Convenience Center Design Considerations and Market Research

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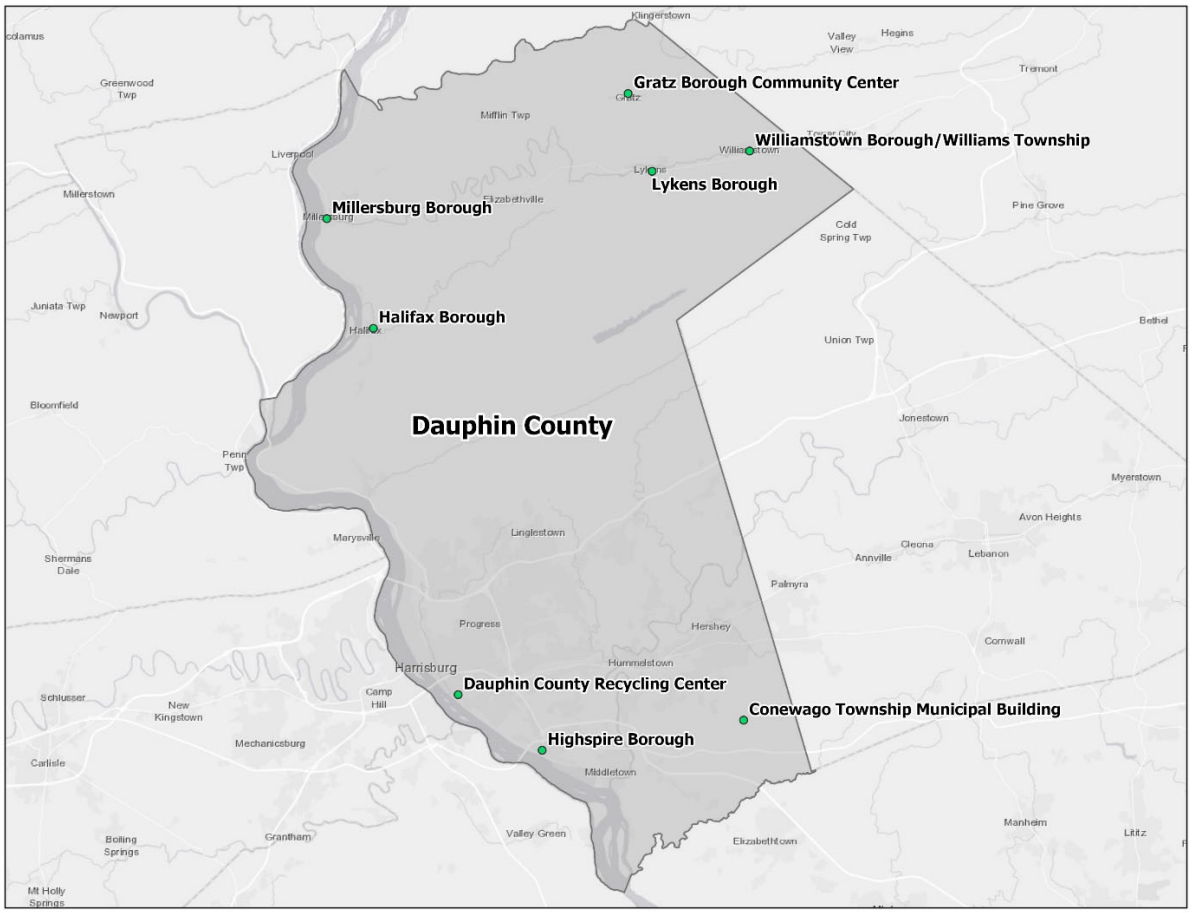
1 BACKGROUND

The Dauphin County Solid Waste Management and Recycling Department provides for the management of solid waste to protect the public health and environment. Many municipalities within Dauphin County are Act 101 Municipal Waste Planning, Recycling, and Waste Reduction mandated recycling communities and have established a recycling ordinance. Other communities in the County are not mandated to recycle and do not have municipal-supported recycling programs.

The County has established a network of eight (8) recycling drop-off locations throughout the County to enhance recycling infrastructure and opportunities. The drop-off program provides opportunities for residents to recycle who do not have access to recycling services through their municipality. The drop-off program is also designed to accommodate the additional recycling needs of residents that have curbside recycling services. **Exhibit 1** includes a map of Dauphin County and the location of the drop-off recycling sites that include the following:

Dauphin County Recycling Center
Conewago Township Municipal Building
Gratz Borough Community Center
Halifax Borough
Highspire Borough
Lykens Borough
Millersburg Borough
Williamstown Borough/Williams Township

Exhibit 1. Locations of Drop-Off Recycling Facilities



Materials accepted for recycling at the drop-off locations include corrugated cardboard, newspaper, magazines, aluminum, and bimetal cans, and #1, #2, and #5 plastic containers. Drop-off sites are open seven days a week to serve residents. The County has established contracts with vendors for the processing and marketing of the materials collected through their program. As shown in **Table 1**, paper, corrugated cardboard, and metal are transported from the drop-off locations to local processing vendors, while plastic containers must be must be hauled to a recycling facility outside the County. Recyclable materials are direct-hauled to processing facilities from the drop-off sites. **Appendix A** includes the requirements for recycling as established in the Pennsylvania Municipal Waste Planning, Recycling, and Waste Reduction Act of 1988.

Table 1. County's Recyclable Material Contractors

Vendor/Location	Materials	Distance (round-trip miles)
Federal Recycling Harrisburg	Paper/corrugated cardboard	Local
Consolidated Scrap Resources Harrisburg	Metal	Local
Cougles Recycling Hamburg	Plastic containers	60

The County also provides recycling services at the Dauphin County Recycling Center located in Harrisburg for non-traditional materials such as electronics, appliances, expanded polystyrene, and mercury containing items. Residents are afforded the convenient service of driving up to the facility and having materials unloaded from their vehicle by County staff. The County has contracts with vendors to process and market the materials collected through this program. These materials and the vendors the County utilizes are as follows:

- **Appliances (non-refrigerant)**: No contract; managed by County via roll-off container; serviced by Consolidated Scrap Resources (Harrisburg)
- **Appliances (refrigerant)**: No contract; contracted vendor is Mendenhall's Refrigerant Recovery for recycling certification; County pays vendor $15 per unit
- **Electronics**: Contract with Kuusakoski Recycling in Illinois; no charge and receive a small monthly rebate
- **Expanded Polystyrene:** No contract; collection service provided weekly by DART Corporation for about 20 years at no cost.
- **Glass Jars/Bottles**: No contract; partnership with the City of Harrisburg which services the collection containers at County's recycling center

The County requested recycling technical assistance to review the design/layout of the Dauphin County Recycling Center to identify opportunities for improving operations and safety. Additionally, the County requested technical assistance to research and identify local/regional markets for materials collected through the drop-off recycling program. **Exhibit 2** includes pictures of select Dauphin County drop-off recycling facilities.

