fees to City, such franchise fees shall be deemed timely paid only if delivered or postmarked on or before the due date. If fees are not timely paid, Franchisee shall be subject to suspension or termination of the Franchise pursuant to Section 14 of this Agreement and/or to any other penalties which may be established and assessed by the City.

4.0 DISPOSAL OF SOLID WASTE. Franchisee shall dispose of solid waste at a permitted landfill, transfer station, recycling facility, materials recovery facility or other disposal or recycling facility, which is lawfully authorized to accept such solid waste.

5.0 RECYCLING SERVICES.

5.1 Each Franchisee shall be required to ensure that recycling services are provided for all of its customers either directly or by arrangement with another Franchisee.

5.2 Materials to be recycled shall be collected at a minimum of once per week.

5.3 Each Franchisee shall, at intervals of no greater than 6 months, provide education and informational literature to its customers and the City describing

the recycling services to be provided, materials to be recycled, instructions on how to participate, and providing the Franchisee's telephone number.

5.4 Each Franchisee shall provide public awareness to its customers in accordance with the provisions of the Pasadena Municipal Code and the Rules and Regulations adopted by the Director.

5.5 Each Franchisee shall select the type of recycling collection operation. When considering recycling collection methods, the Franchisee shall consider factors to assure maximum participation and waste diversion, including but not limited to convenience and cost.

5.6 Nothing in this chapter precludes a Franchisee from assessing reasonable fees for providing recycling services.

6.0 REQUIRED RECYCLING DIVERSION RATES.

6.1 Construction and Demolition Debris. Franchisee shall meet a minimum recycling diversion rate of 75%, on a monthly basis, and on an annual basis for construction and demolition debris. "Construction and Demolition debris" means the excess or discarded materials which are to be removed from a site during or after the construction or demolition of any structure, fence, wall or paving.

6.2 Other Solid Waste. Franchisee shall meet a minimum recycling diversion rate of 60%, on a monthly basis, and on an annual basis for all "other solid waste" as defined in Pasadena Municipal Code 8.61.010.

6.3 Third Party Recycling. If Franchisee works with a third party to assist in recycling efforts, this third party diversion tonnage must be documented in a manner

that conforms to the Rules and Regulations adopted by the Director, and may not exceed twenty five percent (25%) of the total tonnage reported for the recycling diversion rates in any one calendar month.

6.4 Calculation of recycling rates. Recycling diversion rates shall be calculated in accord with the provisions of the Pasadena Municipal Code and any Rules and Regulations adopted by the Director.

7.0 LIQUIDATED DAMAGES.

7.1 Construction and Demolition Debris. Failure of Franchisee to meet the recycling diversion rates of 75% for construction and demolition debris, as defined above, for any month, will result in damages being sustained by the City. Such damages are, and will continue to be, impracticable and difficult to determine. For each month in which the recycling diversion rate is not met, Franchisee shall pay the City an amount of money to be calculated as follows: where the recycling diversion rate in a reported month is 40% or greater, but less than the required recycling diversion percentage of 75%, \$10 per ton of "recycling shortfall tonnage"; where the recycling diversion rate in a reported month is 30% or greater, but less than 40%, \$20 per ton of the "recycling shortfall tonnage"; where the recycling diversion rate in a reported month is 20% or greater, but less than 30%, then \$30 per ton of "recycling shortfall tonnage", and where the recycling diversion rate is less than 20%, then \$40 per ton of the "recycling shortfall tonnage". "Recycling shortfall tonnage" means the number of additional tons of construction and demolition debris that a franchise would have to recycle in order to meet the recycling diversion of 75%. Execution of this Agreement

shall constitute agreement by the Franchisee and City that the stated values are the minimum value of costs and actual damage caused the City by the failure of the Franchisee to meet the recycling diversion rate for construction and demolition debris. Such sum is liquidated damages and shall not be construed as a penalty. Liquidated damages shall be reported and paid to the City by Franchisee along with the monthly franchise fee payment.

7.2 Other Solid Waste. Failure of Franchisee to meet the recycling diversion rate of 60% for other solid waste, as defined above, for any month, will result in damages being sustained by the City. Such damages are, and will continue to be, impracticable and difficult to determine. For each month in which the recycling diversion rate is not met, Franchisee shall pay the City an amount of money to be calculated as follows: where the recycling diversion rate in a reported month is 40% or greater but less than the required recycling diversion percentage of 60%, \$10 per ton of “recycling shortfall tonnage”; where the recycling diversion rate in a reported month is 30% or greater, but less than 40%, \$20 per ton of the “recycling shortfall tonnage”; where the recycling diversion rate in a reported month is 20% or greater, but less than 30%, then \$30 per ton of “recycling shortfall tonnage”, and where the recycling diversion rate is less than 20%, then \$40 per ton of the “recycling shortfall tonnage”. “Recycling shortfall tonnage” means the number of additional tons of other solid waste that a franchise would have to recycle in order to meet the 60%. Execution of this Agreement shall constitute agreement by the Franchisee and City that the stated values are the minimum value of costs and actual damage caused the City by the failure of the

Franchisee to meet the recycling diversion rate for other solid waste. Such sum is liquidated damages and shall not be construed as a penalty. Liquidated damages shall be reported and paid to the City by Franchisee along with the monthly franchise fee payment.

7.3 Continued failure or inability to meet the recycling diversion rates shall be considered a material breach of the franchise and of the franchise agreement and, notwithstanding the payment of liquidated damages, shall be cause for termination, suspension or non-renewal of the Franchise in addition to other remedies provided or specified by Chapter 8.61 of the Pasadena Municipal Code.

8.0 EXEMPTION FROM REQUIRED RECYCLING DIVERSION RATES.

8.1 Basis for Exemption. If Franchisee wishes a partial exemption from the required recycling diversion rates then Franchisee must demonstrate to the satisfaction of the Director that the 75% diversion for construction and demolition debris and/or 60% diversion for other solid waste requirement cannot be met because the waste stream from specific accounts is not able to be recycled because either a) all recyclable materials have already been removed from specific accounts prior to collection by the Franchisee or a third party, or b) the composition of the material stream to be collected by the Franchisee from specific accounts is not made up of recyclable materials.

8.2 Application for Exemption. The Franchisee seeking such an exemption shall submit a waste characterization analysis to the Director on an exemption application form provided by the City and conducted with any then current

methodology of the California Integrated Waste Management Board, or its successor agency as acceptable sampling methodologies. As to each specific account for which the Franchisee wishes to obtain an exemption, the waste characterization analysis must also include: the customer name, address, tonnage, a detailed description of the composition of the waste stream, and a statement as to why specific materials are unable to be diverted.

8.3 An exemption application shall be approved or denied, or approved conditionally, after the Director receives the completed application.

8.4 If the exemption application is approved by the Director, it shall be effective from the date of approval, to and through the earlier of the following dates: June 30, 2010, or (b) the date on which the facts supporting the waste characterization analysis change materially. If the exemption application is approved conditionally, it shall be effective as of the date all of the conditions are met, as determined by the Director.

8.5 An approved exemption shall state the total amount of solid waste, in tons, which is being exempt from the recycling requirement, and this may be used by Franchisee in calculating the recycling diversion rate. In claiming this exception in any reporting period, Franchisee shall affirm that the facts upon which the waste characterization analysis and exemption are based have not changed materially during reporting period.

8.6 A new application must be made for every one year franchise term. If an application is denied, a Franchisee may reapply in the same franchise year if facts or circumstances have changed since denial of the original application.

9.0 REPORTS.

Franchisee shall file a monthly collection report for construction and demolition and/or other solid waste, when applicable, with the Director of the Department of Public Works ("Director") on the first day of every month as follows: Specifically, a report is due on the first day of the second month after the close of the month being reported. For example, the report for the month of April is due on June 1.

The report shall be submitted to:

Department of Public Works/SMIWM Division
Attn: Carmen Rubio-Program Coordinator II
City of Pasadena
P.O. Box 7115
Pasadena, California 91109

The report shall include the following information for Franchisee and its subcontractors, if any:

Franchisee shall file with the Director a monthly collection report no later than 30 days after the end of the month being reported. The report shall include the following information certified as true and correct under penalty of perjury by a responsible owner or official of the Franchisee:

1. Total tonnage of other solid waste, as defined above, disposed, identified by source (residential, multi-family, commercial, industrial entities and large venues);

2. Total tonnage of other solid waste, as defined above, recycled, identified by source (residential, multi-family, commercial, industrial entities, large venues, and third

party) and individual type of material designated to be recycled as well as recycling shortfall tonnage, if any;

3. Destination and disposal site locations of all solid waste disposed and recycled;

4. Total number of accounts served, identified by source (residential, multi-family, commercial, industrial entities, large venues and third party);

The construction and demolition report shall include the following information certified as true and correct under penalty of perjury by a responsible owner or official of the Franchisee:

1. Total tonnage of construction and demolition disposed, identified by source (residential, multi-family, commercial, and industrial entities);

2. Total tonnage of construction and demolition recycled, identified by source (residential, multi-family, commercial, and industrial entities) and individual type of material designated to be recycled as well as recycling shortfall tonnage, if any;

3. Destination and disposal site locations of all construction and demolition disposed and recycled;

4. Total number of accounts served, identified by source (residential, multi-family, commercial, industrial entities);

5. All other information required by the franchise agreement or requested by the Director pertaining to the operation of the franchise.

10.0 Compliance Monitoring

A. Books and Accounts. Franchisee shall maintain accurate and complete books and accounts of all revenues and income arising out of its operations

under the Franchise and in a manner which conforms to generally accepted accounting principles. Franchisee's books, accounts and records, arising out of or related to its operations under the Franchise granted pursuant to Chapter 8.61, shall at all times be open to inspection, examination and audit by authorized officers, employees and agents of the City. Franchisee shall comply with all Rules and Regulations adopted by the Director pertaining to books, records, audits and inspections.

B. Regulatory Inspection. Franchisee shall provide written technical or monitoring program reports which verify compliance with the regulatory aspects of the Franchise as may be specified and requested by the Director. Such reports shall be timely submitted to the Director under penalty of perjury by the responsible operating officer. Franchisee agrees to allow reasonable on site inspection of vehicles and facilities, in accordance with any Rules and Regulations issued by the Director, to evaluate compliance with the Franchise. Franchisee shall comply with all Rules and Regulations adopted by the Director pertaining to regulatory compliance and proof of compliance.

C. Non-Compliance. In addition to other remedies and penalties specified under the Pasadena Municipal Code or under Rules and Regulations adopted by the Director, failure to provide documentation requested by a city auditor or inspector within two weeks of a written request shall constitute failure to pass the audit and shall be grounds for suspension, termination or nonrenewal of the franchise.

11.0. VEHICLE REPORTING, COMPLIANCE, AND IDENTIFICATION.

11.1 Franchisee shall maintain on file with the City, a complete and accurate listing of every vehicle operated for collecting, transporting, disposing and/or recycling of solid waste in the City. Franchisee shall certify, in a form acceptable to City, that every such vehicle conforms to regional and State vehicle emission standards ("emission standards"), and shall provide documentation of compliance on written request of the City. Franchisee understands and agrees that failure to conform to emission standards may result in suspension, termination or non-renewal of a Franchise.

11.2 Vehicle Identification. Every vehicle operated by Franchise for the collection of Solid Waste under this franchise shall display the identification required by Section 8.61.097 of the Pasadena Municipal Code.

11.3 Every vehicle operated by Franchisee and for collecting, transporting, disposing and/or recycling of solid waste in the City shall bear the following identification: Franchisee's trade name, monogram or insignia, the Franchise vehicle number, together with Franchisee's telephone number painted upon both sides of the vehicle. All lettering mentioned in this paragraph shall be not less than 2-1/4" in height and not less than 5/6" stroke, except the Franchise vehicle number which shall be not less than 6" in height. The Franchisee agrees to remove the Franchise vehicle number and all other information within 30 calendar days after the Franchise is terminated or the vehicle is sold, transferred or taken out of service.

11.4. Emission Standards. Every Franchisee shall operate its vehicles under the Franchise in conformance to Rule 1193 and all other Rules and Regulations

adopted by the South Coast Air Quality Management District, and as interpreted and applied by the South Coast Air Quality and Management District as well as the Rules and Regulations adopted by the California Air Resources Board, specifically article 4, Diesel Particulate Matter Control Measures, within Chapter 1, Division 3, Title 13, California Code of Regulations, including but not limited to Sections 2020, 2021, 2021.1, and 2021.2. The Director shall have the authority to require additional inspections deemed necessary to insure that the public health, safety and welfare are adequately protected. All costs of such inspections shall be the responsibility of the Franchisee. Inspections by the California Highway Patrol shall be required annually on all vehicles, and certificates of compliance for said inspections shall be filed with the Director in conformance to the rules and regulations adopted by the California Code of Regulations, Title 13, Chapter 6.5, Section 1202.1 and 1202.2.

11.5 BINS-STANDARDS AND IDENTIFICATION.

Every bin shall be manufactured specifically for its intended use and shall comply with the provisions of Rules and Regulations adopted by the Director pursuant to Section 8.61.035 (B) of the Pasadena Municipal Code as to specifications, characteristics, maintenance, cleanliness and permanent labeling.

12.0 INDEMNIFICATION OF CITY.

12.1 Franchisee shall indemnify and hold the City harmless from and against any and all loss, damages, liability, claims, suits, costs and expenses, fines, charges or penalties whatsoever, including reasonable attorney's fees, regardless of the merit or outcome of any such claim or suit, arising from or in any manner related to the

services provided or business conducted under Chapter 8.61 of the Pasadena Municipal Code or under any non-exclusive Franchise granted pursuant to Chapter 8.61 of said code or otherwise pursuant to this Agreement.

12.2 Franchisee shall indemnify the City, defend with counsel approved by the City, protect and hold harmless the City, its officers, employees, agents, assigns, and any successor or successors to the City's interest from and against all claims, actual damages (including but not limited to special and consequential damages), natural resources damage, punitive damages, injuries, costs, response, remediation and removal costs, losses, demands, debts, liens, liabilities, causes of action, suits, legal or administrative proceedings, interest, fines and charges, penalties and expenses (including, but not limited to, attorneys' and expert witness fees and costs incurred in connection with defending against any of the foregoing or in enforcing this indemnity) of any kind whatsoever paid, incurred or suffered by, or asserted against, the City or its officers, employees, agents or the Franchisee arising from or attributable to any repair, remediation, cleanup or detoxification, or preparation and implementation of any removal, remedial, response, or closure or other plan (regardless of whether undertaken due to governmental action) concerning any hazardous substance or hazardous waste at any place where the Franchisee stores or disposes of solid or hazardous waste. The foregoing indemnity is intended to operate as an Agreement pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, 42 United States Code Section 9607, and California Health and Safety Code Section 25364, and

any successor provisions, to insure, protect, hold harmless, and indemnify the City from liability.

12.3 INSURANCE REQUIREMENTS. Franchisee shall obtain and shall maintain throughout the term of this Agreement, at Franchisee's sole cost and expense, the minimum levels and standards of liability insurance and claims reserve which must be maintained in order to apply for, to receive and to operate a non-exclusive Franchise under Chapter 8.61 of the Pasadena Municipal Code, as established by Resolution of the City Council of the City, a true and correct copy of which is attached hereto as Exhibit 2, and as may be established in any subsequent resolutions that may be adopted by the City Council at any time during the term of this Agreement. Franchisee also agrees to demonstrate compliance with the minimum standards in the manner established by said Resolution of the City Council. The failure to maintain the minimum levels and standards of liability insurance and claims reserve for any period of time is a violation of Chapter 8.61 and shall be sufficient grounds for temporary suspension or termination of a non-exclusive Franchise.

13.0 SUSPENSION.

13.1 The Director of Public Works may suspend any non-exclusive Franchise pursuant to Chapter 8.61 without a hearing, whenever the continued operation by the Franchisee would constitute a danger to public health, safety, welfare or public morals, including without limitation, where there is a failure to maintain the minimum levels and standards of liability insurance or claims reserve or failure to keep in full force and effect any applicable licenses or permits required by federal, state law

or regulation or failure to comply with any material term of this franchise. Continued failure or inability to meet recycling requirements or failure to make timely payments or timely submittal of reports, or non-compliance with a request for documents, reports or inspections shall, among other material violations, constitute grounds for suspension, termination or non-renewal of a Franchise. Any suspension of a nonexclusive Franchise shall specify conditions upon which the nonexclusive franchise may be reinstated or terminated.

13.2 A notice of intent to terminate a non-exclusive Franchise shall be personally delivered or mailed, at the discretion of the Director, to the Franchisee at the Franchisee's notice address of record, shall state grounds for suspension or termination and shall give the Franchisee notice of the time, date and place of a hearing before the City Council thereon, which shall be convened no more than 60 days after the date of notice, subject to continuance with the consent of the parties. The notice shall advise the Franchisee that it may be represented by counsel and may contain any other information deemed proper.

13.3 The hearing shall be conducted and closed, and decision rendered thereon within 60 days after the date of the hearing.

