

The importance of a solid waste and recyclables management plan for new mixed-use, commercial projects

Daniel Cooper, P.E., Project Manager, SCS Engineers, Tampa, Florida; **Marc J. Rogoff**, Ph.D., Project Director, SCS Engineers, Tampa, Florida, and Chair, APWA Solid Waste Management Committee; and **Bruce Clark**, P.E., Project Director, SCS Engineers, Tampa, Florida

Introduction

In the early and mid 2000s many of the older, downtown areas of cities throughout Florida and the nation experienced renewed growth. Much of this growth occurred in the planning and construction of large-scale, mixed-use projects, such as residential condominium towers supported by commercial, retail and professional offices. These projects are typically being proposed and constructed in downtown areas where traditional solid waste collection techniques requiring large open areas for storage and collection are not available. It becomes crucial to the success of the project to include solid waste and recyclables planning at the initial concept level. This article briefly describes how SCS Engineers (SCS) has been called on by architects and developers to provide some innovative solid waste management and recycling solutions.

For the purpose of this article a mixed-use development is defined as a project containing commercial outlets (hotel, restaurants, retail shops), office space, parking and residential elements all within one structure. Some projects have multiple structures, but for ease of explanation, the focus will be on single-building developments. Typically, these types of developments are located in highly-developed downtown areas with the retail outlets and restaurants at street level; condominium-type residences or offices lining a central parking area on the next few levels; then usually an amenities level with residential or hotel/residential mix above the amenities level. Access to the parking and loading areas is normally underground or located within the central portion of the building in an enclosed location. A project encompassing one or two city blocks may generate as much as 200 cubic yards (c.y.) of material with 40 c.y. being recyclables.

The main drivers that are motivating project owners and developers to include solid waste and recyclables planning come from various sources, which range from mandatory recycling ordinances to sustainable building design criteria. In Sarasota County, Florida, a recycling ordinance requires that all new developments provide provisions for residential and commercial recycling. In keeping with this ordinance, new project developers must first submit a solid waste and recycling plan as part of the development approval process. These provisions must be integrated into the design of the

building so as to not be intrusive for the residents, while offering reasonable operational elements for the waste and recycling haulers.

Designing buildings for solid waste management

The design approach is to first determine the quantities and types of materials that will be generated based upon the developer's proposed use schedule. Waste generation factors based upon particular uses and activities may be provided by the municipality or taken from previously conducted national studies.¹ Once the quantity of waste and recyclable materials is determined, a handling, conveyance and storage strategy must be developed. The residences within the project must be provided with a recycling solution that meets several criteria including simple to use, convenient, unobtrusive, clean and comprehensive; otherwise, what we have found is that the recyclables will not be diverted from the solid waste stream as intended. The commercial enterprises within the development will determine individually how best to capture both the solid waste and recyclables stream, with the owner/developer providing a common area for accumulation/storage, which will be located such that collection vehicles will be able to access this area and haul away the products or waste. The solid waste will normally be brought to a centralized waste compactor, while the recyclables will need to be consolidated until collection days.

Depending upon the size and layout of the development, a combination of manual and automated collection techniques will need to be considered for residential recycling and waste capture. If a development is spread out with only a few floor levels, a more traditional centralized dumpster or compactor and separate recycling bins, located on each floor and/or near the compactor area, may meet the recycling criteria. This type of manual collection from many locations throughout the building complex has several disadvantages such as being labor intensive and having multiple locations with "open" collection containers that can smell and attract insects. A more desirable approach, particularly in high-density "curb-to-curb" construction projects with no available areas for collection bins and where open spaces are limited,

¹ California Integrated Waste Management Board, Waste Characterization Database, 2005. <http://www.ciwmb.ca.gov/WasteChar/WasteGenRates/default.htm>

would be to implement an automated collection and temporary storage approach.

There are several manufacturers of automated collection systems designed for high-rise-style buildings. In situations such as those worked on by SCS, where multiple types of recyclables must be segregated, a more complex sorting system is required. Systems recommended by SCS utilize a centralized chute, which can convey waste and recyclables from the upper floors of a building to the ground floor or lower level where the materials will be consolidated/collected, without taking up large amounts of the highly valuable square footage on the upper floors. At the base of the chute an automated turntable (i.e., a carousel) holding up to six portable, one cubic yard (c.y.) plastic, open-top storage containers will collect the recyclables and wastes as they exit the chute.