Exhibit 2. Dauphin County Drop-Off Recycling Facilities

Resident dropping off electronics at the Dauphin County Recycling Center

Resident using recycling containers at the Dauphin County Recycling Center

Residential recycling drop-off located at Highspire Borough

Residential recycling drop-off located at Halifax Township

2 SUMMARY OF WORK

This section summarizes the tasks completed for this project.

Task 1 – Site Visit and Program Observations

The site visit and program observations occurred over a one-day period and included meeting with County staff, touring the Dauphin County Recycling Center on S. Cameron Street, and visiting multiple recycling drop-off locations throughout the County. Program observations allowed SCS staff to understand the operational and safety concerns with traffic at the Dauphin County Recycling Center and inspect collected materials for purity.

Task 2 – Identify Operational and Safety Improvements

The site visit and program observations conducted as part of Task 1 formed the basis of the activities for this task. The SCS team used their expertise and experience designing recycling convenience sites to provide suggestions on signage, lane markings, and traffic flow patterns to facilitate a more efficient and safer site for residents and County staff. The SCS team prepared two updated convenience center designs for the County's consideration.

Task 3 – Material Market Research

County staff report challenging market conditions and limited partners for marketing and processing materials collected through the drop-off recycling program. For this task, SCS staff identified and researched potential markets the County might explore further to improve recycling opportunities through the program.

Task 4 – Final Report

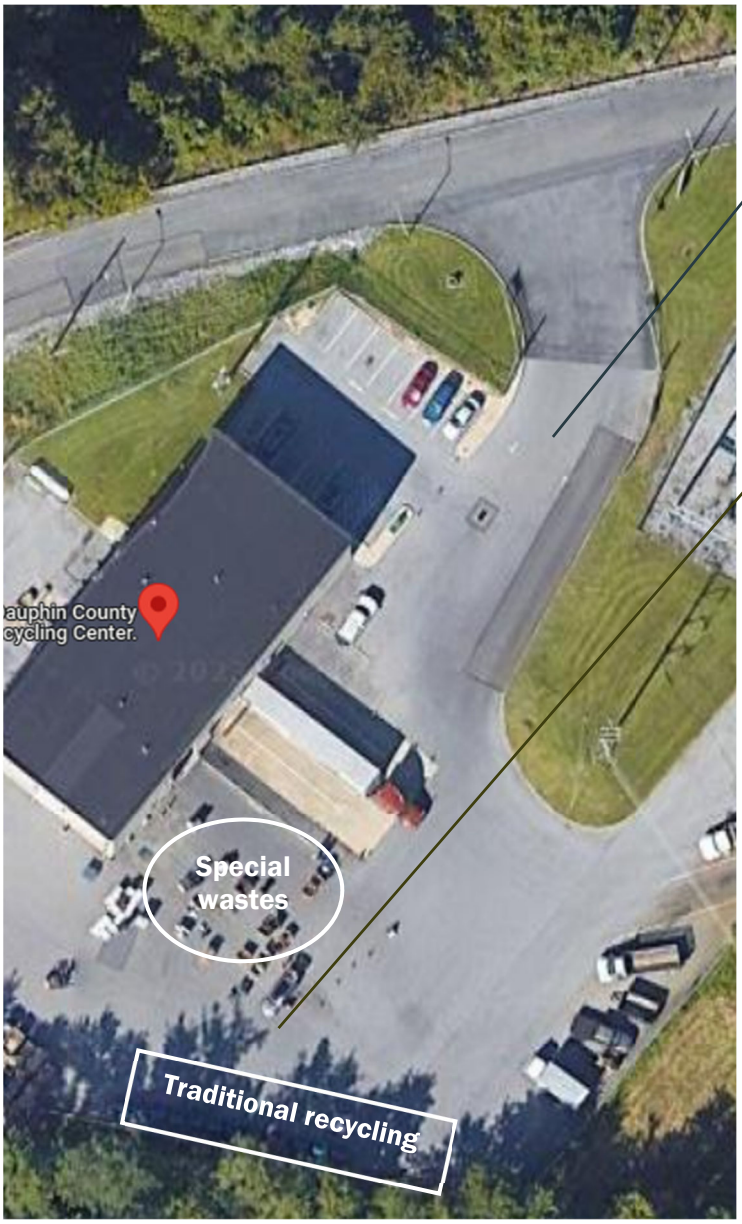
This report includes the research, findings, and results of this study.

3 OPERATIONAL AND DESIGN CONSIDERATIONS

SCS conducted a site visit to the Dauphin County Recycling Center in the Fall 2023. County staff reported that traffic flow is the primary issue experienced at the site. The two major concerns regarding traffic flow and safety are as follows:

1) Initial confusion by customers entering the site on where to go.
2) Conflicts in traffic flow when customers have finished offloading materials.

These issues are visually depicted below.



Customers unsure of where to go when entering the facility

Safety conflicts between customers visiting the traditional recycling area (12 four-cubic-yard dumpsters) and customers dropping off special wastes

SCS staff noted that the collection method of special wastes appears to be labor-intensive, and susceptible to weather-related disruption due to container exposure, as County staff and contracted prison laborers load cardboard boxes that are brought in and out of the recycling center daily.

POTENTIAL SITE IMPROVEMENTS

Using our experience with convenience center design and traffic design best practices, SCS developed two potential future layouts to the Recycling Center to address the traffic flow concerns cited by County staff as follows:

- **Phase 1 –** Designed as a quick and low-cost solution to improve traffic direction and flow at the site.
- **Phase 2 –** A potential redesign of the facility that utilizes separate entrances and exits and creates a complete counter-clockwise traffic flow pattern. The Phase 2 design requires coordination and approval with the Lancaster County Solid Waste Management Authority for usage of a portion of their property.