13.4 The City Council shall have the right to terminate or suspend any non-exclusive Franchise Agreement granted pursuant to Chapter 8.61 if the City Council finds, after a public hearing, that:

13.4.1 The Franchisee has failed to comply with, or to do anything required of the Franchisee by Chapter 8.61, or that Franchisee has violated any

provision of the ordinance granting the non-exclusive Franchise, including, but without limitation, failure to timely pay all franchise fees, or has violated any provision of the non-exclusive Franchise Agreement or any federal, state or local law or regulation applicable to the operation of the non-exclusive Franchise; or

13.4.2 Any provision of Chapter 8.61 or of the Franchise Agreement is repealed or becomes or is declared to be invalid, and the City Council expressly finds that such provision constitutes a material consideration to the grant or continuation of such non-exclusive Franchise.

13.5 TERMINATION. The City Council shall have the right to terminate any nonexclusive Franchise pursuant to Chapter 8.61, whenever the continued operation by the Franchisee would constitute a danger to public health, safety, welfare or public morals, including without limitation, where there is a failure to maintain the minimum levels and standards of liability insurance or claims reserve or failure to keep in full force and effect any applicable licenses or permits required by federal, state law or regulation or failure to comply with any material term of this franchise agreement or any law, rule or regulation governing the operation of the franchise. Continued failure or inability to meet recycling requirements or continued failure or inability to make timely payments or timely submittal of reports, or non-compliance with a request for documents, reports or inspections shall, among other material violations, constitute grounds for suspension, termination or non-renewal of a Franchise. The decision to terminate shall contain findings of fact, a determination of the issues presented and shall be final and conclusive.

14.0 TEMPORARY SUSPENSION. The Director of the Department of Public Works may temporarily suspend any non-exclusive Franchise without a hearing, whenever the continued operation by the Franchisee would constitute a danger to public health, safety, welfare or public morals, including, without limitation, where there is a failure to maintain the minimum levels and standards of liability insurance or claims reserve or failure to keep in full force and effect any applicable licenses or permits required by federal, state or local law or regulation. The notice of temporary suspension may be personally delivered to the party named and to the address given on the application pursuant to which such non-exclusive Franchise was issued and to the notice address stated herein, if different, or, mailed by registered or certified mail to the party named at the address given on the application pursuant to which such Franchise was issued and to the notice address stated herein, if different. Notwithstanding other notice provisions of this Agreement, the temporary suspension is effective upon the earlier of either receipt or the expiration of 3 days from the date of mailing. The notice of temporary suspension shall include a notice of the date and time for termination hearing and all other information required by paragraph B of Section 8.61.130 of the Pasadena Municipal Code. The temporary suspension shall remain effective until the decision on suspension or termination by the City Council is made pursuant to Section 8.61.130 or unless the suspension is lifted by written notice of the Director.

15.0 ACCEPTANCE, WAIVER.

Franchisee agrees to be bound by and comply with all the requirements of Chapter 8.61 and this Agreement. By entering into this Agreement, Franchisee waives, to the maximum extent permitted by law, Franchisee's right to challenge the terms of this Agreement and of Chapter 8.61 under federal, state or local law, or under administrative

regulation, as such laws and regulations exist as of the date of signing of this Agreement.

16.0 GENERAL TERMS AND CONDITIONS.

16.1 INDEPENDENT STATUS. It is understood that in the performance under this Agreement, Franchisee shall be, and is, an independent operator, and is not an agent, contractor, or employee of City and shall furnish services in its own manner and method. Further, Franchisee has and shall retain the right to exercise full control over the employment, direction, compensation and discharge of all persons employed by Franchisee in its business operations. Franchisee shall be solely responsible for, and shall indemnify, defend and save City harmless from all matters relating to the payment of its employees, including compliance with social security, withholding and all other wages, salaries, benefits, taxes, exactions, and regulations of any nature whatsoever.

16.2 FRANCHISEE NOT AGENT. Franchisee and its subcontractors shall have no authority, express or implied, to act on behalf of or bind the City in any capacity whatsoever as agents or otherwise.

16.3 WAIVER. The City's waiver of any term, condition, breach or default of this Agreement shall not be considered to be a waiver of any other term, condition, default or breach, nor of a subsequent breach of the one waived.

16.4 NO ASSIGNMENT. No Franchise shall be sold, leased, transferred, assigned, or otherwise disposed of, either in whole or in part, whether by forced sale, merger, consolidation, bankruptcy, reorganization under bankruptcy laws or otherwise, without the prior consent of the City Council expressed by ordinance; however, a change of name or a sale of accounts to a current City solid waste Franchisee, who is in

good standing and in compliance with City ordinances does not require City Council approval.

16.5 COMPLIANCE WITH LAWS. Franchisee shall comply with all Federal, State, County and City laws, ordinances, resolutions, rules and regulations, which are, as amended from time to time, incorporated herein and applicable to the performance hereof.

16.6 ATTORNEY'S FEES. If any action at law or in equity is brought to enforce or interpret the terms of this Agreement, the prevailing party shall be entitled to reasonable attorney's fees, costs and necessary disbursements in addition to any other relief to which such party may be entitled.

16.7 INTERPRETATION.

16.7.1 Applicable Law. This Agreement, and the rights and duties of the parties hereunder (both procedural and substantive), shall be governed by and construed according to the laws of the State of California.

16.7.2 Entire Agreement. This Agreement, including any Exhibits attached hereto and any documents explicitly referenced herein, constitutes the entire agreement and understanding between the parties regarding its subject matter and supersedes all prior or contemporaneous negotiations, representations, understandings, correspondence, documentation and agreements (written or oral).

16.7.3 Written Amendment. This Agreement may only be changed by written amendment signed by Franchisee and the City Manager or other authorized representative of the City, subject to any requisite authorization by the City Council. Any oral representations or modifications concerning this Agreement shall be of no force or effect.

16.7.4 Severability. If any provision in this Agreement is held by any court of competent jurisdiction to be invalid, illegal, void, or unenforceable, such portion shall be deemed severed from this Agreement, and the remaining provisions shall nevertheless continue in full force and effect as fully as though such invalid, illegal, or unenforceable portion had never been part of this Agreement.

16.7.5 Choice of Forum. The parties hereby agree that this Agreement is to be enforced in accordance with the laws of the State of California, is entered into and is to be performed in the City of Pasadena and that all claims or controversies arising out of or related to performance under this Agreement shall be submitted to and resolved in a forum within the County of Los Angeles at a place to be determined by the rules of the forum.

16.7.6 Order of Precedence. In case of conflict between the terms of this Agreement and the terms contained in any document attached as an Exhibit or otherwise incorporated by reference, the order of precedence is as follows: Charter of the City of Pasadena, the Pasadena Municipal Code, the ordinance granting this Franchise, resolutions of the City of Pasadena, this Agreement, and Franchisee's application to the City for this Franchise.

16.7.7 Duplicate Originals. There shall be two (2) fully signed copies of this Agreement, each of which shall be deemed an original.

16.8 AUTHORITY OF FRANCHISEE. The Franchisee hereby represents and warrants to the City that the Franchisee has the right, power, legal capacity and authority to enter into and perform its obligations under this Agreement, and its execution of this Agreement has been duly authorized.

17.0 ADDITIONAL ASSURANCES BY PASADENA FRANCHISEES.

17.1 EQUAL EMPLOYMENT OPPORTUNITY PRACTICES. Franchisee agrees to comply with the City's Competitive Bidding and Purchasing Ordinance, Chapter 4.08 of the Pasadena Municipal Code, the rules and regulations promulgated hereunder, the California Fair Employment and Housing Act (Government Code Section 12900 et seq.) and to this end:

17.1.1 Franchisee certifies and represents that, during the performance of this Agreement, Franchisee and any other parties with whom it may subcontract shall adhere to equal opportunity employment practices to assure that applicants and employees are treated equally and are not discriminated against because of their race, religion, color, national origin, ancestry, disability, sex, age, medical condition, marital status. Franchisee further certifies that it will not maintain any segregated facilities.

17.1.2 Franchisee shall, in all solicitations or advertisements for applicants for employment placed by or on behalf of this Agreement, state that Franchisee is an "Equal Opportunity Employer" or that all qualified applicants will receive consideration for employment without regard to their race, religious creed, color, national origin, ancestry, disability, sex, age, medical condition or marital status.

17.1.3 Franchisee shall, if requested to so do by the City, certify that it has not, in the performance of this Agreement, discriminated against applicants or employees because of their race, religious creed, color, national origin, ancestry, disability, sex, age, medical condition or marital status.

17.1.4 If requested to do so by the City, Franchisee shall provide the City with access to copies of all of its records pertaining or relating to its employment practices, except to the extent such records or portions of such records are confidential or privileged under state or federal law.

17.1.5 Franchisee agrees to recruit Pasadena residents initially and to give them preference, if all other factors are equal, for any new positions which result from the performance of this Agreement and which are performed within the City.

17.1.6 Nothing contained in this Agreement shall be construed in any manner so as to require or permit any act, which is prohibited by law.

17.1.7 Franchisee shall include the provisions set forth in paragraphs numbered 18.1.1 through 18.1.6 of subsection 18.1 of this Agreement, inclusive, in each of its subcontracts under this Agreement.

17.2 BUSINESS LICENSES. Franchisee shall obtain, and pay any and all costs associated therewith, any Pasadena Business License, which may be required by the Pasadena Municipal Code and all permits, and licenses applicable to Franchisee's operations under this Franchise, which are required of Franchisee by any governmental agency.

17.3 MAINTENANCE AND INSPECTION OF RECORDS.

The City, or its authorized auditors or representatives, shall have access to and the right to audit and reproduce any of the Franchisee's records to the extent the City deems necessary to insure it is receiving all money to which it is entitled under the Agreement and/or is paying only the amounts to which Franchisee is properly entitled under the Agreement or for other purposes relating to the Agreement. The Franchisee shall maintain and preserve all such records for a period of at least 3 years after termination of the Agreement.

The Franchisee shall maintain all such records in the City of Pasadena. If not, the Franchisee shall, upon request, promptly deliver the records to the City of Pasadena or reimburse the City for all reasonable and extra costs incurred in conducting the audit at a location other than the City of Pasadena, including, but not

limited to, such additional (out of the City) expenses for personnel, salaries, private auditors, travel, lodging, meals and overhead.

17.4 CONFLICT.

Franchisee hereby represents warrants and certifies that no member, officer or employee of the Franchisee is a director, officer or employee of the City of Pasadena, or a member of any of its boards, commissions or committees, except to the extent permitted by law.

18.0 NOTICES.

Except as otherwise provided in this Agreement, all notices required by this Agreement or by Chapter 8.61 of the Pasadena Municipal Code shall be given by personal service or by deposit in the United States mail, postage pre-paid and return receipt requested, addressed to the parties as follows:

To City: Department of Public Works/SMIWM Division
Attn: Carmen Rubio-Program Coordinator
City of Pasadena
P.O. Box 7115
Pasadena, California 91109-9866

Franchisee: _____
Attention: _____

Notice shall be deemed effective on the date personally served or, if mailed, three days after the date deposited in the mail.

20.0 Taxpayer Protection Amendment. Under the provisions of the City of Pasadena Taxpayer Amendment of 2000 ("Taxpayer Protection Act"), the Franchisee will be considered a "recipient of a public benefit." The full provisions of the Taxpayer Protection Act are set forth in Pasadena City Charter, Article XVII. Under the Taxpayer Protection Act, City public officials who approve this Contract are prohibited from receiving gifts, campaign contributions or employment from Franchisee for a specified time. This prohibition extends to individuals and entities which are specified and identified in the Taxpayer Protection Act and includes Franchisee and its trustees, directors, partners, corporate officers and those with more than a 10% equity, participation, or revenue interest in Franchisee. Franchisee understands and agrees that: (A) Franchisee is aware of the Taxpayer Protection Act; (B) Franchisee will complete and return the forms provided by the City in order to identify all of the recipients of a public benefit specified by the City in order to identify all of the recipients of a public benefit specified in the Taxpayer Protection Act; and (C) Franchisee will not make any prohibited gift, campaign contribution or offer of employment to any public official who approved this Contract.

21.0 Administrative Rules and Regulations.

Franchisee agrees to conform to all administrative Rules and Regulations duly adopted by the Director, now or at any time during the term of the Franchise, pursuant to Chapter 8.61 of the Pasadena Municipal Code, for the purpose of administering and monitoring the operations of all franchises in the City of Pasadena.

22.0 Security Deposit.

Franchisee shall maintain a bond or other security with the City, in a form acceptable to the Director, in an amount required to secure payment of franchise fees projected for one month of the Franchise, or the amount of ten thousand dollars, whichever amount is greater. The bond or security must be submitted within seven days from the date the Franchise is granted and must be replenished within ten (10) days from any draw by the City. The City may draw upon the bond or security after five (5) days written notice to Franchisee. The remaining bond or security will be returned to the Franchisee by the City on termination of the Franchise.

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IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the date set forth below.

DATED:

CITY OF PASADENA

By: _____
Michael J. Beck
City Manager

ATTEST:

Mark Jomsky
City Clerk

DATED:

FRANCHISEE (TYPE NAME BELOW):

By: _____

Title: _____

APPROVED AS TO FORM:

Nicholas George Rodriguez
Assistant City Attorney

REVIEWED:

Larry Hammond
Purchasing Administrator

STATE OF GEORGIA

COUNTY OF EVANS

Revised 7-5-11

ORDINANCE

Title

This Ordinance shall be known as the "Ordinance to Provide For The Assessment and Collection of Solid Waste User Fees".

Section 1: Purpose and Intent

The purpose and intent of the Ordinance is to provide a means for the assessment and collection of annual user fees to pay the costs incurred for the collection and disposal of solid waste generated by the citizens and taxpayers of Evans County, and to assess said annual user fees against each owner of a residential dwelling unit and each owner of a commercial unit liable for payment of said user fee.

Section 2: Obligation

It is hereby declared that each residential dwelling unit and each commercial unit located within the unincorporated areas of Evans County, Georgia, is hereby assessed an annual user fee in the amount of \$152.00 per year.

Section 3: Definitions

1. Residential Dwelling unit is defined as a building or mobile home or modular home or portion of either, providing complete housekeeping facilities for one family, and shall include both owner-occupied residential dwelling units and renter-occupied dwelling units, irrespective of whether said residential dwelling unit is actually occupied for the entire calendar year.

2. Commercial Unit is defined as a building or portion thereof, in which a business enterprise is conducted, and shall include both owner-occupied commercial units and renter-occupied commercial units, irrespective of whether said business enterprise is actually conducted for the entire calendar year.

Section 4: Liability for Payment

The owner of each residential dwelling unit shall be liable for payment of the applicable annual user fee, and if said residential dwelling unit is permanently affixed to the real estate, both said owner and said real estate shall be liable for payment of said user fee. If the residential dwelling unit is not permanently affixed to the real estate, or if said owner of the real estate is not the owner of the residential dwelling unit, then the real estate where located shall not be liable for payment of said user fee.

Any residential dwelling unit which is first located or constructed within the unincorporated area of Evans County, after January 1, shall pay the annual user fee for said year, based upon a monthly pro-rated basis, computed upon the projected occupancy date through December 31 of said year. The user fee shall be computed by the Tax Assessor at the time of application for said location permit or building permit, and said user fee shall be paid to the Tax Commissioner prior to issuance of said location permit or building permit. For each subsequent year, said user fee shall be billed and collected in accordance to Section 6.

The owner of each commercial unit shall be liable for payment of the applicable annual user fee, and if said commercial unit is permanently affixed to

the real estate, both said owner and said real estate shall be liable for payment of said user fee. If the commercial unit is not permanently affixed to the real estate, or if said owner of the real estate is not the owner of the commercial unit, then the real estate where located shall not be liable for payment of said user fee.

Any commercial unit which is first located or constructed within the unincorporated area of Evans County, after January 1, shall pay the annual user fee for said year, based upon a monthly pro-rated basis, computed upon the projected occupancy date through December 31 of said year. The user fee shall be computed by the Tax Assessor at the time of application for said location permit or building permit, and said user fee shall be paid to the Tax Commissioner prior to issuance of said location permit or building permit. For each subsequent year, said user fee shall be billed and collected in accordance to Section 6.

Section 5: Due Dates

The annual user fee assessed against each residential dwelling unit and each commercial unit shall be due and payable on December 20th of each year, commencing on December 20, 1999 and a penalty for late payment in the amount of \$10.00 shall be assessed if not paid on or before April 20th of each year.

Section 6: Administration

The Evans County Tax Assessor's office shall provide the Evans County Tax Commissioner a list of names and addresses and property tax identification numbers of each residential dwelling unit and each commercial unit which is liable for payment of said user fee.

The Evans County Tax Commissioner shall collect and receive payment of

the applicable user fees, which user fee shall be reflected upon and included upon the annual tax bill issued for ad valorem taxes.

The Evans County Tax Commissioner shall enforce collection of delinquent user fees, penalties and interest by any remedy or right allowed by law for the enforcement of the collection and payment of state property taxes, either by the Revenue Commissioner, Tax Commissioner or Tax Collector, to include, but not limited to the issuance of an Execution Fi Fa which shall be entered upon the General Execution Docket of the Clerk of Superior Court of Evans County, Georgia, levied and sold according to law.

Section 7: Exemptions

There is hereby provided an exemption as to any residential dwelling unit and commercial unit which is not occupied on January 1st of the year in which said annual user fee is due, if the owner shall execute and file with the Tax Assessor's office, an Affidavit stating that said unit is vacant with no intent to occupy or rent the same: provided however, that should said unit become occupied and/or rented during said year, a pro-rated user fee shall be due and payable.