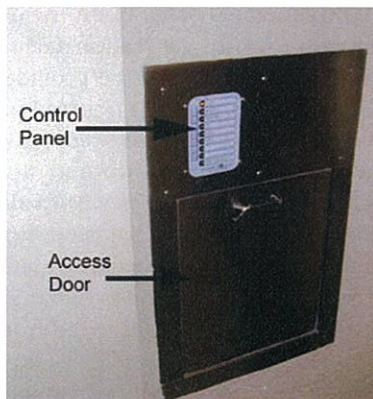


Figure 1. Automated Collection System - Access door

The turntable is controlled by the resident/user from the floors above using a control panel. The resident selects the type of recyclable or waste from the control panel. Their command will engage the electric motor on the carousel to rotate it so that the container used for the specific material selected is oriented directly under the end of the chute. The controls open the access door on the resident's floor and lock out all other floors temporarily from use. The resident deposits the material in the chute and it falls down into the container in the carousel. The access door and control panel are very clean-looking and can be installed behind a fire door to be hidden from sight. This fits in with an architect's desire to maintain a high-end and finished look within the resident's areas. An example of one of the access doors and the base of one carousel system can be seen in Figures 1 and 2.

First-generation versions of these automated systems were installed in the 1970s in cities such as New York and Miami. Due to the tough operating conditions and lack of responsive maintenance, some of the units did not perform reliably. Since then the systems have been refined to operate more reliably. Property managers are now being encouraged to provide the appropriate staff to operate these units and to contract with service companies to assure that the systems receive periodic routine maintenance and proper repair when necessary. As part of the solid waste planning, consultants are also now working closely with architects to plan for proper equipment layout and working space that is required for uninterrupted operation. Additional space required for

extra container storage, repairs, access and ventilation are also key considerations.

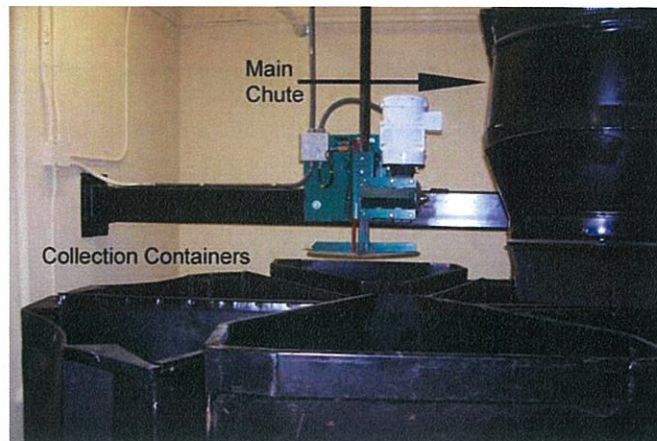


Figure 2. Automated Collection System - Carousel

The final step in the solid waste management plan is to determine how waste and recyclables will be removed from the site and taken to a processing facility or landfill. The design and operational concerns which must be considered are how will large (as long as 34 feet) collection vehicles enter and exit the site and process the materials within the building. SCS utilizes vehicle turn simulation software in conjunction with architectural plans to provide a comprehensive vehicle movement diagram to assure that all types of collection vehicles can enter and exit the project safely. Another vehicle access factor that must be considered early in the building design and planning process is overhead clearance. More and more developments want to process the compactor and recyclable containers underground or inside a building where typical overhead commercial clearances of 14-15 feet are not adequate for most common recycling collection vehicles to process material. Individualized project solutions such as elevated compactors with a winch system for loading and unloading and specific high clearance processing areas have been integrated into some project designs.

Summary

In summary, there exists a new trend in mixed-use commercial development that can become an opportunity for key solid waste and recyclables planning. Planning at this point in the development process benefits all involved parties including the owner/developer, community/commercial haulers, residents and the environment. Whether required by law or instituted by a conscientious developer, having a solid waste and recycling plan as part of your development process is a good idea.

Daniel Cooper can be reached at (813) 621-0080 or dcooper@scsengineers.com; Marc J. Rogoff can be reached at (813) 621-0080 or mrogoff@scsengineers.com; and Bruce Clark can be reached at (813) 621-0080 or bclark@scsengineers.com.

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