Design Principles

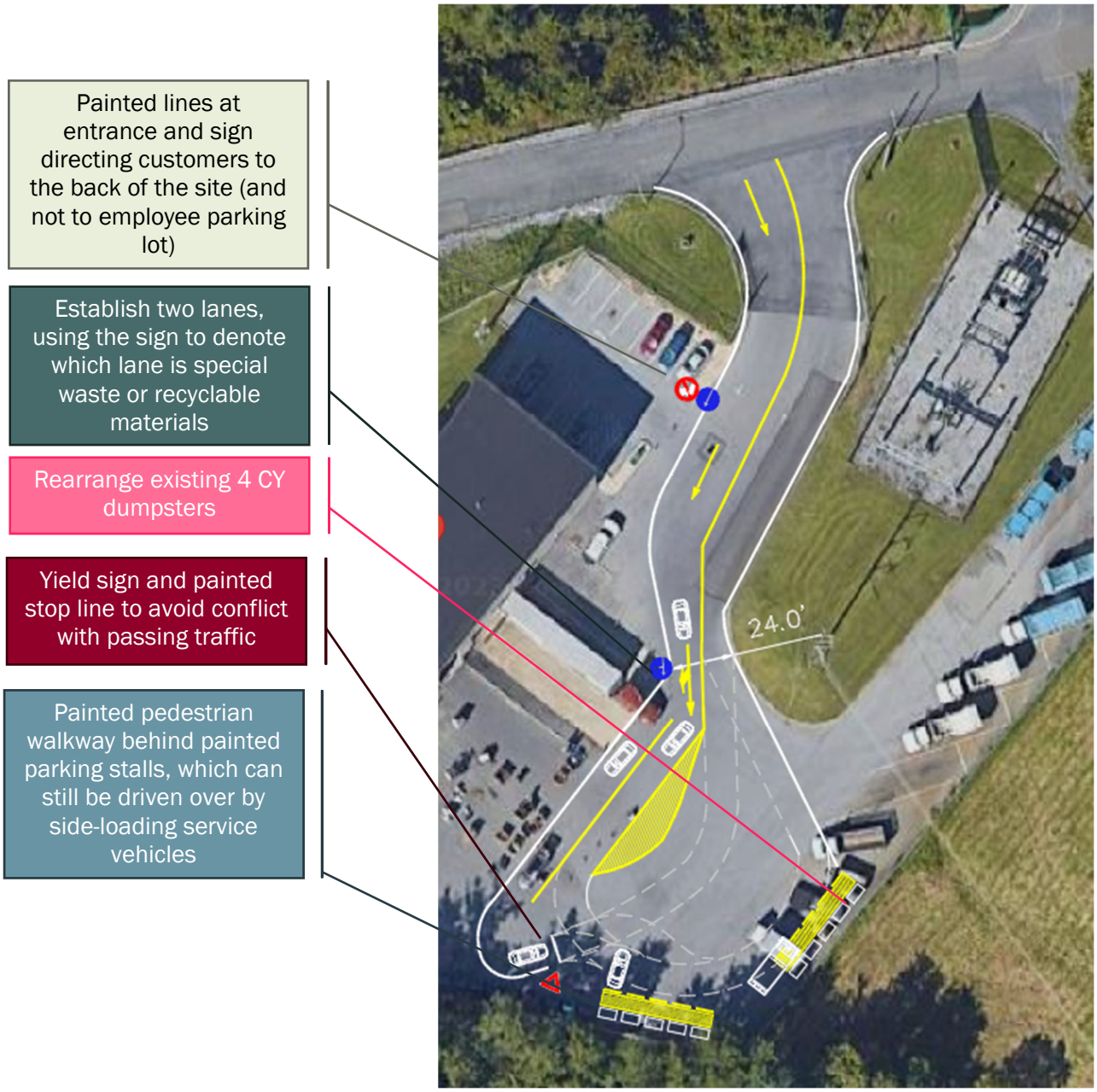
The following guiding principles were used in both Phase 1 and Phase 2 conceptual layouts:

- Ample signage and pavement markings –redundancy of both signage and pavement markings gives customers multiple opportunities to receive the intended communication
- Painted parking spots – functioning similar to a sign to guide vehicles to a safe stopping spot to unload materials
- Side access needed for service vehicles to collect from four (4) cubic yard containers
- One-way, counter-clockwise traffic flow – decreased likelihood of collision if all vehicles are ultimately driving the same direction in a circular pattern and intuitive to drive based on driving on right-side of roadways
- Pedestrian areas – designated spaces are needed for customers to walk between containers depositing multiple recyclable material types
- 12-foot minimum lane sizing – PennDOT Road Design Manual Table 1.3 recommends 10-12 feet for most road applications
- 55-foot turning radius for service vehicles
- Number of containers – planning for 10 four-cubic-yard dumpsters in anticipation of consolidation and space savings

Appendix B includes a document that details example solid waste/recycling convenience center design principles that are often considered best practices when developing and/or modifying convenience centers that are open to the public.

Phase 1

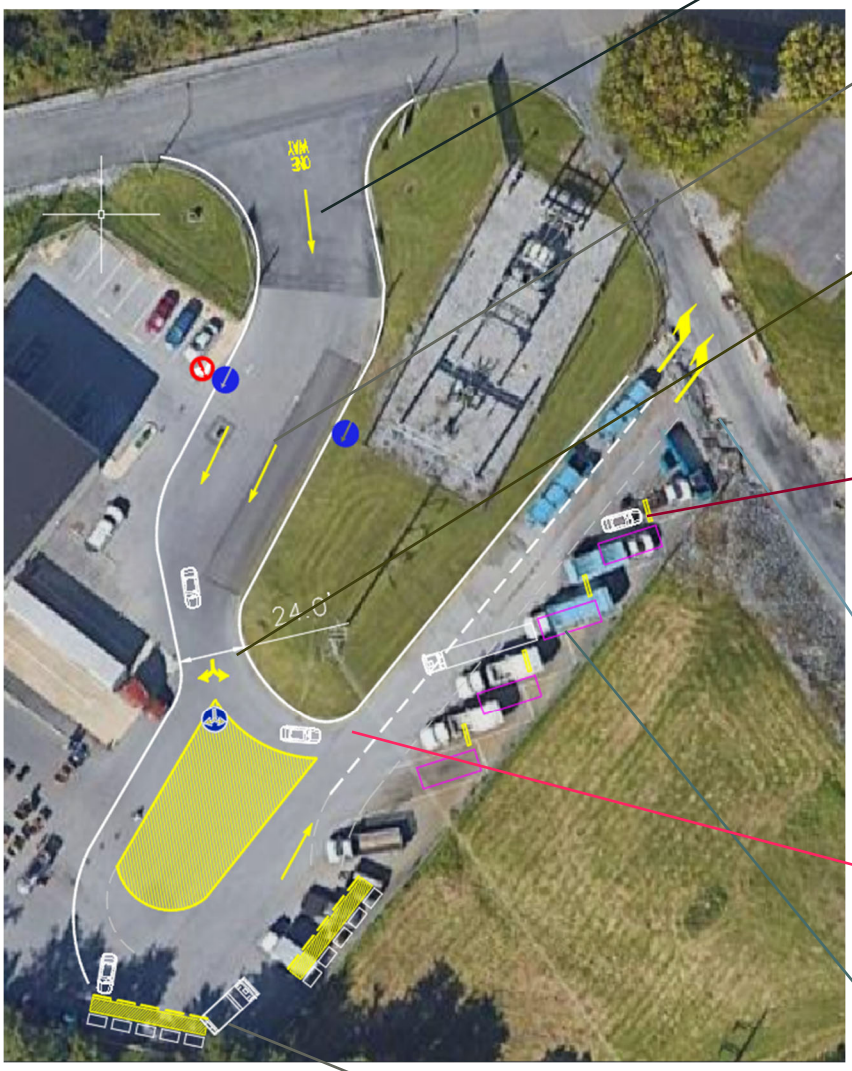
The first alternative layout, Phase 1, is intended to be a low-cost option with limited changes to the current functionality of the Dauphin County Recycling Center. While there are no proposed changes to the special waste handling area, pavement striping (yellow and white) in place of the cones is proposed to create two lanes and establish counterclockwise flow. This layout assumes that the trucks currently parked in the southeastern corner of the paved area can be relocated. Notable design features include:



Phase 2

SCS developed the Phase 2 conceptual design that the County may wish to consider for longer-range planning. This phase provides more space allocated for larger containers and other, more robust changes. However, it does involve some more costly capital investments. It would also require Dauphin County to establish an agreement with the Lancaster County Solid Waste Management

Authority to utilize a portion of their roadway in the resource management complex. Notable design features of Phase 2 include:



Pavement markings for one-way entrance and additional sign

Establish primary lane and bypass lane; direct traffic back to exit road with pavement markings

Establish lane split to new, larger containers vs. existing dumpsters with pavement markings and sign

Curb stops next to each container, room to back out and exit in primary lane

Remove a section of fence and replace with gate, use additional roadway to establish separate entrance/exit

Somewhat tight space for larger service vehicles

Place 20 CY roll-off containers in preexisting parking spaces for recyclable materials collection

Potentially utilize 4 CY dumpsters for special wastes; benefit of built-in weather protection. May need to retrofit the container for heavier materials to avoid lifting hazard to citizens

In order to improve the flow and safety of traffic at the convenience center in the short-term, it is recommended the County consider implementation of the Phase 1 recommendations. These changes are expected to be low-cost and easily completed. The Phase 2 recommendations could be further considered once the County has observed the impact of the Phase 1 recommendations on safety and traffic flow. Phase 2 recommendations are expected to be higher cost with greater impact on site configuration and infrastructure that will take time to put in place.

Please note that the schematics developed for this study are concept-level only. The County should consider conducting a travel path model with specific vehicles and a thorough review of state and local safety/traffic guidelines before implementing these changes.

4 MARKET RESEARCH

In addition to the design considerations for the Dauphin County Recycling Center discussed above, the SCS team researched available recycling markets within 125 miles of Dauphin County. Recycling markets have become particularly challenged in recent years. In 2018, China National Sword cut-off a significant market to recyclable materials generated in the United States, including Pennsylvania. The COVID-19 worldwide pandemic also significantly impacted the recycling industry as well. Many companies did not have the staffing levels needed to maintain existing recycling services. Furthermore, as residents stayed home and generated significant quantities of additional waste and recyclable materials, contamination of recycling increased making materials unmarketable. This forced many recycling companies and processers to refine the mix of materials they accept and aggressively screen incoming materials to avoid loads with too much contamination.

These factors and the changes in the recycling industry impacted local communities throughout the United States, including Dauphin County. County staff report challenges with finding partners to accept recyclable materials collected from the Dauphin County Recycling Center and the seven (7) other recycling convenience centers located throughout the County.

For this project task, the SCS Engineers team conducted internet research to identify available recycling markets in the Harrisburg region. These markets could be further explored to understand the potential for future partnerships to process and manage recyclable materials collected as part of the County's program. SCS divided recycling facilities into two groups:

- Typical Recyclable Material Markets – A "typical" recyclable material market was established based on the types of materials accepted. Companies were identified as "typical" if they accepted more than one type of recyclable material collected by Dauphin County. Most companies listed accept paper materials, metal cans, and plastic containers. Table 2 lists the typical recyclable material vendors identified. Companies shaded in red indicate the County has already established a contract for material processing and marketing.
- Scrap Metal Material Markets - Entities who only accept and recycle metal containers are included in the scrap metal material market table. Table 3 lists the scrap metal recycling vendors identified. The company shaded in light red indicates the County has already established a contract for material processing and marketing.

Prior to expiration of the existing processing and marketing contracts the County has in place for recyclable materials, the County might consider issuing a bid to the companies listed in Table 2 and Table 3 to explore what pricing and contract options are available. SCS notes that collected recyclable materials were observed to be clean with little to no contamination when the site visit and tours were completed (Task 1). The County should request documentation from existing recycling vendors to document the purity of the collected material.

Table 2. Potential Markets for Typical Recyclable Materials

Recycling Facilities					
Distance One-Way (miles)	**County**	**Company/organization name**	**Address**	**Contact information**	**Material(s) accepted**
5	Dauphin	**Federal Recycling & Waste Solutions**	4200 Industrial Rd Harrisburg, PA	Aaron Freedman (717) 236-7971	Aluminum cans, brown bags & sacks, corrugated containers, HDPE, magazines, mixed office paper, newspapers, PET, phone books
20	York	**Penn Waste, Inc**	P.O. Box 3066 York, PA (physical address for MRF: 3625 Mia Brae Dr York, PA)	(717) 767-4456 eward@pennwaste.com	Ferrous and non-ferrous metal, cardboard, glass, plastic bottles, magazines, and newspapers
30	Lebanon	**Reazer's Recycling Inc**	2449 Elia's Ave Lebanon, PA	(717) 273-7474	Ferrous and non-ferrous metals, cardboard, newspapers, glass, and plastic bottles
35	Lancaster	**Reliable Industries, llc**	15 Lititz Run Rd Lititz, PA	(717) 626-2181	Finished and unfinished textiles, corrugated scrap, plastic scrap (film, banding, and rejected parts), mixed office paper, cardboard boxes, chipboard, and drums (steel, fiber, or plastic)
40	Lancaster	**Good's Disposal Service**	4361 Oregon Pike Ephrata, PA	(717) 336-6385 gdinc@ptd.net	Corrugated cardboard, plastic bottles and jugs, metal cans, and glass bottles and jars
45	Juniata	**Cocolamus Creek Disposal Service**	31109 Route 35 North Mcalisterville, PA	(717) 463-2381 ccd@tricountyi.net	Ferrous and non-ferrous metals, plastic bottles, and corrugated cardboard
45	Lancaster	**Zooks Plastic Recovery**	183 S Farmersville Rd Leola, PA	(717) 656-4422	Plastic baler twine, clean white superstacks and feed bags, clear and dry stretch wrap, clear and white greenhouse covers, white bale wrap, clean and dry ag bags (black & white), and sorted greenhouse and nursery trays.
60	Berks	**Cougles Recycling, Inc.**	1000 S Fourth St, Hamburg, PA 19526	(610) 562-8336	Metal cans; paper materials including bags, corrugated containers, magazines, mixed office paper, newspapers: plastic containers
70	Northumberland	**Hand up Foundation Recycling**	275 Mahoing St Milton, PA	(570) 742-3600	Ferrous and non-ferrous metal, textiles, electronics, styrofoam, corrugated cardboard, and car batteries
75	Berks	**Totalrecycle, Inc**	1270 Lincoln Rd Birdsboro, PA	(888) 627-2276	Glass, paper, cardboard and corrugated paper, cartons, metal cans, and plastics
125	Philadelphia	**United States Recycling, Inc**	6101 Tacony St Philadelphia, PA	(215) 338-5050	Corrugated containers, plastic containers, glass, magazines, newspapers, ferrous and non-ferrous metals, and textiles