There is hereby provided an exemption as to any residential dwelling unit or commercial unit which leases a dumpster directly from Evans County; provided however, said exemption shall be forfeited if said lease is terminated.

If the user fees are not paid by the applicable due date, all exemptions from all user fees are disqualified, and the fees must be paid in full.

Section 8: Conflict and Separability

If any provision contained in this Ordinance is found to be in conflict with any other applicable ordinance, rule, regulation or law, the higher legal authority shall govern.

The provisions of this Ordinance are separable. If a section, sentence, clause, or phrase of this Ordinance is adjudicated or held by a court of competent jurisdiction to be invalid, the remaining sections, sentences, clauses, or phrases shall remain of full force and effect.

Section 9: Amendments

When necessary to further its purpose, this Ordinance may be amended by the Board of Commissioners.

Section 10: Conflicting Provisions Repealed

All other Ordinance and parts of Ordinances in conflict with this Ordinance, to the extent of such conflict and not further, are hereby repealed.

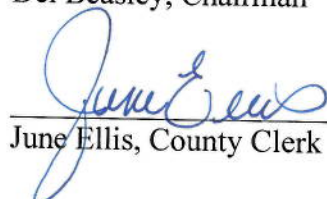
Section 11: Effective Date

This Ordinance shall become effective and in full force and effect as of July 5, 2011.

Certification of Amendment

I hereby certify that the above Ordinance was amended at a called meeting of the Board of Commissioners of Evans County held on July 5, 2011.


Del Beasley, Chairman


June Ellis, County Clerk

STATE OF GEORGIA

COUNTY OF EVANS

**AMENDMENT TO THE EVANS COUNTY
SOLID WASTE, FIRE PROTECTION, & AMBULANCE SERVICE USER FEES ORDINANCES**

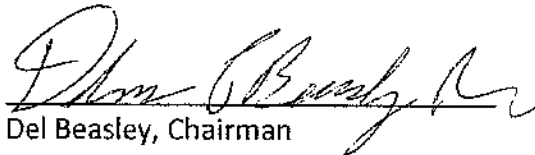
The Evans County Board of Commissioners hereby resolves to amend the Evans County User Fee Ordinances to make the following amendments:

If the user fees are not paid by the applicable due date, all exemptions from all user fees are disqualified, and the fees must be paid in full.

The fire protection user fee can never be exempted.

So resolved this 7th day of June, 2011.

EVANS COUNTY BOARD OF COMMISSIONERS


Del Beasley, Chairman


June Ellis, County Clerk

A new **Section R327 Resource Efficiency** is hereby added to read as follows:

R327 Resource Efficiency

R327.1 Construction waste management . For new *buildings* , and additions over 2,500 square feet or remodels over 2,500 square feet a construction waste management plan acceptable to the *building official* that includes recycling of concrete and masonry, wood, metals and cardboard, is required at time of application for a building permit. The construction waste management plan shall be implemented and conspicuously posted on the construction site. Compliance shall be certified by the hauler through receipts and signed affidavits. Substantive changes to the plan shall be subject to prior approval by the *building official* .

R327.1.1 Building demolitions. Buildings or portions of buildings which are removed shall be processed in such a way as to safely remove all asbestos and lead paint contaminants. All metals, asphalt, concrete and masonry that are free of asbestos and lead paint shall be recycled, and where possible, all remaining materials, such as doors, windows, cabinets, fixtures, and wood, shall be recycled. A construction waste management plan shall be submitted at time of demo permit. Compliance with the CWMP shall be certified by the hauler through receipts and signed affidavits.

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ARTICLE II. - COLLECTION AND DISPOSAL OF REFUSE, RUBBISH AND RECYCLABLES⁽¹⁾

Footnotes:

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Charter reference— Municipal public utilities, Art. XII.

Cross reference— License required for any persons hauling refuse, § 15-411.

Sec. 12-16. - Definitions.

The following words, terms and phrases, when used in this Article, shall have the meanings ascribed to them in this Section:

At the curb or *curbside* shall have the same meaning as "curbside" set forth in § 15-411 of this Code.

Container shall have the meaning set forth in § 15-411 of this Code.

Electronic equipment shall mean any electronic device or electronic component as those terms are defined in the Colorado Hazardous Waste Regulations, 6 Code of Colorado Regulations 1007-3, Section 260.10.

Food scraps shall have the meaning set forth in § 15-411 of this Code.

Food store shall have the meaning set forth in § 15-411 of this Code.

Hazardous waste shall mean any chemical, compound, substance or mixture that state or federal law designates as hazardous because it is ignitable, corrosive, reactive or toxic, including but not limited to solvents, degreasers, paint thinners, cleaning fluids, pesticides, adhesives, strong acids and alkalis and waste paints and inks.

Occupant shall mean a person entitled to possession of the property or premises, whether or not the owner.

Owner shall mean the owner of record, as shown by any records of the City, County or State or any other record available to the City, whether an individual, individuals or entity, any agent or representative of the record owner, and any person or persons entitled to possession of the premises by easement, lease or tenancy.

Property shall mean in addition to the owner's lot or tract of land, whether improved or vacant, the area to the center of an alley abutting the lot or tract of land; any easements on or under the lot or tract of land; and the sidewalk, curb, gutter and parking area of any street abutting such lot or tract of land.

Qualified recycling facility shall have the meaning set forth in § 15-411 of this Code.

Recyclable cardboard shall have the meaning set forth in § 15-411 of this Code.

Refuse shall mean solid or liquid wastes, except hazardous wastes, whether putrescible or nonputrescible, combustible or noncombustible, organic or inorganic, including by way of illustration and not limitation, wastes and materials commonly known as trash, garbage, debris or litter, animal carcasses, offal or manure, paper, ashes, cardboard, cans, yard clippings, glass, rags, discarded clothes or wearing apparel of any kind, or any other discarded object not exceeding three (3) feet in length, width or breadth.

Refuse container shall mean a watertight receptacle of a solid and durable metal or nonabsorbent, fire-resistant plastic with a tightly fitting, insect and rodent-proof cover of metal or plastic or a tightly secured plastic bag.

Rubbish shall mean nonputrescible solid wastes of a large size, including by way of illustration and not limitation, large brush wood, large cardboard boxes or parts thereof, large or heavy yard trimmings, discarded fence posts, crates, vehicle tires, junked or abandoned motor vehicle bodies or parts, scrap metal, bedsprings, water heaters, discarded furniture and all other household goods or items, demolition materials, used lumber and other discarded or stored objects three (3) feet or more in length, width or breadth. As used in this definition, the term *discarded furniture* shall include, without limitation, upholstered furniture that is designed, manufactured and intended primarily for indoor use but is used or stored outdoors in any unroofed area, whether the upholstered furniture is actually discarded or not.

(Code 1972, § 54-15; Ord. No. 183, 1986, § 1, 11-18-86; Ord. No. 140, 1990, § 1, 1-15-91; Ord. No. 155, 1997, § 1, 11-4-97; Ord. No. 51, 2000, § 1, 5-16-00; Ord. No. 198, 2006, § 5, 12-19-06; Ord. No. 024, 2007, § 2, 2-20-07; Ord. No. [023, 2013](#), § 2, 3-5-13; Ord. No. [109, 2016](#), § 2, 9-20-16)

Cross reference— Definitions and rules of construction generally, § 1-2.

Sec. 12-17. - Purpose and policy.

The purpose of this Article is to protect the public health, safety and welfare by regulating the accumulation, storage, transportation and disposal of refuse and rubbish to prevent conditions that may create fire, health or safety hazards, harbor undesirable pests or impair the aesthetic appearance of the neighborhood, and to further the volume-based service requirements for collection of solid waste set forth in Article XV of Chapter 15 of this Code. The City Council shall use every means at its disposal, including its police powers, for the enforcement of this Article.

(Code 1972, § 54-14; Ord. No. 183, 1986, § 1, 11-18-86; Ord. No. 140, 1990, § 2, 1-15-91; Ord. No. 053, 2004, § 1, 4-20-04)

Sec. 12-18. - Collection and disposal of refuse and rubbish.

- (a) The occupant and the owner of any premises wherein any refuse or rubbish is produced or accumulated shall be jointly and severally responsible to provide for collection service and removal of refuse and rubbish to the degree of service necessary to maintain the premises in a clean and orderly condition. They shall not contract or arrange for such collection and removal except with solid waste collectors licensed by the City under § 15-417. An individual may dispose of his or her own refuse and rubbish, provided that it is properly disposed of at the Larimer County Landfill or at any other disposal site which is approved by the State, in conformity with all City and county regulations.
- (b) All moveable refuse containers and recyclable materials shall be kept in the storage area except on collection day, or within twelve (12) hours preceding the time of regularly scheduled collection from the premises, when they may be placed at the curb or upon the edge of the alley. Following collection, they shall be returned to the storage area the same day. Refuse containers and recyclable materials shall not, at any time, be placed on the sidewalk or in the street, or in such a manner as to impair or obstruct pedestrian, bicycle or vehicular traffic.
- (c) If plastic bags are used as refuse containers, they must be securely tied or sealed to prevent emission of odors, be of a material impenetrable by liquids and greases, and be of sufficient thickness and strength to contain the refuse enclosed without tearing or ripping under normal handling.

(Ord. No. 183, 1986, § 1(54-9), 11-18-86; Ord. No. 140, 1990, § 4, 1-15-91; Ord. No. 51, 2000, § 5, 5-16-00; Ord. No. [109, 2016](#), § 3, 9-20-16)

Sec. 12-19. - Group accounts for collection.

- (a) Any person who solicits solid waste collection services from a solid waste collector for residential customers through a group account shall arrange for such services in a manner that offers residential customers:
 - (1) Choices from amongst volume capacity categories of the containers of solid waste that are placed for collection by the residential customer;
 - (2) Charges to residential customers that are based upon such volume capacity categories; and
 - (3) Recycling services, including containers required to be provided for recycling, in a manner consistent with § 15-413.
- (b) Any person who is subject to the requirements of Subsection (a) above shall provide written notice consistent with the notice required in Subsection 15-413(d) to all residential customers served through the group account. Said notice shall be given to all such residential customers no more than thirty (30) days after notice of volume capacity categories, related rates and recycling services and container options have been provided by a solid waste collector. In addition, written notices shall be sent to all new residential customers who join the group account after the date of the original notice. Said additional notices shall be given to each new member no more than ten (10) days after the new member joins the group account. A copy of the form of each such notice, a list of recipients of the notice, and a record of the date and manner of distribution shall be retained by the person providing the notice for a period of five (5) years from the date each notice was provided, and shall be made available to the City for inspection upon request during said period of time.
- (c) No person who is subject to the provisions of Subsection (a) above shall in any way discourage or provide disincentives to any current or prospective residential customer served through a group account who wishes to select a volume capacity category or level of recycling service that is different from that selected by other residential customers served through such account.
- (d) For the purposes of this Section, the terms contained herein shall have the same meanings as in § 15-411.

(Ord. No. 053, 2004, § 2, 4-20-04; Ord. No. 052, 2009, § 1, 5-19-09)

Sec. 12-20. - Tampering with refuse or rubbish container prohibited.

- (a) No person other than the owner or the agents or employees of such owner or a person holding a license from the City for the collection and disposal of refuse and rubbish shall tamper with any refuse container or its contents or remove the contents of any refuse container, or remove a refuse container from the location where the same has been placed by the owner.
- (b) No owner of any dog, cat or other pet shall permit, whether by act or omission, that pet to damage or open any refuse container or scatter the contents.

(Ord. No. 183, 1986, § 1(54-10), 11-18-86; Ord. No. 140, 1990, § 5, 1-15-91; Ord. No. 51, 2000, § 5, 5-16-00; Ord. No. 053, 2004, § 3, 4-20-04)

Sec. 12-21. - Hazardous waste disposal.

No person shall place hazardous waste in refuse containers for collection or bury or otherwise dispose of the hazardous waste in or on private or public property within the City. Residents may contact the County

Health Department for recommendations on disposal of hazardous waste. Highly flammable or explosive materials shall be stored and disposed of in accordance with Poudre Fire Authority regulations at the expense of the owner or possessor of such materials. Except in response to an emergency and under order and direction of the Poudre Fire Authority, in no event shall toxic or flammable liquids or any waste liquid containing crude petroleum or its products be disposed of by discharge into or upon any gutter, street, alley, highway, or stormwater facility as defined in § 26-491, lake, or other watercourse or upon the ground unless such liquid has undergone suitable treatment in accordance with § 26-498 of the Code.

(Ord. No. 183, 1986, § 1(54-11), 11-18-86; Ord. No. 21, 1992, § 1, 3-3-92; Ord. No. 51, 2000, § 5, 5-16-00; Ord. No. 053, 2004, § 3, 4-20-04)

Cross reference— Hazardous materials transportation, Ch. 11.

Sec. 12-22. - Required recycling.

- (a) No person shall place electronic equipment in refuse containers for collection, nor shall any person bury or otherwise dispose of electronic equipment in or on private or public property within the City. All electronic equipment must either be stored and presented or delivered to a licensed solid waste collector for recycling in accordance with the provisions of Subsection 15-416(b), or delivered directly to a qualified recycling facility for electronic equipment.
- (b) No person shall place recyclable cardboard in refuse containers for collection, nor shall any person bury or otherwise dispose of recyclable cardboard in or on private or public property within the City. All recyclable cardboard must either be stored and presented or delivered to a licensed solid waste collector for recycling in accordance with the provisions of Subsection 15-413(e) or delivered directly to a qualified recycling facility appropriate for recyclable cardboard.
- (c) It shall be the duty of any owner or occupant of any premises to ensure that bags or containers do not contain materials required to be recycled under this Section when such bags or containers are offered for solid waste collection.

(Ord. No. 024, 2007, § 3, 2-20-07; Ord. No. [023, 2013](#), § 2, 3-5-13; Ord. No. [109, 2016](#), § 4, 9-20-16)

Sec. 12-23. - Collection requirement—Food store food scraps.

- (a) *Food stores—Service requirement.* Commencing on December 31, 2017, food stores within the City that dispose of more than ninety-six (96) gallons of food scraps per week shall subscribe to a service for the collection of food scraps by a collector licensed to provide such services within the City or shall obtain a variance in accordance with the following provisions:
 - (1) If a food store desires not to obtain food scraps collection services for any reason, including space constraints, donation of all food scraps for human or animal consumption, self-hauling of food store food scraps to a location or facility permitted by the State of Colorado to accept such material (but not to a landfill), disposal of food scraps via garbage disposal or other similar technology that processes food scraps for disposal via waste water infrastructure, on-site composting or failure to generate food scraps, the food store must submit a written request for variance on a form provided by the City.
 - (2) Upon receipt of such a request for variance, the director shall either approve the variance for good cause shown or disapprove the variance. If the variance is approved, the food store shall not be required to obtain food scraps collection services for a period of twelve (12) months from the date of approval. If, after twelve (12) months, the constraints on which the variance was based still exist, the food store may submit a request for an additional twelve (12) month variance.

- (3) For purposes of Subsection 12-23(a), "good cause shown" shall mean evidence presented by the food store that, to the reasonable satisfaction of the Director of the City's Environmental Services Department, demonstrates that the customer lacks sufficient space for food scraps containers, donates all food scraps for human or animal consumption, self-hauls food scraps to a facility permitted by the State of Colorado to accept such material (but not to a landfill) or disposes of food scraps via garbage disposal or other similar technology that processes food scraps for disposal via waste water infrastructure, or by on-site composting.
- (b) *Collection frequency.* Food stores obtaining such food scraps collection services shall require collection with such frequency as is necessary to prevent overflow of containers. Service must be provided at least once per week, but no less frequently that may be required by the Larimer County Department of Health and Environment.
- (c) *Disposal of food scraps.* Except as permitted by a variance obtained in accordance with Subsection 12-23(a) above, a food store located within the City shall not commingle food scraps with refuse or recyclable material or dispose of food scraps by any means other than at a location or facility permitted by the State of Colorado to collect such material (but not to a landfill).

(Ord. No. [109, 2016](#), § 5, 9-20-16)

Sec. 12-24. - Refuse containment in transit.

No person shall collect, transport or receive any refuse or rubbish within or upon any public streets in the City or anywhere in the City except in leak-proof containers or vehicles so constructed that no refuse or rubbish can leak or sift through, fall out or be blown from such container or vehicle. Any person collecting or transporting any refuse or rubbish shall immediately pick up all refuse and rubbish which drops, spills, leaks or is blown from the collecting or transporting container or vehicle and shall otherwise clean the place onto which any such refuse or rubbish was so dropped, spilled, blown or leaked.

(Code 1972, § 54-6; Ord. No. 183, 1986, § 1(54-12), 11-18-86; Ord. No. 51, 2000, § 5, 5-16-00; Ord. No. 053, 2004, § 3, 4-20-04; Ord. No. 024, 2007, § 3, 2-20-07; Ord. No. [109, 2016](#), § 5, 9-20-16)

Editor's note— Ord. No. 109, 2016, § 5, adopted September 20, 2016, amended the Code by adding a new § 12-23 and renumbered the existing §§ 12-23—12-26 as §§ 12-24—12-27.

Sec. 12-25. - Owners have ultimate responsibility for violations

Every owner remains liable for violations of responsibilities imposed upon an owner by this Article even though an obligation is also imposed on the occupant of premises and even though the owner has by agreement imposed on the occupant the duty of maintaining the premises or furnishing required refuse containers and collection.