Table 3. Potential Scrap Metal Markets

Distance One-Way (miles)	County	Company/organization name	Location	Contact information	Material(s) accepted
5	Dauphin	**Consolidated Scrap Resources (CSR)**	1616 N Cameron St Harrisburg, PA	(717) 287-0339	Ferrous and non-ferrous scrap metal, cardboard, scrap vehicles
5	Dauphin	**Poland Recycling llc**	1745 N 7th St Harrisburg, PA	(717) 232-4964 polandmetalllc@gmail.com	All ferrous and non-ferrous metal
5	Dauphin	**Tri-State Scrap llc**	2209 N 7th St Harrisburg, PA	Dave (717) 233-5606 dave@tristatescrapllc.com	Aluminum cans, aluminum scrap, ferrous metal, lead, non-ferrous metal, stainless steel
10	Dauphin	**Royalton Recycling**	3 Hollendale St Middleton, PA	(717) 944-4823 info@royaltonrecycling.com	Aluminum scrap and cans, copper, brass, lead, and steel
30	Lancaster	**Sahd Metal Recycling**	1045 Lancaster Ave Columbia, PA	(717) 684-8506 dan@recycleyourmetal.com	Ferrous and non-ferrous scrap metal (steel, aluminum, copper, stainless steel, lead)
35	Dauphin	**One-stop recycling**	1855 Pottsville St Lykens, PA	(717) 453-7840	Steel, iron, copper, brass and aluminum scrap
40	Dauphin	**Stoneroad Iron and Metal #2**	10191 State Route 209 Williamstown, PA	(717) 647-7300 stoneroadrecycling@yahoo.com	Ferrous and non-ferrous scrap metal

5 CONCLUSION

Dauphin County has established a robust and comprehensive recycling program. The County's network of eight (8) recycling convenience centers are strategically placed in key communities throughout the County to provide easy and quick access to recycling services. The program compliments the curbside recycling services provided by many communities in the County by giving those residents extra capacity to recycle items that cannot fit into curbside containers. It also provides recycling services to County residents who may not live in a community with curbside service.

The Dauphin County Recycling Center on South Cameron Street in Harrisburg provides a number of services to the community, including serving as one of the County's eight (8) recycling drop-off sites. The Center also provides additional services for residents to safely and soundly recycle electronics, foam, and other hard to recycle items. The multi-faceted services offered at this site have created challenging traffic management issues that have impacted site efficiency and safety. The County could consider implementing the Phase 1 site modifications to improve access and safety in the short-term. These modifications were specifically recommended for their ease of implementation in a quick manner with real impacts to current traffic flow. The Phase 2 modifications could be considered as part of a larger site plan update and redesign to further improve operations and management. These modifications are more capital and infrastructure intensive and would require an agreement to be reached with the Lancaster County Solid Waste Management Authority for usage of part of the complex's property they control.

The County should continue to monitor recycling markets and explore opportunities and partners for material processing and marketing that benefit both the County and the contractor. The companies listed in Tables 2 and 3 represent a current list of material processors and marketers in the Harrisburg region. It is important to explore the pricing and contract options available from multiple entities to find an agreement that provides the best value to the County. The County's track record of providing clean material streams to current vendors should serve to enhance the County's position in negotiating a favorable contract.

Appendix A
Municipal Recycling Requirements of Act 101

Summary of Act 101
Mandatory Municipal Recycling Requirements

Overview

Chapter 15, Section 1501 of the Pennsylvania Municipal Waste Planning Recycling and Waste Reduction Act (Act 101), outlines the requirements for large municipalities to recycle. Municipalities, other than counties, with a population of 10,000 or more people or with a population of more than 5,000 but less than 10,000 people, and a population density of more than 300 people per square mile, are mandated to recycle.

Recycling Ordinance

An Act 101 mandated local government must adopt an ordinance that requires recycling. The ordinance shall require the following:

1) Recycling at single-family homes and apartments; commercial, municipal, and institutional establishments; and at community activities.
2) A scheduled day, at least once per month, when separated recyclable materials are to be placed at the curb or similar location for collection.
3) A collection system, including trucks and related equipment, to pick-up separated recyclable materials from the curb or similar location at least once per month from homes and businesses in the municipality. The municipality shall explain how the system will operate, the dates of collection, the responsibilities of persons within the municipality and incentives and penalties.
4) Provisions to ensure compliance with the ordinance, including incentives and penalties.
5) Provisions for the recycling of collected materials.

Residential Recycling

Residents must separate for recycling at least three materials deemed appropriate by the municipality from municipal waste generated at their homes, apartments, or other residential establishments. Separated materials must be stored at the property until collection. The three materials must be selected from the following:

- Clear glass:
- Colored glass;
- Aluminum;
- Steel and bimetallic cans;
- High-grade office paper;
- Newsprint;
- Corrugated paper;
- Plastics.

Leaf waste must also be separated from municipal waste generated at residential properties and stored for collection unless residents have already provided for the composting of the materials (i.e. backyard composting).

Owners or landlords of multi-family rental properties with four or more units must establish a recycling collection system at each property. The collection system must include suitable containers for collecting and sorting materials, easily accessible locations for the containers and written instructions to the occupants concerning the use and availability of the collection system. Owners or landlords that comply with these requirements shall not be liable for noncompliance by occupants of their buildings.

Commercial, Municipal, and Institutional Recycling

Occupants of commercial, municipal, and institutional establishments are required separate and store for recycling of the following materials at a minimum:

- High-grade office paper
- Aluminum;
- Corrugated paper;
- Leaf waste.

Occupants of commercial, municipal, and institutional establishments may be exempt from the requirements of this law if those persons have otherwise provided for the recycling of materials they are required to recycle. To be eligible for an exemption, the commercial, municipal, or institutional generator must provide written documentation to the municipality annually.

Community Activity Recycling

Organizers of community events must provide for the separation, storage, and collection of high-grade office paper, aluminum, corrugated paper, and leaf waste at the events. Community activities required to recycle include events sponsored in whole or in part by a municipality or held within a municipality and sponsored privately. Events include fairs, bazaars, picnics, or sporting events that will be attended by more than 200 or more people each day of the event.

Leaf Waste Diversion

Municipalities mandated to recycle under Act 101 must require residential and commercial establishments to separate and store leaf waste for collection. Leaf waste includes leaves, shrubbery, tree trimmings, and similar materials, excluding grass clippings. These materials must be collected at least monthly. In order to comply with Act 101, mandated municipalities must at a minimum:

1) Implement an ordinance that requires leaf waste to be separated from municipal waste for recycling at residential and commercial, municipal, and institutional establishments, <u>AND</u>
2) Establish a scheduled day, at least once per month, when leaf waste is collected curbside or similar location, <u>OR</u>
3) Establish a scheduled day, no less than two times per year and preferably in the spring and fall, when leaf waste is collected curbside or similar location from residential and commercial establishments, <u>AND</u> facilitate a drop-off location or other collection alternative approved by the Pennsylvania Department of Environmental Protection that allows persons to drop-off leaf waste for composting at least once per month. A leaf waste drop-off site can be in a neighboring municipality or at a private establishment provided there is an agreement in place to utilize the site, and residents and occupants of commercial establishments are informed of the drop-off location at least every six months.

Municipalities are encouraged to manage source separated Christmas trees as leaf waste for processing at DEP approved composting facilities.

Public Education and Outreach

Municipalities subject to the requirements of Act 101 must implement a comprehensive and sustained public education program. This program is to provide residents and owners/tenants/occupants of commercial, municipal, and institutional establishments with information on recycling program features and requirements. The educational program includes two features:

- **Initial Education** – At least 30-days prior to the start of a recycling program notify all persons occupying residential, commercial, municipal, and institutional establishments of the recycling requirements as contained in the ordinance.
- **Sustained Education** – Every six months the municipality must inform and remind all persons occupying residential, commercial, municipal, and institutional establishments of the recycling requirements.

Numerous forms of educating the public are acceptable and include:

- Newspaper advertisement circulating in the municipality;
- Public notice posted where such notices are customarily posted;
- Notices in other official notifications (i.e. utility bills);
- Website;
- Newsletter;

A combination of forms are acceptable and at least one form must be in print annually.

Implementation

Municipalities may implement their responsibilities for the collection, transportation, processing, and marketing of recyclable materials in one or a combination of the following ways:

1) Collect, transport, process, and market recyclable materials themselves;
2) Enter into a contract(s) with other entities for the collection, transportation, processing, or marketing of recyclable materials. If contracting for recycling services, the entity being contracted is responsible to the municipality for implementing of recycling activities.
3) Contract with a landfill or material recovery facility, in lieu of a curbside recycling program, that guarantees by contract that at least 25 percent of the waste received is recycled. The technology utilized in this program must have prior approval from DEP.
4) Utilize a recycling facility that demonstrates that the materials separated, collected, recovered, or created by the facility can be marketed as readily as materials collected through a curbside recycling program. In addition, the mechanical separation technology used by the facility has been demonstrated to be effective for the life of the facility.

Exceptions

The municipality is not required to collect, transport, process, or market recyclable materials or contract for these services if all of the following conditions are met:

1) The municipality is not collecting and transporting municipal waste from such establishment or activity.
2) The municipality has not contracted for the collection and transportation of municipal waste from such establishment or activity.
3) The municipality has adopted an ordinance as required, and the establishment or activity is in compliance with the provisions of the ordinance.

Act 140
Requirements for Section 904 Recycling Performance Grants

Overview
Act 101 was amended in 2006 by Act 140 to establishment requirements for the use of Section 904 Recycling Performance Grants.

Requirements
Municipalities mandated to recycle under Act 101 and receive more than $10,000 in funding from recycling performance grants must meet the following requirements:

1) Requires, through ordinance, that all residents have waste and recycling service.
2) Has an implemented residential recycling program and facilitates a commercial recycling program or participates in a similar county or multi-municipal program.
3) Has a residential and business recycling education program.
4) Has a program of enforcement that periodically monitors participation, receives complaints and issues warnings for required participants and provides fines, penalties, or both, in its recycling ordinance.
5) Has provisions, participates in a county or multi-municipal program or facilitates a private sector program for the recycling of special materials.
6) Sponsors a program, facilitates a program or supports an organization to address illegal dumping and/or littering problems.
7) Has a person or entity designated as recycling coordinator who is responsible for recycling data collection and reporting recycling program performance in the municipal or municipalities.

If these requirements are not satisfied by the municipality, then the grant funds awarded under this section must be expended by the municipality only to satisfy these requirements. If all these requirements are satisfied, then the grant funds awarded may be used for any expense as selected by the municipality.

Appendix B
Convenience Center Example Design Principles

CITIZENS' SOLID WASTE/RECYCLING CONVENIENCE CENTER EXAMPLE DESIGN PRINCIPLES

This document summarizes general recommendations that the County of Dauphin may consider utilizing if it is interested in reconfiguring or updating existing citizens' convenience centers or designing new ones. SCS uses these principles as a guide for our convenience center design projects across the Mid-Atlantic region of the US.

Layout

Container Placement

If space allows, collection center containers should be arranged in a staggered formation to maximize the number of citizens able to effectively utilize the facilities at any one time. This should be accomplished by designing with implied, if not delineated, parking areas adjacent to the space surrounding the containers. Containers should be placed with convenience and ease of use in mind. Materials which should be placed in close proximity are listed below:

- Mixed paper and OCC (Old Corrugated Containers).
- Plastics, Glass, Aluminum Cans, and Steel/Tin Cans.
- Common bagged household waste (Compactor containers) and bulky solid waste.
- Bulky solid waste and scrap metal/appliances.

The collection center containers and other interior features should allow aisle clearance of at least 4 feet from any retaining wall, fence, embankment, or other raised edge. To discourage unauthorized use, any attendant structure should be well-positioned to observe and enforce the rules of the site. Care should be given to use containers that limit the possibility for windblown litter and that allow easy and ergonomic disposal to the most senior of County residents. In addition, the placement of compactors or other frequently serviced containers should be made with ease of hauler approach and swap-out/removal in mind.

Bulky waste collection containers as well as other standard roll-offs are recommended to be situated upon fixed guiderails in order to prolong the useful life of each box. While this reduces container placement flexibility, it is becoming standard practice for convenience center infrastructure and can at least be installed for permanently positioned containers.

Expandability and Flexibility

Space should be incorporated into the design to allow for future expandability and flexibility of the site should additional collections containers for new or existing (if quantities increase enough to warrant it) material streams be necessary.

Signage considerations include longevity as well as flexibility; County policies, materials accepted, and the manner of material collection may change over time.