(Ord. No. 183, 1986, § 1(54-14), 11-18-86; Ord. No. 053, 2004, § 3, 4-20-04; Ord. No. 024, 2007, § 3, 2-20-07; Ord. No. [109, 2016](#), § 5, 9-20-16)

Editor's note— Former § 12-24. See Editor's Note § 12-24.

Sec. 12-26. - Implementation.

The City Manager may adopt such other rules and regulations concerning the collection, removal and hauling of refuse and rubbish as may be necessary to implement the provisions of this Article not in conflict with such provisions.

(Code 1972, § 54-19; Ord. No. 183, 1986, § 1(54-16), 11-18-86; Ord. No. 053, 2004, § 3, 4-20-04; Ord. No. 024, 2007, § 3, 2-20-07; Ord. No. [109, 2016](#), § 5, 9-20-16)

Editor's note— Former § 12-25. See Editor's Note § 12-24.

Sec. 12-27. - Violations and penalties.

Any person who violates § 12-18 of this Article, or who violates Subsection 12-22(b), or Subsection 12-22(c) as it relates to Subsection 12-22(b), commits a civil infraction and is subject to the penalty provisions of Subsection 1-15(f). Any person who violates any other provision of this Article also commits a misdemeanor. All such misdemeanor violations are subject to a fine or imprisonment in accordance with § 1-15.

(Code 1972, § 54-20; Ord. No. 183, 1986, § 1(54-15), 11-18-86; Ord. No. 053, 2004, § 3, 4-20-04; Ord. No. 198, 2006, § 6, 12-19-06; Ord. No. 024, 2007, § 3, 2-20-07; Ord. No. 085, 2008, § 3, 8-19-08; Ord. No. [023, 2013](#), § 3, 3-5-13; Ord. No. [109, 2016](#), § 5, 9-20-16)

Editor's note— Former § 12-26. See Editor's Note § 12-24.

Cross reference— General penalty, § 1-15.

Secs. 12-28—12-55. - Reserved.

ARTICLE XV. - SOLID WASTE COLLECTION AND RECYCLING SERVICES^{[15](#)}

Footnotes:

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Editor's note— Ord. No. 109, 2016, § 6, adopted September 20, 2016, repealed former Art. XV, §§ 15-411—15-430, and enacted a new Art. XV, §§ 15-411—15-432 as set out herein. Former Art. XV pertained to similar subject matter and derived from Ord. No. 116, 1990, adopted October 16, 1990; Ord. No. 58, 1995, adopted June 6, 1995; Ord. No. 165, 1995, adopted January, 2 1996; Ord. No. 5, 1996, adopted February 20, 1996; Ord. No. 22, 2000, adopted March 7, 2000; Ord. No. 025, 2004, adopted April 20, 2004; Ord. No. 024, 2007 adopted February 20, 2007; Ord. No. 052, 2009, adopted, May 19, 2009; and Ord. No. [023, 2013](#), adopted March 5, 2013.

Cross reference— Garbage and refuse, § 12-16 et seq.

Sec. 15-411. - Definitions.

The following words, terms and phrases, when used in this Article, shall have the meanings ascribed to them in this Section:

Basic service shall mean collection of solid waste and recyclable materials from a residential customer by a collector.

Collector shall mean a person or entity providing collection service for solid waste and/or recyclables and/or food scraps and/or yard trimmings.

Commercial customers shall mean any premises utilizing collection service where a commercial, industrial or institutional enterprise is carried on, including, without limitation, retail establishments, restaurants, hospitals, schools, day care centers, office buildings, nursing homes, clubs, churches and public facilities. Customers, other than residential customers, serviced using any type of collection container, including without limitation poly-carts, dumpsters, or roll-off bins, are considered commercial customers unless the service is provided for an active construction or demolition project permitted by the City building department.

Communal system for the collection of waste shall mean an arrangement for the collection of waste from multiple properties or residences using collection containers shared by those properties or residences.

Composting of food scraps shall mean the process of converting these materials into a nutrient-rich soil amendment.

Container shall mean a refuse container as defined in § 12-16, a poly-cart, disposable bags, bin-type containers, carts or bulk-volume dumpsters or plastic receptacles, each of variable volume capacities as defined in this Article, provided by a collector to a customer and used for the collection of refuse, recyclable materials, food scraps or yard trimmings.

Curbside shall mean at or near the perimeter of the premises, whether or not there is a curb, but does not mean or permit placement on the sidewalk. If the curb and any sidewalk are of unitary construction, the term means behind the sidewalk or on the street side of the curb so long as such location does not impede bike, pedestrian, or car traffic and is not on an arterial street.

Curbside collection shall mean the collection of solid waste or recyclables placed at a curbside location or within a dumpster site.

Director shall mean the Director of the City's Environmental Services Department.

Dumpster shall mean a metal or plastic container one (1) cubic yard to ten (10) cubic yards in volume that is used to collect refuse or recyclables.

Electronic equipment shall mean any electronic device or electronic component as those terms are defined in the Colorado Hazardous Waste Regulations, 6 Code of Colorado Regulations 1007-3, Section 260.10.

Existing customers shall mean customers with whom a collector has a written contract for collection services or for whom a collector is providing collection services, but not recycling services, as of December 31, 2016.

Feed animals shall mean to divert for use as animal feed, in accordance with regulations established by Colorado Department of Public Health and Environment.

Feed hungry people shall mean donate extra food to food banks, soup kitchens, and shelters and/or other methods of making extra food available for human consumption consistent with state and local regulation.

Food scraps shall mean any animal- or vegetable-based staple foodstuffs, including food scraps resulting from the preparation, cooking, and serving of food, unsaleable or outdated food, and other compostable items such as food-soiled paper, provided that such materials have been designated for collection by the City Manager pursuant to § 15-416.

Food store shall mean a retail establishment or business located within the City in a permanent building, operating year round, that is a full-line, self-service market and which sells a line of staple foodstuffs, meats, produce, dairy products or other perishable items. "Food store" does not include:

- (a) temporary vending establishment for fruits, vegetables packaged meats and dairy products;
- (b) vendors at farmers' markets or other temporary events;
- (c) businesses at which foodstuffs are an incidental part of the business. Food sales will be considered to be "incidental" if such sales comprise no more than two (2) percent of the business' gross sales in the city as measured by the dollar value of food sales as a percentage of the dollar value of total sales at any single location.

Group account shall mean a customer account for solid waste collection services that provides for collection of waste from multiple residential customers, regardless of the method by which such services are contracted or arranged. An account for service arranged by a single property owner for collection of solid waste from multiple locations owned by that property owner shall not constitute a group account for the purposes of this Article.

Hierarchy for materials management shall mean the same as the definition for that term formally adopted by the US Conference of Mayors in 2015 as follows: the prioritization of methods for management of materials in the following order, from preferred use to least preferred: 1) extended producer responsibility and product redesign; 2) reduce waste, toxicity, consumption, and packaging; 3) repair, reuse, and donate; 4) recycle; 5) beneficial reuse; 6) waste-based energy as disposal; 7) landfill as disposal.

Hierarchy of uses for food scraps shall mean the prioritization of methods for reducing or disposing of food scraps in the following order, from preferred use to least preferred: 1) source reduction of food scraps; 2) feed hungry people; 3) feed animals; 4) industrial uses; 5) composting; 6) disposal in a landfill or incineration.

Industrial uses of food scraps shall mean to provide waste oils for rendering and fuel conservation and food scraps for digestion to recover energy.

Landfill shall mean an area of land or excavation licensed by the State of Colorado to accept waste for permanent disposal.

Large capacity container(s) shall mean a container with a volume capacity of more than ninety (90) gallons but not more than ninety-nine (99) gallons.

Medium capacity container(s) shall mean a container with a volume capacity of more than sixty (60) gallons but not more than sixty-nine (69) gallons.

Multi-family customers shall mean residential properties for which there is a communal system for the collection of solid waste.

Poly-cart shall mean a durable, plastic, wheeled container with a hinged lid, manufactured and used for the collection of refuse, recyclable materials, food store food scraps, or yard trimmings. For multi-family or commercial customers, a dumpster or roll-off bin with aggregate volume of multiple poly-carts shall be deemed to constitute one (1) or more poly-carts.

Qualified recycling facility shall mean a facility that arranges for or causes the recovery of useful materials from one (1) or more specified recyclable materials including items for reuse, and shall be deemed to include only a facility that meets any federal or state standards that may be established to regulate or designate such recycling facilities.

Recyclable cardboard shall mean corrugated cardboard, and shall include, but not be limited to, materials used in packaging or storage containers that consist of three (3) or more layers of Kraft paper material, at least one (1) of which is rippled or corrugated. Cardboard shall be considered recyclable cardboard regardless of whether it has glue, staples or tape affixed, but not if it is permanently attached to other packing material or a nonpaper liner, waxed cardboard or cardboard contaminated with oil, paint, blood or other organic material.

Recyclable materials shall mean materials which have been separated from solid waste and can be recovered as useful materials and are properly prepared for the purpose of recycling, provided that such materials have been designated by the City Manager as recyclable pursuant to § 15-414 of this Article.

Recycling shall mean the process of recovering useful materials from solid waste, including items for reuse.

Recycling collector shall mean a person or entity providing recyclable collection services.

Refuse shall have the meaning set forth in § 12-16 of this Code.

Residential customer shall mean a customer at a residential property for which a communal system for the collection of waste is not employed.

Roll-off bin shall mean an open-top or gable-top metal container used to collect refuse or recycling that is ten (10) cubic yards or greater in capacity.

Service shall mean collecting, transporting or disposing of solid waste, recyclable materials, food store food scraps or yard trimmings for consideration.

Small capacity container(s) shall mean a container with a volume capacity of more than thirty (30) but not more than thirty-nine (39) gallons.

Solid waste shall mean all refuse, putrescible and nonputrescible waste, excluding discarded or abandoned vehicles or parts thereof, sewage, sludge, septic tank and cesspool pumpings or other sludge, discarded home or industrial appliances, hazardous wastes, materials used as fertilizers or for other productive purposes and recyclable materials which have been source separated for collection.

Solid waste collector shall mean the person who provides solid waste collection service on a regular, recurring schedule.

Source reduction of food scraps shall mean reduction of the volume of surplus food generated and disposed of.

Source separation shall mean to separate solid waste, recyclable materials, food scraps and yard trimmings at the waste source.

Volume capacity category of containers shall mean small capacity containers, medium capacity containers, or large capacity containers placed for collection of solid waste, recyclable materials, food scraps or yard trimmings.

Yard trimmings shall mean yard clippings, wood, branches, leaves, and twigs as designated for collection by City Manager pursuant to § 15-416.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-412. - License requirement.

- (a) *License required.* No person shall operate as a collector within the corporate limits of the City without first obtaining a collection license for such activity pursuant to § 15-417.
- (b) *Exemptions.* The following persons or entities are not required to obtain a solid waste or recyclable collection license:
 - (1) A civic, community, benevolent or charitable nonprofit organization that collects, transports and markets materials for resource recovery solely for the purpose of raising funds for a charitable, civic or benevolent activity;
 - (2) A person who transports solid waste or recyclable materials produced by such person;
 - (3) A property owner or agent thereof who transports solid waste, recyclable materials, yard trimmings or food scraps left by a tenant upon such owner's property, so long as such property owner does not provide collection service for compensation for tenants on a regular or continuing basis;
 - (4) A demolition or construction contractor or landscaper who produces and transports solid waste in the course of such occupation, where the solid waste produced is merely incidental to the particular demolition, construction or landscape work being performed by such person.
- (c) *Volume-based rates for solid waste service.*
 - (1) Any person licensed to operate as a collector within the City shall charge all residential customers, including, but not limited to, residential customers provided service through a group account, on the basis of the volume capacity category of the solid waste containers placed for collection by each residential customer. Collectors shall determine a rate for, and offer to residential customers, the small capacity container solid waste service, and that rate shall be used to determine the rates for all other service levels. Said charges shall be based upon the solid waste container size, rather than the volume of solid waste actually deposited within such containers by the residential customers. The charge for additional solid waste containers of the same volume capacity category shall be no less than one hundred (100) percent of the charge for the first such container. The charge for solid waste volumes in excess of a customer's service subscription level (based on volume capacity category) shall be proportional by volume to the collector's standard rate for a small capacity container.
 - (2) In order to further ensure that the charge for the collection of solid waste is based upon volume as required above, any person licensed as a collector shall provide to each residential customer containers (which may include disposable bags), or labels to be attached to customer-provided disposable bags, showing the volume capacity category of such bags, or shall establish another system for accomplishing the same purpose which is acceptable to the City. A solid waste collector shall arrange for provision of service to each group account in a manner that results in

an individual selection by each individual residential customer of a level of service from the full range of volume capacity category container sizes and levels of service offered by the collector. In the case of a group account, the solid waste collector shall require a written contract confirming compliance with the provisions of this Article.

- (3) In offering or arranging for services, a collector shall provide reasonable notice of the full range of volume capacity category container sizes or levels of service offered by the collector, and shall provide to each residential customer that customer's requested volume capacity category container size or level of service.
 - (4) It shall be unlawful for any person to knowingly attach any label to a container exceeding in volume the volume capacity category shown on, or represented by, such label, and to place said container for collection.
 - (5) No collector shall collect or transport solid waste, recyclables, food scraps or yard trimmings which have not been placed for collection through such system or in containers upon which such labels have been attached.
 - (6) The provisions of Subsection 15-412(c) shall not be construed as prohibiting any collector from also establishing rules and regulations regarding the maximum weight of containers of solid waste and/or recyclable materials.
 - (7) A collector shall not collect any overloaded container unless the collector accounts for and bills the customer the appropriate fee or charge for the collection of such excess solid waste. Loading of a container so as to prevent the lid of the container from closing securely shall be deemed to constitute overloading of the container for the purposes of this provision. The determination of overloading and charges therefor shall be made on an individual pick-up date basis, and there shall be no "averaging" of pick-up volumes to allow for overloading at one (1) time offset by a low volume at another time.
- (d) *Fixed fees for prepaid disposable bags or labels for solid waste service.*
- (1) Where prepaid disposable bags or prepaid labels for customer-provided disposable bags (rather than reusable containers) are provided by a collector to its customers for solid waste collection services, solid waste collectors may, but are not required to, charge a fixed fee for the purpose of covering the fixed operational costs of routing service trucks for such collections in addition to the volume based rates for the prepaid bags or labels under Subsection 15-412(c) above.
 - (2) If a solid waste collector elects to charge such fixed fee, said fee shall not exceed seventy-five (75) percent of the monthly volume-based rate charged for one (1) small capacity container per week.
 - (3) In the event that a solid waste collector elects to establish a fixed fee, all bills for services provided by such collector to residential customers shall clearly show both the fixed fee and the volume-based rate.
- (e) *Service surcharge for solid waste service.*
- (1) In addition to the volume-based rates required pursuant to Subsection 15-412(c) above and any fixed fees permitted under Subsection 15-412(d) above for collection of prepaid disposable bags or prepaid labels for customer-provided disposable bags, collectors may, but are not required to, charge a service surcharge to residential customers. A service surcharge may be imposed only to cover fluctuating operational costs of doing business outside of a collector's control (such as, for example, fuel costs or market based recycling fees paid by collectors). A service surcharge shall be permitted and charged only as set forth in Subsection 15-412(e).
 - (2) If a collector elects to charge such service surcharge, said surcharge shall not exceed twenty-five (25) percent of the monthly volume-based rate charged for one (1) small capacity container per week.

- (3) In the event that a collector elects to establish a service surcharge, all bills for services provided by such collector to residential customers shall clearly show both the service surcharge and the volume-based rate. Additionally, in the event that a collector elects to establish a service surcharge, such collector shall, on or before January 1 of each ensuing year, deliver to the Director a true and correct copy of such rate schedule.
- (f) *Refusal due to recyclable materials.* In the event that a collector refuses to collect any solid waste container because it contains materials required to be recycled under § 12-22, the collector shall not be required under § 15-412 to credit the customer for such refused container. A collector shall not collect materials required to be recycled under § 12-22 comingled in a solid waste container, except that, with respect to recyclable cardboard, a collector may, but shall not be obligated to, accept any solid waste container that has reasonably been determined, based upon visual inspection, to contain no more than twenty-five (25) percent recyclable cardboard by volume.
- (g) *Subcontractors or agents.* In the event that a collector elects to perform collection of solid waste or recyclable materials through subcontractors or agents, such agency relationship shall not relieve the collector of responsibility for compliance with the provisions of this Code and the rules promulgated hereunder.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-413. - Recycling requirement.

(a) *Curbside/on-site collection—Residential.*

- (1) Each solid waste collector licensed by the City shall provide to each residential customer in the City, as a part of any solid waste collection services provided by such solid waste collector and without additional charge other than a service surcharge under Subsection 15-412(e), the collection at curbside of both solid waste and recyclable materials. Charges for such basic service provided to each residential customer shall include recyclable materials in a minimum amount equal to at least eighteen (18) gallons and need not be more than two (2) large volume capacity containers. No collector shall be permitted to divide or diminish charges for the provision of such basic service at the request of such customer or for any other reason.
- (2) All collectors providing solid waste collection services to residential customers shall provide curbside recycling collection services at least once per week and on the same day of the week as the day of collection of solid waste from the customer; provided, however, that collection of recyclable materials need not be accomplished on the same day as the collection of solid waste for residential customers located within mobile home parks. After a collector has offered and made available to its residential customers medium and/or large capacity containers for recycling, said collector may modify its recycling collection schedule to a minimum of two (2) collections per month as long as curbside recycling collection services are provided on the same day of the week as the day of collection of solid waste from the residential customer. When a residential customer has two (2) large capacity containers for recycling collection, collectors may require that all recyclable materials fit inside the container provided to a residential customer.