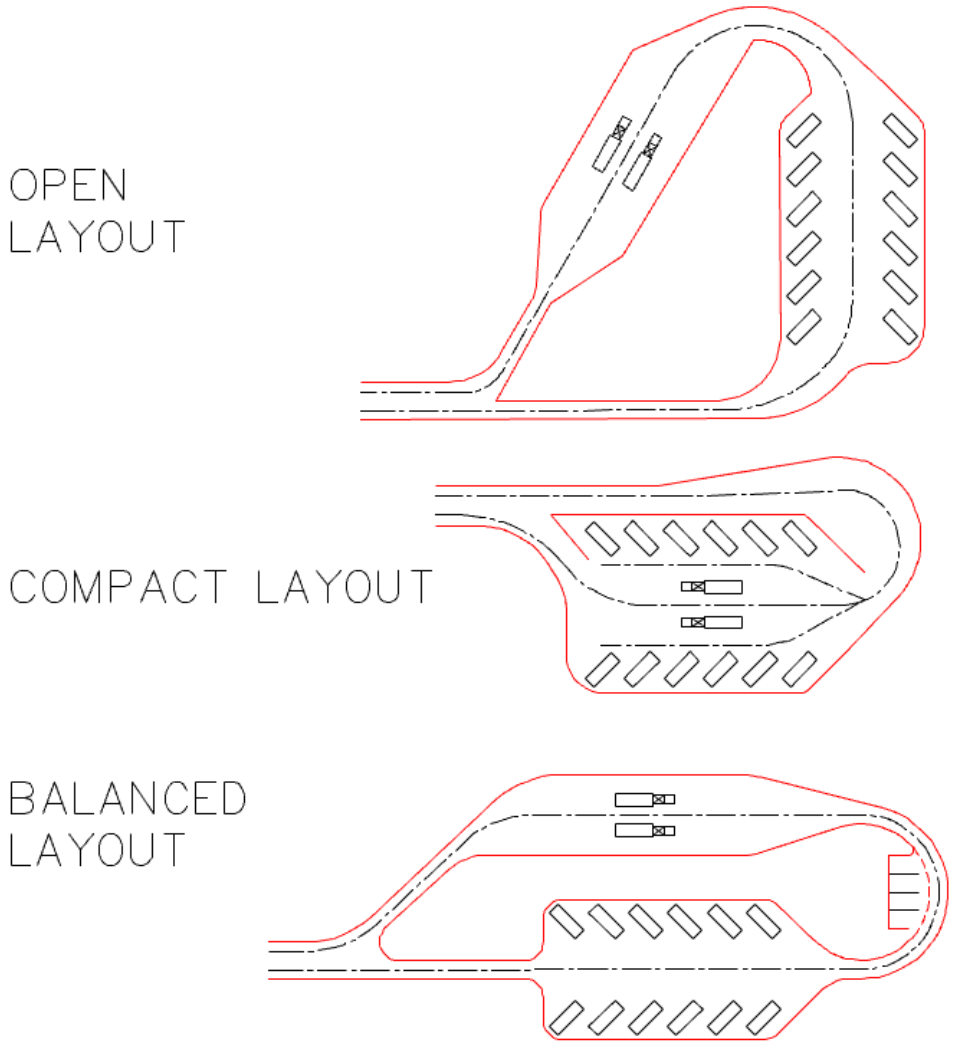
Traffic Flow

Safe and efficient traffic flow is a critical consideration for the design and development of a convenience center. Important aspects of traffic flow to consider include the following:

- The centers should be sized to accommodate the expected traffic load at peak utilization (typically midday on Saturdays). The size of the centers should be at a minimum sufficient to meet the current expected peak loads, and ideally for the future as well. Traffic load may be established through a field study and/or utilization of GIS data.

- The most desired traffic flow format for each new and redesigned center from a traffic flow perspective is a counterclockwise loop with an entrance separate from the exit. This flow format is not always feasible given budgetary or physical site constraints, so a "lollipop" loop with a commercial entrance wide enough to accommodate both entering and exiting traffic is another option. In general, having more queuing space increases traffic capacity, which can be directly related to the degree of compactness of the centers, ranging from a highly compact layout to a more open layout. Three example formats of collection center layouts, all of which utilize a counterclockwise traffic flow direction, are shown in **Figure A-1** below to demonstrate potential degrees of compactness.

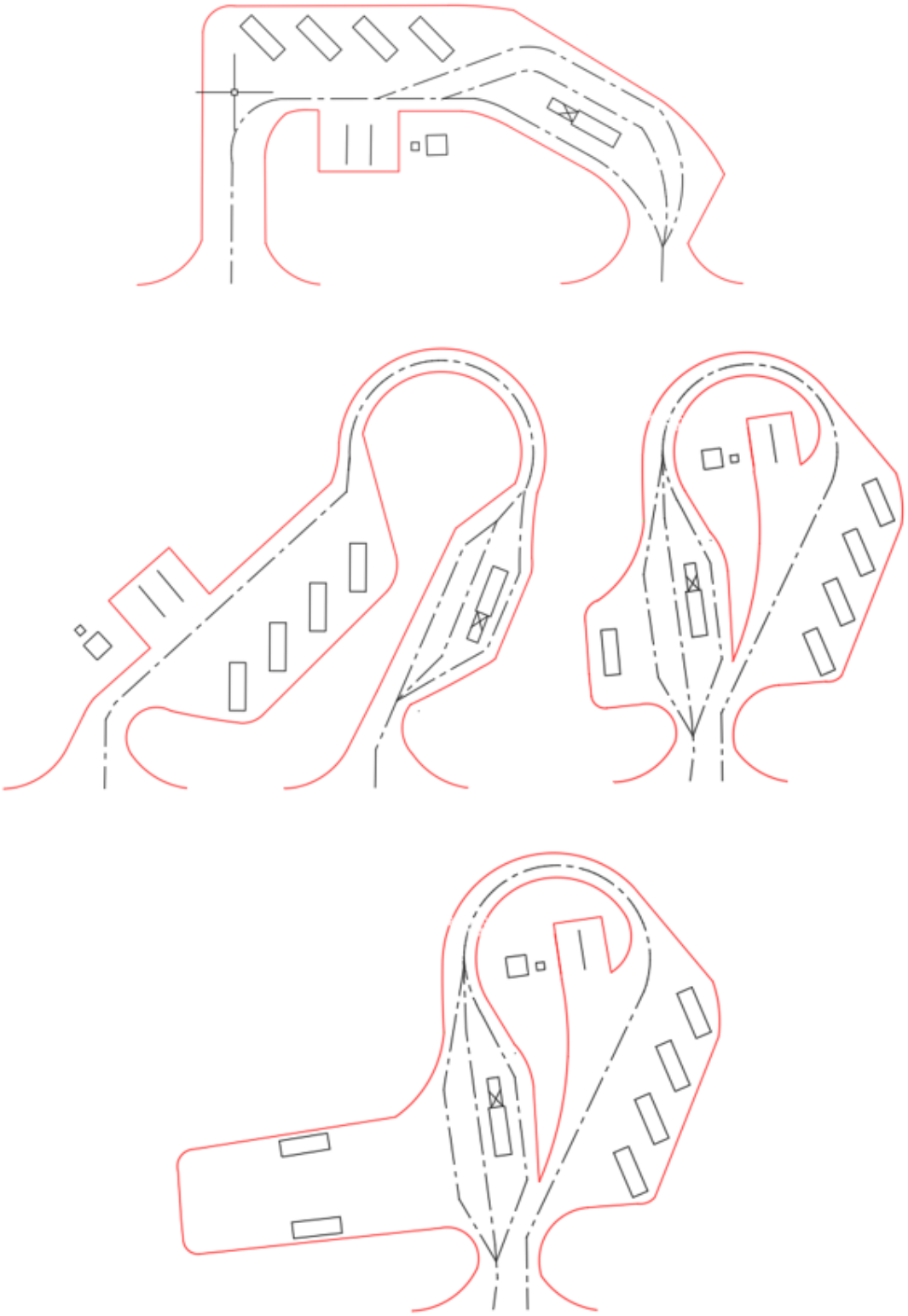
Figure A-1. Example Layouts of Potential Collection Centers



The Open Layout allows for maximum traffic queuing and usable space, but because of its area, requires the most site work and land disturbance. The Compact Layout minimizes the impacted area of construction but does not allow for much queuing. This Balanced Layout allows some queuing space, a central island area for the attendant and/or green space, and reduced land disturbance as compared to the Open Layout. This layout enables high levels of traffic flow while guiding collection center users in a deliberate manner throughout the site. Note these sketches represent sites with a very high level of service and capacity and the designs may be consolidated/tweaked according to actual needs.