(b) *On-site collection—Multi-family and commercial.*

- (1) Each solid waste collector licensed by the City shall, upon request, provide to each multi-family and commercial customer (and other customers receiving solid waste collection services through a communal system of waste collection) as a part of any solid waste collection services provided by such solid waste collector, the collection of recyclable materials. Such collector shall be permitted to impose an additional charge to multi-family and commercial customers (and other customers receiving solid waste collection services through a communal system of waste collection) for the collection of recyclable materials.

- (2) The amount of recyclable materials collection that shall be provided to each multi-family and commercial customer as a part of such basic services shall be not less than one-third ($\frac{1}{3}$) of the total collection volume (including both solid waste and recyclables) for such customer based on the size of solid waste containers provided to such customer and the service frequency ("minimum recycling service"). For example, if such a customer is provided with pick-up of a 4-cubic-yard trash container that is collected once per week, the collector shall also provide minimum recycling service in an amount equal to not less than a 2-cubic-yard recycling container as a part of such basic services (Two (2) cubic yards is one-third ($\frac{1}{3}$) of the total service volume (including both solid waste and recyclables) of six (6) cubic yards).
- (3) Commencing January 1, 2017, each solid waste collector licensed by the City shall provide to new and existing multi-family and commercial customers (and other customers receiving solid waste collection services through a communal system of waste collection) as a part of any solid waste collection services provided by such collector, the minimum recycling service calculated under Subsection 15-413(b)(2) in accordance with the schedule set forth in Subsection 15-413(b)(3). Each solid waste collector licensed by the City must add minimum recycling service to the solid waste collection service provided to existing multi-family and commercial customers not receiving recycling service as of December 31, 2016 ("unserved multi-family and commercial customers") in accordance with the following schedule:
 - a. by December 31, 2018, forty (40) percent of its unserved multi-family and commercial customers; and
 - b. by December 31, 2020 one hundred (100) percent of its unserved multi-family and commercial customers.

Thereafter, the cost for minimum recycling service must be billed in addition to the cost of solid waste collection service for all multi-family and commercial customers. The charge for both such services may be itemized separately for billing purposes, but shall not be reduced to exclude the cost of minimum recycling service unless a variance is granted in accordance with Subsection 15-413(b)(3).

A variance may be granted by the City in accordance with the following provisions:

- (i) If a collector's multi-family or commercial customer declines to participate in minimum recycling collection services offered by a collector due to space constraints, self-hauling recyclables to recycling drop-off center, utilization of a separate licensed recycling collection provider other than the solid waste collector, failure to generate recyclables, or if only available location for recycling bin is not safely serviceable by hauler, the customer must submit a written request for variance on a form provided by the City and signed by the customer. A recycling bin location that is not safely serviceable is defined as a location that is substantially less safe to service than the trash bin service area for that location. Upon receipt of such a request for variance, the Director shall either approve the variance for good cause shown, or disapprove the variance. A copy of the approved or disapproved variance shall be sent by the City to the solid waste collector servicing that customer.
- (ii) For purposes of Subsection 15-413(b)(3) "good cause shown" shall mean evidence presented by the customer that, to the reasonable satisfaction of the Director, demonstrates that the customer lacks sufficient space for recycling containers, self-hauls recyclables to a drop-off recycling center, utilizes a separate licensed recycling collector, generates recyclables in an amount less than one-third ($\frac{1}{3}$) of the customer's total solid waste and recyclables, or the only available location to service recycling bin(s) is substantially less safe to service than the trash bin service area for that location and therefore is deemed unsafe to service.
- (iii) If a variance is granted for a customer not generating recycling of at least one-third ($\frac{1}{3}$) of the volume of waste generated, but the customer generates at least ninety-six (96) gallons of recyclables per week, the variance will require that recycling service in the volume of recycling the customer generates be included as a part of solid waste collection services.

- (iv) If a variance is approved in accordance with the foregoing provisions, the collector shall not be required to provide such recycling services to such multi-family or commercial customer for the five (5) year period following approval of the variance, except as otherwise provided by the Code. If, after the five (5) year period, the constraints on which the variance was based still exist, the customer may submit a request for an additional five (5) year variance, except as otherwise provided by the Code.
 - (v) If the variance is not approved, the collector shall be required to provide minimum recycling services, in addition to solid waste collection, and charge the customer for the minimum required volume of recycling services as set forth herein.
- (4) Collectors providing collection services to multi-family and/or commercial customers shall provide services for the collection of recyclable materials from such customers with such frequency as is necessary to prevent overflow of the recycling containers.
- (5) Collectors shall provide each multi-family and commercial customer with educational guidelines for recycling and signage for use inside its facilities, which guidelines and signage may be designed and provided by the collector and approved by the City or the collector may utilize City-provided guidelines and signage for this purpose.
- (c) *Collection of recyclable materials; duties of collectors.* All licensed collectors of recyclable materials and solid waste operating within the City shall have the following duties:
 - (1) Except for materials that customers have not properly prepared for recycling, collectors may not commingle designated recyclable materials with refuse, nor dispose of recyclable materials set out by recycling customers by any means other than at a qualified recycling facility. Recyclable materials shall include all those materials designated by the City Manager pursuant to § 15-416 as materials which collectors must offer to collect for recycling.
 - (2) Collectors shall provide to each residential solid waste customer who utilizes recycling services within the City a container for storing and setting out recyclable materials meeting the requirements of Subsection 15-413(c), clearly marked as a recyclables container with words or symbols or both. Collectors must annually offer each residential recycling customer, in writing, a choice of a medium capacity or large capacity recycling container. The collector must provide the requested container without additional charge to such customer, except that the collector may require the payment of a refundable damage or loss deposit or a charge for lost or damaged containers, not to exceed the actual cost of the container. The collector must provide a container for recycling to all residential recycling customers except those customers who expressly decline a container, and must provide a container to any customer at any time upon request within one (1) billing period after the request is made. Collectors shall provide recycling containers to multi-family and commercial customers (in the form of containers, dumpsters, or roll-off bins as deemed appropriate for servicing the location) and with a capacity sufficient to meet one-third (1/3) of service as recycling volume requirement. Regardless of the type of container, it must be clearly identifiable as a recycling container and include a conspicuous chasing arrows decal on the side(s) of the container accessed by service or pedestrian access, as well as signage such as stickers or weather-resistant laminated posters or imprinting into the surface of the container during manufacture, of recyclable materials accepted in local collection programs, including graphics depicting acceptable materials; such information may be delivered by use of City-provided graphics or graphics provided by the collector and approved by the City.
 - (3) The collector may establish such reasonable and industry-accepted requirements for the preparation of materials for recycling as are necessary to provide for the orderly collection of recyclable materials, including requirements regarding the preparation of materials for collection, the collection of recyclable materials and requirements for source separation.
 - (4) All recyclable materials placed for collection shall be owned by and be the responsibility of the customer until the materials are collected by the collector. The material then shall become the property and the responsibility of the collector. No person other than the customer or the collector of recyclable materials shall take physical possession of any recyclable materials placed for collection.

- (5) Any vehicle used for the collection of recyclables must be clearly and unambiguously marked as a recycling truck, whether by permanent decals or markings, or by signage or placards displayed at all times during such use.
- (d) *Customer notification.*
- (1) Upon the initial provision of collection services to new residential customers, and on or before December 31 of each year with respect to existing residential customers, collectors shall notify in writing such customers of:
- the availability of the collection of recyclable materials;
 - the range of recycling containers available;
 - the materials designated for recycling collection pursuant to § 15-416; and
 - such rules and regulations as have been established by the collector for the orderly collection of recyclable materials as authorized pursuant to Subsection 15-413(b)(2);
 - the variable-rate solid waste collection service options offered by the solid waste collector;
 - the related volume-based rates and service surcharges; and
 - the availability of optional collection service for residential yard trimmings under § 15-414.
- In addition, such notice shall include educational guidelines and information regarding solid waste, recycling and yard trimmings provided by the City to the collectors in electronic or printed form not later than December 31 of each year. Collectors must provide notice in paper form to all customers receiving a paper bill or paper service calendar. Collectors may provide notice electronically to customers receiving only electronic communications.
- (2) For group accounts, the notices required hereunder may be sent to the group representative for said account, provided that such notice shall further notify said representative of its obligation to notify all individual residential customers within the group of the availability of recycling services and the terms of variable-rate service options, pursuant to Subsection 12-19(b).
- (3) All verbal and written communications with customers by or on behalf of a collector, whether in person, by telephone, in written form or through any other means, must be consistent with and clearly and accurately describe all components of the system employed by the collector to provide and charge for variable-rate solid waste collection and recycling services.
- (4) The collector shall deliver to the Director a true and correct copy of each form of such notification sent on or before December 31 of each year.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-414. - Optional service—Residential yard trimmings.

- (a) *Residential service required.* As of April 1, 2017, each solid waste collector licensed by the City shall make available to each residential customer receiving solid waste collection services, including customers receiving solid waste collection services through a group account, curbside collection of residential yard trimmings at least once per week from April to November of each year upon a customer's request.
- (b) *Rates.* Collectors shall be responsible for setting rates for collection of residential yard trimmings and such charges may be billed separately from any charges for basic services, as defined in § 15-411 to include collection of solid waste and recyclable materials, provided by the collector, and shall not be governed by the requirements of Subsection 15-412(c).
- (c) *Disposal of yard trimmings.* Collectors may not comingle yard trimmings with refuse or recyclable materials, nor dispose of yard trimmings at a landfill. Yard trimmings shall be disposed of by the

collector at a location or facility permitted to collect organic materials for recycling, reuse or composting.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-415. - Collection of food store food scraps.

- (a) *Frequency of collection.* Collectors providing food scraps collection service to food stores shall provide collection with such frequency as is necessary to prevent overflow of containers. Service must be provided at least once per week, but no less frequently than may be required by the Larimer County Department of Health and Environment.
- (b) *Collectors—Duties.* All licensed collectors of food scraps operating within the City shall have the following duties:
 - (1) Except as permitted by variance allowed under Subsection 12-23(a), collectors may not commingle food scraps with refuse or recyclable material or dispose of food scraps by any means other than at a location or facility permitted by the State of Colorado to collect such material (but not to a landfill).
 - (2) A collector may establish such reasonable and industry-accepted requirements for the preparation of food scraps as are necessary to provide for the orderly collection of such materials, including requirements regarding the preparation of materials for collection, the collection of materials, and requirements for separation.
 - (3) All food scraps placed for collection shall be owned by and be the responsibility of the food store until the materials are collected by the collector. The material then shall become the property and the responsibility of the collector. No person other than the food store or the collector of food scraps shall take physical possession of any such materials placed for collection.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-416. - Designation of recyclable materials, food scraps, and yard trimmings for collection.

- (a) The City Manager shall, on or before the 1st day of October of each year, after consultation with the Larimer County Board of Commissioners, the Natural Resources Advisory Board and representatives of the licensed collectors operating within the City, determine which items (including recyclables, food scraps, and yard trimmings) shall be designated for collection based upon the following criteria:
 - (1) Local, state and federal laws and regulations, including, but not limited to, the requirements of this Article;
 - (2) Potential for waste stream reduction;
 - (3) Availability of markets;
 - (4) Market price;
 - (5) Safety factors and risks of transportation;
 - (6) Risks of commingling of liquid wastes; and
 - (7) Adherence to the hierarchy of materials management and hierarchy of uses of food scraps.
- (b) Notwithstanding the foregoing, collection for recycling of electronic equipment shall be at each collector's option; provided, however, that no collector providing collection services for electronic equipment may dispose of any such electronic equipment, but instead shall deliver any collected electronic equipment for recycling at a qualified recycling facility for electronic equipment.

- (c) The City Manager is authorized to promulgate such rules and regulations as are necessary to effectuate the implementation and enforcement of this Article.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-417. - Application for license.

- (a) Any person desiring to obtain a license to engage in the business of being a collector of solid waste, recyclable materials, food scraps, or yard trimmings within the City shall make written application to the Financial Officer on forms provided by the City. All applications for renewal of a license by a licensed collector must be submitted no later than November 30 in advance of the new license year. The application shall include, without limitation, the following information:
- (1) The name and address of the applicant;
 - (2) The principal place of business for the business to be conducted;
 - (3) A list of vehicles owned and/or operated by the applicant directly in the collection of solid waste, recyclables, food scraps, and/or yard trimmings, or operated or located at any time in the City during the current or pending license year, including vehicle make, color, year, U.S. Department of Transportation safety inspection identification number, cubic yard capacity, Colorado license plate number and empty tare weight.
 - (4) A description of the system to be used to account for and charge volume-based rates as required under Subsection 15-412(c), and a plan describing the structure and operation of the recycling collection services to be offered to each customer class. The description of the system shall include a detailed description of the means by which residential customers are notified of and offered the full range of sizes of containers provided for solid waste collection and those provided for curbside recycling and of the availability of seasonal yard trimmings collection service. In addition, the description shall provide sufficient detail to allow the Financial Officer to determine the means by which volume-based rates are applied to residential customers receiving waste-hauling services through any group account, such as the formula used to set volume-based rates for any group accounts, and the methods used to offer and account for the volume-based charges.
 - (5) All information required pursuant to Subsection 15-418(a) for the preceding twelve-month period.
- (b) The Financial Officer shall determine whether an application meets the requirements of this Article, and whether all taxes, fees, penalties, interest or other financial obligations to the City of the applicant or any predecessor in interest of the applicant have been met, and whether the applicant is in current compliance with the requirements of this Article. The Financial Officer may request such additional information as he or she deems relevant to a determination of whether the requirements of this Article will be met by the applicant. The Financial Officer may deny any application if the Financial Officer reasonably determines that any requirements of this Article will not be met by the operation proposed by the applicant, or if the applicant is ineligible for a license under the terms of a revocation determination by the City Manager pursuant to § 15-426.
- (c) Upon a determination by the Financial Officer of whether a license shall issue under § 15-417, the Financial Officer shall give written notice to the applicant of his or her decision thereon. An applicant whose application has been denied may, within twenty (20) days after such decision is mailed, petition the City Manager for a hearing on the denial. The City Manager shall notify the applicant in writing of the time and place of the hearing. After such hearing, the City Manager shall make such order in the matter as he or she deems just and proper and shall furnish a copy of such final order to the applicant.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-418. - License requirements; fees and insurance.

Upon approval of a license application, but prior to issuance, the collector shall furnish to the Financial Officer the following:

- (1) A license fee in the sum of one hundred dollars (\$100.) for each vehicle required to be identified under Subsection 15-415(a); and
- (2) Proof that the collector has obtained a general comprehensive liability/automobile insurance policy protecting the collector from all claims for damage to property or for bodily injury, including death, which may arise from operations under or in connection with this license and providing limits of coverage of not less than five hundred thousand dollars (\$500,000.) for bodily injury and property damage per occurrence or in the aggregate.
- (3) Proof that each vehicle required to be identified under Subsection 15-415(a) has been registered with the U.S. Department of Transportation.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-419. - Term of license.

All licenses issued pursuant to this Article shall run from the date of issuance until the 31st day of December of the year in which such license is issued. All licenses shall expire on December 31 of each year. Licenses are not transferable.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-420. - Plans, recordkeeping and reports.

- (a) Each collector must accurately and completely account for and record, and report to the City using a form provided by the City by November 30 of each year, the following:
 - (1) The specific manner in which trash collection, recycling services and collection of food scraps and yard trimmings have been delivered in compliance with this Article, including, but not limited to, a complete list of all rate schedules used to charge for such services, including those offered to individual customers and those offered to group accounts, as well as the frequency of collection;
 - (2) A description of any system used to impose and verify charges for volumes in excess of customer subscription levels;
 - (3) The number of individual residential, multi-family and commercial customers, and any other customer category, who received collection services from the collector, by category, together with the number of group accounts within each category and the number of any such customer category that received services through a group account;
 - (4) The number of customers within each category that subscribe to each level of solid waste, recycling, yard trimmings, or food scrap collection services, and the number of containers provided to residential customers, by size.
- (b) In addition, prior to implementation of any change to operational systems, plans or structures of any licensee which are required to be reported for issuance of a license or annually hereunder, the collector must submit such changes to the City for review.
- (c) All information submitted to the City pursuant to § 15-420 shall constitute public information, except as otherwise provided in the Colorado Open Records Act. Any such information constituting confidential customer records or financial proprietary information and identified as such by the licensee shall be maintained as confidential by the City, unless otherwise required by court order or

as agreed by the relevant party-in-interest. If the City receives a request for public inspection or a request for release of any collector customer records or collector financial information to a third party, the City shall provide timely notice of such request to the licensee.

- (d) Each collector licensed pursuant to this Article shall maintain accurate and complete records of the service provided to each customer, the charges to such customer and payments received, the form and recipients of any notice required pursuant to this Article, and any underlying records, including any books, accounts, contracts for services, including contracts for group accounts, written records of individual level of service requests, invoices, route sheets or other records necessary to verify the accuracy and completeness of such records, and copies of all applications for and documentation pertaining to all requests for variance pursuant to Subsection 15-413(b)(3) above. It shall be the duty of each collector to keep and preserve all such documents and records, including any electronic information, for a period of three (3) years from the end of the calendar year of such records, except for paper records of route sheets, which may be discarded one (1) year after the end of the calendar year of such route sheets.
- (e) Promptly upon a request by the City Manager in connection with an audit or other investigation he or she has initiated, a licensee shall make records retained pursuant to Subsection 15-420(d) available, at its place of business or in such other reasonably convenient location as the licensee shall specify, for review by the City Manager, the Financial Officer or his or her designee, or an officer of the City charged with the investigation of potential violations of the Code, for the purpose of enforcing the requirements of this Article.
- (f) A licensee shall make available for review by the City such records in its possession as may be relevant to the investigation of any complaint regarding such licensee that has been submitted to the City or is under investigation by the City.
- (g) All collectors shall accurately and completely report to the City the following information, which shall be deemed to constitute public information:
 - (1) Number of tons of solid waste collected in the City from all residential, multi-family and commercial customers, and any other customer category, reported by category of customer. The weight of solid waste collected shall be documented and verified based on actual load weight measurements.
 - (2) Number of tons of each type (as determined by the City Manager pursuant to § 15-416) of recyclables collected from all residential, commercial and multi-family , and any other customer category, reported by category of customer.
 - (3) Number of tons of food scraps collected in the City from any customer category, reported by category of customer.
 - (4) Number of tons of yard trimmings collected in the City from any customer category, including group accounts, reported by category of customer.

Such reports shall be made on forms to be provided by the City and shall be made for each full half-year of curbside collection performed by the collector. A half-year shall mean January 1 through June 30 or July 1 through December 31. All such reports shall be submitted to the City Manager no later than thirty (30) days following the close of each half-year.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-421. - Disposal of solid waste.

All persons holding licenses pursuant to this Article as a collector of solid waste shall dispose of all such refuse and solid waste at the Larimer County Landfill or at any other disposal site that is approved by any state. No solid waste shall be disposed of at any other location either inside or outside of the City.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-422. - Identification of vehicles.

Each vehicle used by a collector to provide services within the City pursuant to a license issued under this Article shall bear an identification sticker issued by the Financial Officer in a conspicuous place upon the vehicle, which identification sticker shall be issued by the Financial Officer at the time the license is granted.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-423. - Hours of operation.

No collector shall operate any vehicle for the purpose of collecting solid waste, recyclables, food scraps, or yard trimmings on any street designated by the City as "local residential" or "residential collector" between the hours of 7:00 p.m. and 7:00 a.m. (the "Nighttime Hours").

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-424. - Investigation of reports, records and other items relating to compliance with this article.

For the purpose of ascertaining the correctness of any reports, plans or other documents submitted or required to be prepared and maintained by a licensed collector pursuant to this Article, or for the purpose of determining compliance with any requirements of this Article of any person, whether or not the same is licensed under this Article, the City Manager may hold investigations, including audits, and hearings concerning any matters covered by this Article, and may examine any relevant books, papers, records or memoranda of any such person and may require the attendance of such person, or any officer or employee of such person, or of any person having knowledge of transactions involved, and may take testimony and proof of the information. The City Manager shall have the power to administer oaths to such persons. Except for routine or random audits, any such investigation shall be based upon reasonable suspicion of a violation as determined by the City Manager. The City Manager shall provide advance notice to the affected collector of his or her intent to conduct an investigation under § 15-424, unless the City Manager determines that provision of such notice may compromise the purpose of the investigation.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-425. - Subpoenas and witness fees.

All subpoenas issued under the terms of this Article may be served by any person over the age of eighteen (18) years. The fees of witnesses for attendance in response to a subpoena shall be the same as the fees of witnesses before the District Court, such fees to be paid when the witness is excused from further attendance. When the witness is subpoenaed at the instance of the City Manager, such fees shall be paid by the City, but when a witness is subpoenaed at the instance of any other party to such proceeding, the City Manager may require that the cost of service of the subpoena and the fee of the witness be borne by the party at whose instance the witness is summoned. In such case, the City Manager, in his or her discretion, may require a deposit to cover the cost of such service and witness fees prior to issuing such subpoenas. A subpoena issued as aforesaid shall be served in the same manner as a subpoena issued through a court of record.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-426. - Attendance of witnesses and production of evidence to be compelled by municipal or district judge.

Any Judge of the Municipal Court or the District Court, upon the application of the City Manager, may compel the attendance of witnesses, the production of books, papers, records or memoranda and the giving of testimony before the City Manager, by an action for contempt or otherwise in the same manner as the production of evidence may be compelled before such court.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-427. - Depositions.

The City Manager, or any party to an investigation or hearing before the City Manager, may cause the deposition of witnesses residing within or without the State to be taken in the manner prescribed by law for depositions in civil actions in courts of this State and to that end compel the attendance of witnesses and the production of books, papers, records or memoranda.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-428. - Suspension or revocation of license.

The City Manager may, after written notice of no less than ten (10) days and an opportunity for a hearing if requested by the licensee within twenty (20) days of such notice, suspend or revoke any license issued under this Article as he or she determines reasonably appropriate upon a finding that the licensee has failed to comply with any provision of this Article or has violated other applicable laws intended to protect public health, safety or the environment. No period of suspension shall exceed six (6) months in duration. In the event of a revocation of a license, the City Manager may further declare such licensee ineligible for licensure under this Article for a period of up to one (1) year from the date of revocation, if he or she reasonably determines that the circumstances so warrant. In lieu of suspension or revocation of a license under § 15-428, or as a condition of future eligibility for licensure, if a licensee is declared ineligible for the same, the City Manager may establish reasonable terms and conditions for continuation of a license or such future eligibility. A license shall be subject to immediate suspension in the event of violation of any such terms and conditions for continuation of a license.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-429. - Notices.

All written notices required to be mailed, served or given to any person under the provisions of this Article shall be hand delivered or mailed, postage prepaid, addressed to such person at the last known address of such person on file with the City and shall be deemed to have been received by such person when so mailed or delivered.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-430. - Review of decisions of the city manager.

The licensed collector or other person subject to final action of the City Manager under this Article may apply for review of such action in the Larimer County District Court in accordance with Rule 106 of the Colorado Rules of Civil Procedure. The review must be sought no later than thirty (30) days after the date of the decision to be reviewed.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-431. - Violations.

It shall be unlawful for any person to:

- (1) Fail or refuse to make or file any record, report, application or other document required to be made or filed by this Article or to make any false or fraudulent record or report or any false or fraudulent statement in any such document;
- (2) Operate as a collector within the corporate limits of the City without the license required by this Article or to continue to do business during a period of suspension of such license or after such license is revoked; or
- (3) Aid or abet another in any attempt to evade any requirements imposed by this Article.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Sec. 15-432. - Other remedies unaffected.

Nothing in this Article shall be construed to limit or forbid the City or any other person from pursuing any other remedies available at law or in equity to enforce the provisions of this Article, including, without limitation, the prosecution of violations of this Article pursuant to § 1-15 of this Code.

(Ord. No. [109, 2016](#), § 6, 9-20-16)

Secs. 15-433—15-449. - Reserved.

Chapter 7.16

SOLID WASTE COLLECTION AND RECYCLING

Sections:

7.16.010	Intent.
7.16.020	Definitions.
7.16.030	License requirement.
7.16.050	Recycling services.
7.16.060	Collection frequency and notification.
7.16.070	Billing requirements.
7.16.080	Designation of recyclable materials.
7.16.090	License application, issuance and updating.
7.16.110	Term of license.
7.16.120	Reporting requirements.
7.16.130	Disposal of solid waste.
7.16.140	Identification of vehicles.
7.16.160	Hours and location of collection.
7.16.180	Enforcement and suspension of license.
7.16.200	Unlawful acts.
7.16.220	Fees and charges-Assessment.
7.16.230	Exemption.
7.16.240	Unlawful use of system.
7.16.250	City charges and collections.
7.16.260	Nonuse of service.
7.16.270	Rules and regulations-Authority.

7.16.010 Intent.

It is the intent of this chapter to: (1) reduce the volume of trash and solid waste entering the waste stream and landfills; (2) encourage the recycling of certain waste materials; and (3) protect the health, safety, and welfare of the public. (Ord. 5194, 2007; Ord. 4648 § 9, 2001; Ord. 4273 § 1 (part), 1997)

7.16.20 Definitions.

A. The following words, terms and phrases, when used in this Chapter 7.16, shall have the following meanings:

1. "City manager" shall mean the city manager of the City of Loveland, Colorado, or the manager's designee.
2. "Collector" shall mean the person or entity providing solid waste or recyclable material collection services within the City of Loveland, Colorado.
3. "Commercial customer" shall mean any premises utilizing collection services where a commercial, industrial, or institutional business or enterprise is undertaken, including, without limitation, retail establishments, restaurants, hospitals, manufacturing facilities, schools, day care centers, office buildings, nursing homes, clubs, churches, and public facilities.
4. "Compensation" shall mean a payment or exchange of money or other value including the exchange of in-kind goods or services.
5. "Curbside" shall mean at or near the perimeter of the premises, whether or not there is a curb.

6. "Curbside collection or collection" shall mean the collection of solid waste or recyclable materials that are placed at a curbside location or within an approved dumpster site.
7. "Group account" shall mean a customer account for solid waste collection services that provides for collection of waste from multiple residential customers regardless of the method by which such services are contracted or arranged. An account for solid waste collection services arranged by a single property owner for collection of waste from multiple locations owned by that property owner shall not constitute a "group account" for the purposes of this chapter.
8. "Hazardous waste" shall mean any chemical, compound, substance or mixture that state or federal law designates as hazardous because it is ignitable, corrosive, reactive or toxic including but not limited to solvents, degreasers, paint thinners, cleaning fluids, pesticides, adhesives, strong acids and alkalis and waste paints and inks.
9. "Household recycling container" shall mean a bag, bin-type container, cart, or a plastic receptacle used for the storing, containment, and setting out of recyclable materials for collection by a collector.
10. "Multifamily customer" or "multifamily property" shall mean a residential property, or cluster of residential properties, which contains four or more residential dwelling units and employs a communal system for the collection of solid waste generated by the residents of the residential property or cluster of residential properties.
11. "Mosquito control" shall mean any seasonal city program intended to reduce, suppress, or manage the breeding, reproduction, or public annoyance of mosquitoes and other biting flies.
12. "Owner" shall mean the owner as shown upon the tax rolls, whether person, firm or corporation; any agent or representative of the owner; and any occupant of the premises.
13. "Recycling facility" shall mean a facility lawfully operated for the purpose of recycling and processing recyclable materials.
14. "Recyclable materials" shall mean those materials: (1) that have been separated from solid waste; (2) are properly prepared for recycling; (3) can be recovered and processed as useful or reusable materials; and (4) are designated by the city manager as recyclable.
15. "Recycling" shall mean the process of recovering useful materials from solid waste, including items for reuse.
16. "Residential customers" or "residential property" shall mean all single-family homes, duplexes, triplexes, townhomes, or trailer homes excluding multifamily properties as defined by this Section 7.16.020A.10., which residential customers are served by a collector and are not employing a communal system for the collection of solid waste.
17. "Residential waste services" shall mean the collection and transportation of solid waste or recyclable materials from sources other than industrial, commercial, or institutional properties.
18. "Service" shall mean collecting, transporting, or disposing of solid waste, hazardous waste or recyclable materials at a lawfully-permitted landfill, recycling, or hazardous waste collection facilities, as applicable.
19. "Solid waste" shall mean all putrescible and nonputrescible waste. The term solid waste shall not include discarded or abandoned vehicles or parts thereof, sewage, sludge, septic tank and cesspool pumpings or other sludge, discarded home or industrial appliances, hazardous wastes, materials used as fertilizers or for other productive purposes and recyclable materials which have been source separated for collection.

20. "Solid waste collector" shall mean the person or entity that provides solid waste collection service for compensation and who must be licensed pursuant to this Chapter 7.16.
21. "Solid waste management services" shall mean curbside and drop-off recycling services, hazardous waste collection and management services, large item disposal services, and solid waste management planning services.
22. "Source separation" shall mean to separate recyclable materials from solid waste at the waste source.
23. "Utility services" shall mean water, wastewater, stormwater, electric or solid waste service, or any combination thereof. (Ord. 5194, 2007; Ord. 4648 § 9, 2001; Ord. 4447 §§ 1, 2, 1999; Ord. 4273 § 1 (part), 1997)

7.16.30 License requirement.

- A. License required. No person or entity shall operate as a solid waste collector or operate as a collector of recyclable materials within the corporate limits of the City of Loveland without first obtaining a collection license for such activity from the city as provided by this chapter.
- B. Exemptions. The following persons or entities are not required to obtain a collection license:
 1. A civic, community, benevolent, or charitable nonprofit organization that collects, transports, and markets recyclable or other materials for resource recovery solely for the purpose of raising funds for a charitable, civic, or benevolent activity;
 2. A person who transports solid waste or recyclable materials produced by such person or such person's household;
 3. A person who hauls or transports solid waste or recyclable materials on a one-time and individual basis provided that such person does not offer or engage in providing such services on a regular, routine, or repeated basis for any one person or customer;
 4. A property owner or the owner's agent who transports solid waste or recyclable materials left by a tenant upon such owner's property, so long as such property owner does not provide solid waste collection service for compensation for tenants on a regular or continuing basis; and
 5. A demolition, construction, or landscape contractor who produces and transports solid waste in the course of such occupation, where such solid waste is produced by and is incidental to the particular demolition, construction, or landscaping work being performed by such person. (Ord. 5194, 2007; Ord. 4273 § 1 (part), 1997)

7.16.50 Recycling services.

All licensed collectors operating within the city shall have the following duties and rights:

1. Each collector may establish such reasonable and industry-accepted requirements, rules, or regulations for the separation and preparation of materials for recycling as are necessary to provide for the orderly collection of recyclable materials.
2. Household recycling containers may be made available by collectors to all solid waste customers who utilize curbside recycling services within the city.
3. Except for materials which customers have not properly prepared for recycling, collectors may not dispose of recyclable materials set out for collection by their customers by any means other than delivery at a lawfully operating recycling facility.
4. In the event that a collector elects to perform collection of solid waste or recyclable materials through subcontractors or agents, such agency relationship shall not relieve the

collector of responsibility for compliance with the provisions of this chapter or any rule promulgated hereunder.

5. All recyclable materials placed for curbside collection shall be owned by and be the responsibility of the customer until the materials are collected by the collector. Such material shall then become the property and the responsibility of the collector. No person other than the customer or the collector of recyclable materials shall take physical possession of any recyclable materials placed for curbside collection. (Ord. 5194, 2007; Ord. 4273 § 1 (part), 1997)

7.16.60 Collection frequency and notification.

- A. Residential customers. Where curbside recycling collection services are provided to residential customers by a collector, such service shall be provided on at least a once-weekly basis and on the same day as the day of collection of solid waste from the residential customer.
- B. Multifamily and commercial customers. Collectors who provide collection of recyclable materials from multifamily and/or commercial customers shall provide such services with such frequency as is necessary to prevent overflow of the recycling containers.
- C. Upon the initial provision of solid waste collection services to new customers, collectors shall notify such customers in writing of the availability of the collection of recyclable materials, the materials designated for recycling collection pursuant to Section 7.16.080 and such rules and regulations as have been established by the collector for the orderly collection of recyclable materials as authorized pursuant to Section 7.16.050(1). (Ord. 5194, 2007; Ord. 4273 § 1 (part), 1997)

7.16.70 Billing requirements.

- A. Volume-based Rates.
 1. Every licensed solid waste collector within the city shall charge all residential customers, including, but not limited to, residential customers provided service through a group account, such as a homeowners' association, on the basis of:
 - a. The volume of solid waste placed by the customer for collection by the collector, i.e., a pay-as-you-throw system using prepaid bags or tags; or
 - b. A variable can or cart subscription system whereby customers sign up for a predetermined maximum volume of weekly waste to be collected, e.g., 30, 60, 90, 120 or 150 gallons.
 2. Each collector shall establish a volume-based rate structure as follows:
 - a. Each collector shall offer all their residential customers collection service at a minimum level of 30-gallons per week. Higher service levels, such as 60 and 90-gallons, may be offered, however the rates for these levels must not decrease on a per unit basis for subsequent larger service levels above the 30-gallon level. For example, if the 30-gallon rate is x , then the 60-gallon rate must be no less than $2x$, and the 90-gallon rate no less than $3x$. Collectors shall determine a rate for the 30-gallon service level, which shall serve to determine rates for all other service levels.
 - b. Containers provided by collectors cannot exceed a capacity of 90-gallons, although customers may request additional containers. Rates for additional containers shall be established based on the requirements set forth in Subsection A.2.a. above.
 - c. A solid waste collector shall arrange for provision of service to each group account in a manner that results in an individual selection by each individual