Additional potential layouts are shown in **Figure A-2** below.

Figure A-2. Example Layouts of Potential Collection Centers



Signage

Signage located at the County collection facilities should ensure visibility, clarity, and overall effectiveness. It is critical that a consistent messaging program is employed to deter citizens from discarding incorrect materials and avoid other types of confusion. Signs are a great tool in combination with direction to drivers communicated by pavement striping.

Consistency can also be established with branding – this is also an essential part of any effort that injects modern themes of environmental stewardship, including adding new materials streams or recycling policies.

Security, Safety, and Aesthetics

Security, safety, and aesthetics are additional considerations that should be taken into account during the development of Neighborhood collection center layouts/configurations.

Safety

The safety and comfort of collection center users, attendants, and contractors is paramount.

- Safety features for users:
  - If stepladders or stairs are used to give residents easier access to dumpsters, they should always be implemented with the potential for injury in mind. These features should include guardrails for stability, and they should provide adequate grip for both the feet and hands to reduce the potential for slips, trips, and falls.
  - Signage directing traffic in the proper direction should be employed to avoid congestion and potential accidents.
  - Only the collection center attendant should be allowed to cycle compactor boxes. Boxes should be key-operated; Lock Out/Tag Out measures should be employed and the compactor key should be removed from the machine after each completed compaction cycle.

- Safety and comfort features for attendants:
  - A prefabricated, electrically wired attendant shed should be located on-site and heated/cooled according to the outside temperature. In addition, it should be equipped with an attendant cell phone for communication with contractors and other County staff and stocked with drinking water at all times.
  - The attendant house should be implemented in such a way to avoid the costs and engineering requirements associated with a constructed footing. Prefabricated buildings could avoid this extra cost.
  - A portable toilet primarily for attendant use should be located at each collection center and serviced regularly.

- Safety features for County/contracted haulers and other non-attendant personnel:
  - County staff or contractors servicing the collection sites by performing duties such as emptying full containers, making repairs, spreading gravel, or performing other potentially disruptive work should make an effort to do so during off-peak traffic hours if possible (beginning and end of the day).
  - Potential conflict between low-lying overhead utility lines or other obstructions and roll-off trucks should be avoided through engineering controls during the design phase and good operational practices.

- **Other safety features:**
  - A speed limit of 10 mph should be set and prominently displayed on a sign to reduce the risk of accidents in all collection centers.
  - Clear, bright striping and/or reflective surfaces/coloration should be used where a point of contact between collection center infrastructure and vehicles may occur.
  - A minimum of two concrete filled 6-inch I.D. steel pipe bollards or horizontal concrete bumpers should be placed on each side of all on-grade compactor boxes, and possibly also roll-off containers as well.
  - Adequate lighting should be provided to reduce shadows and dark areas in and around the collection site. Lighting fixtures should be installed with power efficiency in mind; however, it is also important to consider the aesthetic nature of the lighting for consideration of neighbors. Lighting should only be provided from dawn to dusk to reduce electrical costs except during hours of operations in which additional lighting is necessary for the safety of collection center users.
  - All road/embankment washouts, potholes, damaged infrastructure (such as containers, fencing etc.), and other obstructions should be dealt with promptly upon their discovery.

Security

Fencing should form a complete perimeter around the centers and be able to be secured with restricted access to prevent unauthorized intruders, human and otherwise. A heavy-duty padlock should be employed to lock the gate each evening at the collection center. Additionally, a locking mechanism should be employed on the attendant shed during hours of closure. The collection of items for which there is an assessed fee is discouraged. Requiring collection center attendants to make monetary transactions would require the accumulation of cash and may be a safety issue.

A closed-circuit camera should be positioned so the collection center is in full view of the recording device in order to capture any potential unauthorized activity on film. At a minimum, a faux camera can deter intruders without incurring significant up-front expense or recurring operating costs.

Aesthetics

In an age of frequent and very public expressions of “Not in My Backyard” (NIMBY) sentiment, it is desirable to make aesthetic considerations a priority for convenience centers. SCS believes that in addition to good security, convenience center fencing, gating, landscaped screening, and other features should provide an aesthetic acceptable to the surrounding community’s standards. The compactor site shown in **Exhibit A-1** is an example of an existing collection center that has taken intentional efforts to incorporate aesthetic considerations via the planting of screen trees.

Exhibit A-1. Example of Screen Trees Around Existing Compactor Site

Ideally all waste and recycling collection areas are screened from view by an opaque fence as well as planted landscaping elements. Fencing screen height should extend at least 1 foot above the tallest container or structure within the collection center, with a minimum height of 7 feet, and landscaping/horticultural elements should be expected to well exceed the fence height upon their maturity.

Convenience centers should avoid institutional, industrial, or heavy-commercial elements that would detract from the overall residential nature of their surrounding communities. Specific elements to avoid may include barbed wire, metallic chain-link fencing, and rusty or damaged containers. Using green chain link fencing delivers an increase in aesthetic quality over plain metal fencing. The maintenance of landscaping shrubbery and other features can go a long way in improving the look of the full service Centers; it is important to consider upkeep of these features as a recurring expense.

Material Stream-Specific Recommendations

Solid Waste

Bulky Waste Collection: Certain brands of compactors may be able to be substituted for open-top waste collection containers which can accommodate larger materials that normally could not be

compacted. This would allow for greatly increased efficiencies and a higher resident throughput during peak traffic hours.

Recyclable Material

Operators may consider purchasing compactors exclusively for the most heavily utilized material containers. This can increase the density of collected material, make a more efficient use of space, and reduce the number of container pulls needed for this material.

Yard Waste and Other Organics

Operators should require citizens to tarp loads of yard waste to reduce the chances of debris going airborne on the way to the collection center or upon arrival at the convenience center.

Additional Material Categories

- **Items for Reuse:** Still-usable discarded item collection sheds may be incorporated into the design of the convenience center. If items for reuse are collected, a covered and at least partially enclosed storage area should be incorporated into the collection center design. It is recommended that the storage area be completely enclosed in a fenced cage to prevent theft of items by individuals who may wish to hop the perimeter fence to obtain things of value. The enclosed space should be protected from the elements and signage should be included at the collection location which prohibits broken or unclean materials from being dropped off. Any additional guidelines for reused material drop-off should be prominently displayed with large font and clear language.

- **Libraries:** The Regional sites will offer the same amenities as Neighborhood sites.

- **Electronic Waste and Batteries:** SCS has noticed some increase in allotting space for “hot loads”, where vehicles that may ignite due to items such as Lithium batteries can be directed to extinguish the fire and/or wait for assistance away from the center of the site.

- **Construction and Demolition (C&D) Debris:** This material can be more easily compacted when segregated from standard trash and can be processed through the removal of salable metals more easily.