- residential customer of a level of service from the full range of container sizes and levels of service offered by the hauler.
- d. In offering or arranging for services, a solid waste collector shall provide reasonable notice of the full range of bag or container sizes or levels of service offered by the hauler, and shall provide to each residential customer that customer's requested size or level of service. (Ord. 5194, 2007)
 3. Until January 1, 2009, the performance of legally binding arrangements for the provision of solid waste collection services to group accounts that: (1) were in effect as of June 1, 2007, and (2) do not offer choice of volume-based service levels to individual residential customers, shall be deemed not to violate the terms of this Section 7.16.070 for so long as and to the extent that the existing contractual obligations preclude the solid waste collector from modifying the rates or terms of such services to offer choice of level of service to individual residential customers in compliance with the requirements of this Section 7.16.070.
 4. The provisions of this subsection shall not be construed as prohibiting any collector from also establishing rules and regulations regarding the maximum weight of containers of solid waste and/or recyclable materials.
 5. A collector shall not collect any container which is overloaded or which contains a volume of solid waste greater than the rated or specified volume of such container unless the collector accounts for and bills the customer the appropriate fee or charge for the collection of such excess solid waste. The determination of overloading and charges therefore shall be made on an individual pick-up date basis, and there shall be no "averaging" of pick-up volumes to allow for overloading at one time offset by a low volume at another time.
 6. The contents of each container shall fit securely into the container so as not to cause the opening between the level rim and the lid of the container to be greater than a forty-five degree (45°) angle. All materials above the level of the rim of the container must be bagged to prevent spillage. Any waste which does not so fit within the container constitutes excess solid waste. All bags, whether or not within the container, shall be securely tied off to prevent spillage.
- B. Billing. The collector shall bill the customer for the collection of any excess solid waste at its next usual billing cycle, but in no event later than three months after the collection of the excess solid waste. The rate for each extra 30-gallon increment of solid waste cannot be less than the weekly equivalent of the 30-gallon monthly volume subscription rate exclusive of any base fee. For example, if the monthly volume subscription rate is \$8.00 for 30-gallon trash cart service, the rate for an extra 30-gallon bag cannot be less than \$1.85 [i.e. \$8.00/4.33 weeks].
- C. Flat monthly fee. In addition to the volume-based rates required pursuant to Subsection A. above, collectors may charge an additional flat monthly fee to residential customers regardless of whether solid waste or recyclable materials are placed by the customer for collection during the month. The flat monthly fee is to be charged for the purpose of covering the fixed operational costs of collecting solid waste and recyclable materials from residential customers. Nothing herein shall prevent or prohibit such collector from charging additional fees for providing additional services other than collection of solid waste or recyclable materials such as, but not limited to, collection of large bulky household items or yard waste. If a collector elects to charge a flat monthly fee, the flat fee shall not exceed the monthly volume-based rate charged assuming the collection of only one standard container per week. In the event that a collector elects to establish a flat monthly fee, all bills for services provided by such collector to residential customers shall clearly identify both the flat monthly fee and the volume-based fees charged to the

customer for the collection of solid waste. If a collector elects to charge a flat monthly fee, such fee must be standardized and applied equally to all service levels and may not be varied according to the service level chosen by the customer.

D. Provide documentation to city.

1. Within ten calendar days after establishing a program to implement the volume-based rate and/or flat monthly fee requirements of this Section 7.16.070, and on or before January 1 of each ensuing year, each collector shall deliver to the city's public works department a description of such program, including a description of the means by which volume-based rates are applied to residential customers receiving waste hauling services through any group account, such as the formula used to set volume-based rates for any group accounts, and the methods used to offer and account for the volume-based charges, and including a true and correct copy of such collector's complete rate schedule listing all service levels and pricing and charges for excess trash and any other charges. The rate schedule shall include all rates offered to each group account. Collectors must provide a rate schedule to all residential customers, including those within group accounts, at a minimum of once per year and provide copies of such notifications to the city. If a hauler elects to charge additional fees associated with providing weekly collection services such as, but not limited to, fuel surcharge fees or environmental fees, all such fees must be bundled into the volume-based rate fees or the flat monthly fees.
2. Each collector shall keep a complete set of books of account, invoices, copies of orders, pick-up and delivery logs, instructions, bills, correspondence, and all other records necessary to show fully the individual and collective business transactions of the collector. The city may require the collector to furnish such information as it considers necessary for the property administration of this chapter. The city may require an audit to be made of such books of account and records on such occasions as it may consider necessary by an independent auditor to be selected by the city, which auditor shall likewise have access to all books and records of such collector. If the collector has not complied with the provisions of this code as determined by the city or is found to be in violation of any part of this code, the expense of the audit shall be paid by said collector.
3. Failure by a collector to comply with the requirements of this section or any provision of this chapter shall constitute grounds for the potential revocation of such collector's license, as further set forth in Section 5.04.100 of this code.

7.16.80 Designation of recyclable materials.

- A. The city manager shall, on or before the thirtieth day of November of each year, or as soon thereafter as possible, determine which items shall be designated as recyclable for the purpose of residential collection by all collectors based upon the following criteria:
 1. Local, state, and federal laws and regulations;
 2. Potential for waste stream reduction;
 3. Availability of markets for the recyclable materials;
 4. Market price for the recyclable materials;
 5. Feasibility for residential collection;
 6. Safety factors and risks of transportation; and
 7. Risks of commingling of liquid wastes.
- B. All collectors shall notify their customers within 90 days of the items identified by the city manager to be recycled.
- C. The city manager is authorized to promulgate such rules and regulations as are necessary to effectuate the implementation and enforcement of this chapter. (Ord. 5194, 2007)

7.16.90 License application, issuance and updating.

- A. Any person or entity desiring to obtain a license to engage in the business of solid waste and/or recyclables collection within the City of Loveland shall submit a written application to the public works department. The application form shall require, at a minimum, the following information:
 - 1. The name and address of the applicant including name(s) of those employees that will oversee or administer the collector's conformance with the requirements of this chapter;
 - 2. The principal place of business for the business to be conducted;
 - 3. A list of vehicles owned and/or operated by the applicant to be used directly in the collection of solid waste and/or recyclable materials within the city, including vehicle make, color, year, cubic yard capacity, Colorado license plate number, and empty tare weight;
 - 4. A written plan describing how the recycling collection services will be structured by the collector for each customer class;
 - 5. A schedule of proposed rates for collection services to be provided by the collector; and
 - 6. A description of the system to be used to account for and charge volume-based rates as required under Section 7.16.070. The description of the system shall include a detailed description of the means by which residential customers are notified of and offered the full range of sizes of bags or containers provided. In addition, the description shall provide sufficient detail to allow the public works department to determine the means by which volume-based rates are applied to residential customers receiving waste hauling services through any group account, such as the formula used to set volume based rates for any group accounts, and the methods used to offer and account for the volume-based charges.
- B. The public works department may promulgate forms for such application which require information in addition to the requirements of Subsection A. of this section and which is necessary to ensure compliance with the requirements of this chapter.
- C. The public works department shall review each completed application, and shall approve the application if the department finds such application conforms to the requirements of this chapter.
- D. Upon approval of a license application, but prior to the issuance of the license, the applicant shall furnish to the public works department the following:
 - 1. A license fee in the sum of one hundred dollars for each vehicle to be used by the applicant's business for the purpose of the collection of solid waste and/or recyclable materials within the city; and
 - 2. Proof that the applicant has obtained a general comprehensive liability/automobile insurance policy protecting the applicant from all claims for damage to property or for bodily injury, including death, which may arise from operations under or in connection with the license and providing limits of coverage of not less than one million dollars for bodily injury and property damage per occurrence or in the aggregate.
- E. Following the applicant's presentation of a completed application conforming with all requirements of this section, the public works department shall issue the license to the applicant.
- F. Each collector shall update information contained within an approved license application within thirty days of any change of such information. (Ord. 5194, 2007)

7.16.110 Term of license.

All licenses issued pursuant to this chapter shall be valid from the date of issuance until the 31st day of December of the year in which such license is issued. All licenses shall expire on December 31 of each year. License fees shall not be prorated and licenses are not transferable. (Ord. 5194, 2007)

7.16.120 Reporting requirements.

- A. All collectors shall report to the city the following information for each category of customer listed:
 - 1. Number of tons of solid waste collected from each of the following categories of customers within the city: (1) residential customers; (2) multifamily residential customers; and (3) commercial customers.
 - 2. Number of tons of recyclable materials collected from each of the following categories of customers within the city: (1) residential customers; (2) multifamily residential customers; and (3) commercial customers.
 - 3. Total number of customers in the following categories within the city: (1) residential customers; (2) multifamily residential customers; and (3) commercial customers.
- B. All reports required by this Section 7.16.120 shall be made on forms to be provided by the city and shall be made biannually for each full half-year of collection performed by the collector. A half-year shall mean January 1 through June 30 or July 1 through December 31. All such reports shall be submitted to the public works department no later than thirty days following the close of each half-year. (Ord. 5194, 2007)

7.16.130 Disposal of solid waste.

All persons or entities holding licenses pursuant to this chapter and engaged in the business of collection of solid waste shall dispose of all solid waste at the Larimer County Landfill or at any other disposal site which is approved by any state. No solid waste shall be disposed of at any other location either inside or outside of the city. (Ord. 5194, 2007)

7.16.140 Identification of vehicles.

Each vehicle used by a collector for collection services within the city shall bear an identification emblem or sticker issued by the public works department. Such emblem or sticker shall be conspicuously placed in a location specified by the public works department at the time of license issuance. (Ord. 5194, 2007)

7.16.160 Hours and location of collection.

No collector shall operate any vehicle for the purpose of collection of solid waste or recyclable materials within three hundred feet of any district in the city zoned as follows: established low-density residential, developing low-density residential, established high-density residential, developing high-density residential, and developing two-family residential between the hours of seven p.m. and seven a.m. A zoning district map shall be available from the city planning division upon request. (Ord. 5194, 2007)

7.16.180 Enforcement and suspension of license.

- A. A violation of the requirements of this chapter shall be punishable as provided by Chapter 1.12 of the Loveland Municipal Code.
- B. The city manager may, after notice and hearing, suspend or revoke the license of any person violating any provision of this chapter. The public works department shall establish procedural rules for the conduct of any such hearing. (Ord. 5194, 2007)

7.16.200 Unlawful acts.

It shall be unlawful for any person other than the customer or the collector of recyclable materials to remove or tamper with any solid waste or recyclable materials placed in containers for collection. (Ord. 5194, 2007)

7.16.220 Fees and charges – Assessment.

Each residential customer and multifamily customer of the city receiving utility services shall be assessed fees established by resolution of the city council for solid waste management services and mosquito control service. (Ord. 5194, 2007)

7.16.230 Exemption.

The following residential customers and multifamily customers shall be exempt from payment of the solid waste management services fee set forth in Section 7.16.220, and shall not be eligible for collection and/or disposal of solid waste and recyclable materials by the city:

- A. Multifamily customers who have provided for alternative means of solid waste collection and disposal, and have notified the city thereof; and
- B. Any customer whose premises is unoccupied, who has applied to the city manager for, and has obtained approval of, an exemption prior to the period for which the exemption is sought, and who has paid the service charge established by city council for costs incurred by the city in processing the exemption. Such application shall be on forms furnished by the city and shall be approved upon a showing satisfactory to the city manager that no solid waste collection and disposal service, whether the city's or any other, will be used during such period. It shall be the duty of such customer to notify the city prior to commencing use of a solid waste collection and disposal service. (Ord. 5194, 2007)

7.16.240 Unlawful use of system.

It is unlawful for any person to commit any of the following acts:

- A. Use the city's solid waste management services in any manner during the period for which an exemption has been granted pursuant to Section 7.16.230 or during a period for which or a purpose for which any fee applicable to the service has not been paid;
- B. Use the city's solid waste collection and disposal service for the disposal of solid waste generated at any premises outside the city limits of the City of Loveland; or
- C. Use the city's solid waste collection and disposal service for the disposal of any solid waste or recyclable materials generated by any commercial activity within a home business unless the applicable fee has been paid to the city for such collection and/or disposal. (Ord. 5194, 2007)

7.16.250 City charges and collections.

- A. The costs and any charges assessed by the city pursuant to this chapter associated with collection and removal of solid waste shall be paid by the customer within thirty days after mailing of the bill or assessment of such cost by the city to the customer. The city shall have the right to proceed for the collection of any unpaid charges for solid waste management and collection services in the manner provided by law for collection of debts and claims on behalf of the city, including, without limitation, collection and lien procedures provided in this section.
- B. If the customer fails to pay the charges associated with the collection and removal of solid waste within the described thirty-day period, a notice of the assessment shall be mailed via certified mail by the city to the owner of the property, notifying the owner that failure to pay the assessed amount within ten days of the date of the letter shall cause the assessment to become a lien against the property.

- C. Failure to pay the amount assessed for solid waste management or collection services as described in this section shall cause such assessment to become a lien against such lot, block, or parcel of land associated with and benefiting from said services, and shall have priority over all liens, except general taxes and prior assessments, and the same may be effected at any time after such failure to so pay by recordation with county land records of a certification by the city director of finance setting forth the costs to be charged against the property, the date(s) of service, and a description(s) of services giving rise to such charge(s).
- D. Failure to pay the amount assessed for solid waste management or collection services as described in this section shall cause such assessment to become a lien against such lot, block, or parcel of land associated with and benefiting from said services, and shall have priority over all liens, except general taxes and prior special assessments, and the same may be certified at any time after such failure to so pay, by the director of finance to the county treasurer to be placed upon the tax list for the current year, to be collected in the same manner as other taxes are collected, with a ten-percent penalty to defray the cost of collection, as provided by the laws of the state. This lien and collection procedure is supplementary and additional to any collection procedures described elsewhere within this section or this code. (Ord. 5194, 2007)

7.16.260 Nonuse of service.

Except when an exemption has been granted pursuant to Section 7.16.230, the assessment charged against each person or persons to whom the solid waste management services are made available as set forth in Section 7.16.220 shall be paid regardless of whether or not such person or persons assessed actually use the solid waste management services so made available. (Ord. 5194, 2007)

7.16.270 Rules and regulations – Authority.

The city manager shall have the authority to establish and enforce such rules and regulations concerning the collection, removal, or disposal of solid waste and recyclable materials by the city providing that the same are not contrary or inconsistent with the provisions of this chapter. (Ord. 5194, 2007)

ARTICLE IV. - COMMERCIAL WASTE HAULERS

DIVISION 1. - GENERALLY

Secs. 14-121—14-135. - Reserved.

DIVISION 2. - LICENSE

Sec. 14-136. - Required.

No commercial waste hauler may operate within the unincorporated area of the county without first having obtained a waste hauler annual operating license for such activity.

(Ord. No. 1991-1, § 1(a), 7-8-1991)

Sec. 14-137. - Exceptions.

The following persons or entities are not required to obtain a waste hauler annual operating license:

- (1) A civic, community, benevolent or charitable nonprofit organization that collects, transports and markets materials for resource recovery solely for the purpose of raising funds for a civic, benevolent or charitable activity;
- (2) A person who transports waste or recyclable materials produced by such person;
- (3) A property owner or agent thereof who transports waste or recyclable materials left by a tenant upon such owner's property, so long as such property owner does not provide waste collection service for compensation for tenants on a regular or continuing basis;
- (4) A demolition or construction contractor or landscaper who produces and transports waste in the course of such occupation, where the waste produced is merely incidental to the particular demolition or construction work being performed by such person.

(Ord. No. 1991-1, § 1(b), 7-8-1991)

Sec. 14-138. - Submission of application and fee; term.

- (a) Annual operating licenses shall be issued by the county natural resources director on behalf of the county to commercial waste haulers who meet the minimum requirements for such operations established pursuant to this article by the county natural resources director. Commercial waste haulers who wish to obtain a license shall be required to submit a completed application along with an annual license fee in the amount set out in the appendix to this Code per company to the county natural resources department.
- (b) All licenses issued under this article shall run from the date of issue until January 31 of the year following the date of issuance.

(Ord. No. 1991-1, § 2, 7-8-1991)

Sec. 14-139. - Identification of vehicles.

Each vehicle used in a commercial waste hauling enterprise licensed under this article, shall bear an identification issued by the natural resources director in a conspicuous place upon the vehicle, clearly visible to the landfill gate attendants from their normal work location, which identification shall be issued by the natural resources director at the time the license is granted.

(Ord. No. 1991-1, § 3, 7-8-1991)

Sec. 14-140. - Regulations and standards.

The county natural resource director shall establish minimum regulations and standards for the licensing of commercial waste haulers who wish to operate within the unincorporated area of the county.

- (1) The designation of weight or volume based fee structures designed to provide economic incentive for resource recovery and waste minimization.
- (2) All commercial waste haulers licensed by the county shall make available to their customers within the Fort Collins and Loveland Urban Growth Areas, at the customer's option, curbside collection of recyclable materials, as such materials are designated annually by the director of natural resources. Within the Loveland Urban Growth Area, the director of natural resources shall designate minimum materials to be recycled as those materials collected by the City of Loveland curbside collection program, unless otherwise directed by the board of county commissioners. Within the Fort Collins Urban Growth Area, the director of natural resources shall designate minimum materials to be recycled as those materials designated for curbside recycling by the city manager of Fort Collins, pursuant to Section 15-414, Ordinance No. 116-1990, City of Fort Collins, unless otherwise directed by the board of county commissioners.
- (3) Nothing in this article or in the regulations and standards established hereunder shall be construed as allowing the county to regulate, interfere with, designate, manipulate, or in any way set the rates charged by commercial waste haulers licensed by the county. The amount charged by licensed commercial waste haulers, on a volume or weight basis, shall be at the sole discretion of each individual trash hauler, provided such charges provide a reasonable economic incentive to their customers for waste reduction and accurately reflect the actual amounts of waste generated by such customers.

(Ord. No. 1991-1, § 4, 7-8-1991)

Sec. 14-141. - Procedures for findings and determinations.

Any finding or determination made by the natural resources director pursuant to the provisions of this article shall be made subject to the following procedures:

- (1) The natural resources director shall initially publish all such proposed findings or determinations as written proposed findings or determinations. Publication, for the purpose of this provision, shall mean mailing of such proposed findings or determinations to all county licensed commercial waste haulers and the publication in a newspaper of general circulation in the county of a public notice describing in summary fashion such proposed written findings or determinations. Such mailing or public notice shall indicate that a copy of the proposed findings or determinations may be obtained in the natural resources director's office, and state that interested parties shall have 15 days from the date of publication in which to submit written comments to the board of county commissioners.
- (2) Upon the expiration of 15 days following the publication of the notice of the proposed findings or determinations, the natural resources director may adopt final findings or determinations, either in the form as originally proposed, or as modified in the discretion of the board of county commissioners. Such final findings or determinations shall be mailed to all county licensed commercial waste haulers and to any interested party who submitted timely written comments upon the proposed findings or determinations. All such findings and determinations shall include a brief statement of the right of interested parties to appeal.
- (3) Any interested party who submitted timely written comments, upon the proposed findings or determination and any county licensed commercial waste hauler may appeal any final finding or determination of the county natural resources director by submitting a written request for appeal

addressed to the county natural resources director and board of county commissioners within ten days of the mailing of the final finding or determination. All appeals shall be heard by the board of county commissioners at a regular or special public meeting. The board of county commissioners shall schedule an appeal hearing to be held within 30 days of receipt by the board of the written appeal request. The review by the board of county commissioners shall be de novo. All parties to the appeal may be represented by counsel. At the conclusion of such hearing, the board of county commissioners may adopt, reject or adopt with amendment the finding or determination of the natural resources director. The board of county commissioners in its discretion may take the matter under advisement and issue a written decision within a reasonable time, provided that the vote of the board shall be taken in public session. In all events, the written decision of the board of county commissioners shall be final.

(Ord. No. 1991-1, § 5, 7-8-1991)

Sec. 14-142. - Penalties.

It shall be a misdemeanor for any person to engage in any commercial waste hauling within the unincorporated area of the county without first having obtained a license for such operation. Each separate commercial pickup of waste at any site or deposit of waste at the county landfill, without a license therefor as required in this article, shall constitute a separate violation which shall be punishable by a fine of \$300.00 or 90 days in the county jail, or both.

(Ord. No. 1991-1, § 6, 7-8-1991)

Sec. 14-143. - Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, unless the context clearly indicates a different meaning:

Commercial waste hauling means the provision of a service of collecting, transporting or disposing of waste for another for a fee, by a private entity, on a regular or periodic basis, but shall not be construed to include the hauling, transporting, collecting or disposing of trash or waste by a construction contractor, which activity is directly associated with construction or excavation activities.

Waste means include all discarded matter from the preparation of food, all condemned food products, and all refuse and discarded matter from the handling, storage, preparation and sale of produce, and all substances which are discarded from dwellings, roominghouses, hotels, clubs, restaurants, boardinghouses, eating places, shops, stores or other places of business, recreation, or residence. Septage, sewage, materials collected for reuse or recycling, and/or byproducts of waste water and/or water treatment facilities shall not be defined as waste for the purposes of this article.

(Ord. No. 1991-1, § 7, 7-8-1991)

Cross reference— Definitions generally, § 1-2.

Secs. 14-144—14-170. - Reserved.

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Memo F

Disposal Site Options – Advantages and Disadvantages
(with attachments)

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Memo

Date:	Tuesday, September 18, 2018
Project:	North Front Range Regional Wasteshed Planning Study – Phase 2
To:	North Front Range Regional Wasteshed Planning Coalition TAC
From:	Doug DeCesare and Wendy Mifflin, HDR, Inc.
Subject:	Disposal Site Options – Advantages and Disadvantages

1. Introduction

The North Front Range Regional Wasteshed Planning Coalition Technical Advisory Committee (TAC) has been working cooperatively to identify a road map for the continued efficient, economical and environmentally responsible handling of waste generated in the Wasteshed. As part of this effort, a Solid Waste Infrastructure Master Plan is being developed that refines potential infrastructure options based on established goals and objectives, population and waste projections, resource needs, capital and operational costs and sustainable return on investment analyses.

Initially, the TAC considered the option of a New County Landfill as part of the analysis of infrastructure options available to the Wasteshed. With input from the Policy Advisory Committee resulting from an unsolicited alternative disposal option, an additional option under consideration by the TAC is an alternative disposal site in lieu of a publicly owned and operated landfill. Both options include the transfer of waste from the Central Transfer Station (recommended infrastructure option) to either a publicly owned and operated landfill or a potential privately owned and operated landfill upon the closure of the Larimer County Landfill, which is expected to reach capacity in 2025.

The purpose of this memorandum is to provide the TAC a comparison of the potential advantages and disadvantages for transferring waste to an alternative disposal site as opposed to a publicly owned and operated disposal site for further consideration.

2. Advantages and Disadvantages of a Publicly Owned and Operated Disposal Site

In 2006, recognizing the capacity limitations of the current Larimer County Landfill site, the County purchased 640 acres at the intersection of County Road 76 East and County Road 11 North near the town of Wellington. The potential landfill site has few neighbors, a low water table and county roads with good access. Advantages and disadvantages to a publicly owned and operated disposal site are presented in Table 1.

Table 1 – Publicly Owned/Operated Disposal Site Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> Provides the Wasteshed with the most control and stability for waste disposal. Supports Wasteshed goals and objectives including evolving technologies for future infrastructure options or resource recovery opportunities. Increased service quality and flexibility to the stakeholders and general public due to local control. Tip fees are set and maintained by local government allowing for changes when needed. Control over transfer haul timing (e.g. turnaround time, queuing, and inclement weather). Direct control towards environmental goals such as landfill gas control. Allows the Wasteshed to provide special community events. Facility inspection and performance levels are maintained at the local level. Easier to change to private disposal, if beneficial, over a reduced timeframe. Keeps disposal rates competitive by having multiple local disposal options. Potential early mitigation of existing Larimer County Landfill by providing disposal in a lined facility. 	<ul style="list-style-type: none"> Volume of waste could decrease if competition offered lower prices; fixed overhead costs to operate could result in an increase in public landfill tipping fee. Capital costs for construction of a new landfill facility, equipment and ancillary features reduces capital for other facilities such as a transfer station or C&D processing facility. Requires management of closure/post-closure financial assurance. Long-term environmental liability is the responsibility of local government. Public agency operations requires a political process in order to respond to potential financial impacts from regulatory changes, reduced tonnages or system shutdowns. Requires permitting, inspections and an engineered landfill design process that requires pre-planning and scheduling. Shut downs due to wind at the landfill site requires waste to be held at an off-site facility such as a transfer station (which would need to be sized to handle these occurrences). No competition for services due to a single option for disposal. Increased traffic to a new landfill site. Potential impacts to property value, road serviceability, and community growth in area of landfill. No current guarantees that existing property is suitable for landfill use.

3. Advantages and Disadvantages of an Alternative Privately Owned and Operated Disposal Site

Utilizing an alternative disposal site would mean the County would contract with a private landfill to receive the waste from the Central Transfer Station. It would replace the publicly owned and operated landfill.

An alternative disposal site through a privately owned and operated landfill can be a complex issue recognizing that each governmental entity may require different levels of service and intangible factors such as political and social aspects and local goals and objectives which may have an impact on an evaluation similar to cost. Advantages and disadvantages to an alternative disposal site are summarized in Table 2.

Table 2 - Alternative (Privately Owned/Operated) Disposal Site Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • No capital costs for construction of a new landfill facility including equipment and ancillary features. • Private landfills already exist expediting timeline for disposal. • No Larimer County operational and maintenance costs associated with a landfill facility. • No Larimer County closure/post closure financial assurance required. • Potential cost savings measure as tip fees can be negotiated and reduced. • Choice of providers through competition. • Larimer County Long-term environmental liability is partially mitigated due to multiple facility users. • Private sector can have the depth of expertise and resources of a national or multi-national company. • Response time to changes in technology may be less in the private sector. • Government's fiduciary responsibility to protect public health, safety and the environment can be monitored through contract negotiations and agreement enforcement. • Existing assets (i.e., equipment and property) may be sold (generating additional revenue) or repurposed. • Mitigates landfill closings due to wind based on specific permit requirements, operation preferences, and location related to wind patterns. • Does not require permitting, inspections, and engineering design. 	<ul style="list-style-type: none"> • Loss of control and stability for waste disposal and diversion opportunities. • Contract would likely require that all waste not captured by Tier 1 recommended facilities be directed to the private landfill or the County would be subject to penalties (e.g. put or pay contract). This would preclude the creation of future resource recovery options. • Loss of flexibility and accountability. • Volume or type of waste increases or decreases over time impacting pricing. • Contract disputes if contract terms are not clear and concise. • Changes in regulatory requirements trigger increased fees for disposal. • Disposal site does not operate as designed and permitted resulting in shutdowns and safety hazards that cause the use of further alternative disposal sites resulting in higher transfer costs. • Potential cost savings/discounts may result in increase fees for other users outside the wasteshed. • Lengthy time requirement necessary if decide to develop publicly owned landfill after commitment to private disposal. • Potential bankruptcy or change in ownership could impact disposal location. • No control over transfer haul timing (e.g. turnaround time, queuing, and inclement weather). • Potential need to add staff for monitoring/inspecting/permitting/auditing the private landfill. • Future landfill may not be in desired location. • Landfill design/operation likely to maximize potential profit for operator which may conflict with Wasteshed social and environmental goals such as buffers, landfill height and visual impact.

4. Conclusion

Various advantages and disadvantages (risks) exist with the disposal of waste at either a publicly owned facility or an alternative disposal site for the Wasteshed. A risk impact assessment process should be developed that assesses and prioritizes these risks based on a ranking system.






Additionally, a Sustainable Return on Investment (SROI) analysis should be initiated to make the risk assessment more robust by providing visibility into intangible internal costs and benefits, and externalities - social, economic, and environmental effects that are typically not considered in traditional cash-oriented project planning.

This strategy would assist the TAC in determining which risks would need to be managed or mitigated according to which infrastructure option is selected for implementation.

North Front Range Regional Wasteshed Coalition - Landfill Risk Assessment Matrix

Risk Identification			Qualitative Analysis				
Scenario	Risk Event (threat/opportunity)	SMART Column	Probability	Impact	Risk Matrix	Strategy	Action to be Taken
Type of Landfill Ownership	Risk is an uncertain event or condition that, if it occurs, has a positive (opportunity) or negative (threat). For example; Private Landfill Bankruptcy.	Detailed description of the risk. Includes information on the risk that is Specific, Measureable, Attributable, Relevant and Timebound .	Assessment of the likelihood of occurrence. Valid entries are Low or High.	The severity of the risk's effect on Wasteshed goals/objectives. Low or High.	High: Substantial impact on cost, schedule, or technical. Substantial action required to alleviate issue. Low: Minimal impact on cost, schedule, or technical.	Avoid, Transfer, Mitigate, Acceptance	Develop options and determine actions to be taken in response to the risk event. Immediate action may be required at the time of identification.
Publicly Owned Landfill							
Publicly Owned Landfill	Competition lowers tipping fees thus reducing tonnages to publicly owned landfill.	Causes increase in tipping fee to users of publicly owned landfill.	High	High	Probability H L L H Impact	Mitigate	Monitor markets and keep tipping fees competitive.
Publicly Owned Landfill	Capital cost for construction of a landfill facility exceeds budget.	Causes increase in tipping fee to users of publicly owned landfill.	Low	Low	Probability H L L H Impact	Avoid	Develop and construct the landfill facility within budget.
Publicly Owned Landfill	Proper management of closure/post closure funds as required by Colorado State Law.	Larimer County assumes responsibility for proper management of funds. If funds are not set aside, closure/post closure costs could revert to liable parties.	Low	Low	Probability H L L H Impact	Avoid	Ensure closure/post closure funds are set aside and evaluated on a yearly basis.
Publicly Owned Landfill	Long-term environmental liability rests with local government.	Environmental liability such as groundwater contamination/30-year post closure monitoring are responsibility of public landfill.	Low	Low	Probability H L L H Impact	Mitigate	Ensure proper design and construction of the site. Recognize post-closure responsibility and provide adequate funding.
Publicly Owned Landfill	Political process can slow response time to financial impacts from regulatory changes, reduced tonnages or system shutdowns.	Slow reaction times to change at local government level cause reduced revenues and lack of response to issues.	Low	Low	Probability H L L H Impact	Accept	Provide local level measures to speed response time through policies and procedures. Allow time for response.
Publicly Owned Landfill	Permitting, inspections and an engineered landfill design process requires pre-planning and scheduling. Site not suitable for landfilling.	Lengthy process causes landfill construction to be delayed and no disposal option is available at time of Larimer County landfill closure. Existing site is not suitable for landfilling and thus requires time for another option.	Low	High	Probability H L L H Impact	Mitigate	Begin permitting process as soon as possible and keep process on track.

Publicly Owned Landfill	Wind events at landfill site cause disruptions to service provided.	Possibility for high wind events at new landfill site cause waste stockpiles and site closure.	High	Low	Probability  Impact	Mitigate	Develop options for waste disposal during wind events including design modification, operational procedures, wind fencing, barriers and stockpile capacity at transfer station.
Publicly Owned Landfill	Traffic impacts due to commercial trucks to the landfill.	Commercial trucks traveling to the landfill impact roads and traffic volumes to and from the site.	High	Low	Probability  Impact	Mitigate	Review road configurations and access points. Create an approved haul route with trucks required to stay on it.
Publicly Owned Landfill	Potential impacts to property value, road serviceability and community growth near landfill.	Property values are decreased and community growth is stunted due to location of landfill.	Low	Low	Probability  Impact	Accept	The proposed landfill site is in a sparsely populated area. Create a buffer zone around it to control growth and development.
Privately Owned Landfill							
Privately Owned Landfill	Loss of control and stability for waste disposal and diversion opportunities. Potential put or pay concepts.	Control and stability for disposal are based on waste acceptance policy at the private landfill and contracted volumes.	High	High	Probability  Impact	Mitigate	Negotiate contract language regarding waste that is accepted at the private landfill.
Privately Owned Landfill	Landfill ceases operations or is unable to accept waste and waste is required to be re-routed to landfill with a greater haul distance.	Cost for waste disposal is increased due to the greater haul distance.	Low	High	Probability  Impact	Mitigate	Establish contract language that requires private landfill to cover the costs for rerouted waste if landfill ceases operations or is unable to accept waste.
Privately Owned Landfill	Impacts to Wasteshed goals and objectives through loss of direct control. Discourages resource recovery opportunities.	Wasteshed established goals and objectives may not align with private landfill.	Low	High	Probability  Impact	Avoid	Ensure that the Wasteshed goals and objectives are included in the contract and private landfill recognizes them.
Privately Owned Landfill	Reduced flexibility and accountability.	The Wasteshed has less flexibility for disposal and diversion options resulting in potential reduced service quality and accountability.	Low	High	Probability  Impact	Accept	The Wasteshed will not be able to mitigate flexibility if the private landfill option is chosen.
Privately Owned Landfill	Volumes of waste increase or decrease over time impacting pricing.	Prices increase due to changes in waste. Increases are passed on to resident.	High	High	Probability  Impact	Accept	Establish contract language that protects prices over a long term.
Privately Owned Landfill	Contractual disputes if contract terms not clear and concise.	Contract disputes cause disruption to service, increased fees, and legal costs.	Low	High	Probability  Impact	Avoid	Ensure contract terms are clear and concise through legal counsel prior to signing agreement.

Privately Owned Landfill	Additional staffing necessary to monitor and enforce contractual requirement.	Additional staff maintained over the life of the contract for monitoring is an added cost for disposal.	High	Low	Probability H L  Impact	Accept	Additional staffing will be required to monitor the contract.
Privately Owned Landfill	Private landfill design/operations maximize profits but conflict with Wasteshed environmental goals and objectives.	Wasteshed goals and objectives are not maximized causing conflicts.	High	High	Probability H L  Impact	Avoid	Avoid private landfills that do not meet Wasteshed goals and objectives.
Privately Owned Landfill	Changes in regulatory requirements trigger increased fees for disposal.	Colorado landfill regulations are updated and disposal fees are increased to cover implementation.	Low	High	Probability H L  Impact	Accept	Wasteshed partners can comment on rules and regulations prior to State of Colorado adopting them.
Privately Owned Landfill	Loss of control over transfer haul time.	Haul times to the landfill are increased due to inability to offload waste, costs are significantly increased resulting in increased fees to the public.	Low	High	Probability H L  Impact	Mitigate	Establish contract language that places penalties on the private landfill if offload of waste times are not met.
Privately Owned Landfill	Lengthy time requirement necessary to permit a publicly owned landfill once commitment made to dispose of waste at private facility.	Permitting a publicly owned landfill is lengthy.	Low	Low	Probability H L  Impact	Accept	Once decision is made to dispose of waste at private landfill, permitting a publicly owned landfill would be difficult, costly and time consuming.

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