UGA Waste Management Baseline Conditions Assessment

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EXECUTIVE SUMMARY

The UGA Waste Management Baseline Conditions Assessment provides a snapshot of where we are now regarding waste management operations at UGA, illuminates gaps in our systems, and serves as a starting point from which to develop and eventually implement best practices in waste reduction and circular materials management fitting of the flagship institution of higher education in Georgia.

UGA and FMD annually invest $3.2M in waste management operations, including several innovative waste reduction programs, however overall outcomes are less than desirable. Contrary to UGA strategic goals, landfill tonnage has increased in the last decade. Waste management infrastructure, including vehicles and exterior containers, are at or beyond their industry-standard useful lifespan. A decentralized management structure contributes to a lack of clarity regarding waste reduction roles and responsibilities within FMD. Ongoing training and education that emphasizes waste reduction is needed for operational staff and campus customers.

Immediate priorities include clarification of leadership and accountability related to UGA's waste reduction goals and a review of exterior container service to ensure that materials are delivered to the appropriate facilities in a timely manner.

Longer-term, an integrated solid waste and circular materials management master plan should be developed with campus-wide stakeholder input to establish shared vision and specific action steps toward waste reduction at UGA. The master plan development process should include establishing a campus-wide task force charged by UGA senior leadership and engaging an external consultant with demonstrated industry-leading expertise in University waste management operations.

PURPOSE, RECOMMENDATIONS, AND ISSUES TO BE ADDRESSED

The UGA Waste Management Baseline Conditions Assessment was developed by members of the Facilities Management Division Waste Reduction Working Group. Appendix A provides a list of Working Group members. Appendix B provides a list of abbreviations and glossary of terms used in this report.

Purpose of the Baseline Conditions Assessment

The UGA Waste Management Baseline Conditions Assessment is the first step toward an integrated solid waste and circular materials management master plan for the University of Georgia. Understanding the current state of waste management operations establishes a baseline to assess operational effectiveness and measure current and future progress toward the University's strategic waste reduction goals. This assessment provides a snapshot of where we are now, illuminates gaps in our systems, and serves as a starting point from which to develop and eventually implement best practices toward a coordinated waste reduction program that is fitting of the flagship institution of higher education in Georgia.

Recommended Next Steps

FMD should address immediate concerns related to exterior container service (dumpsters and carts) to ensure that materials are removed from campus in a timely manner and delivered to the appropriate facilities. At the same time, an integrated solid waste and circular materials management master plan should be developed for UGA. This plan should incorporate input from stakeholders campus-wide to create a shared vision for waste reduction and specific action steps to achieve that vision. The plan should include a waste characterization study, functional and economic analyses of waste management operations, staffing, vehicles, containers, technology, and education and outreach, including an emphasis on sustainable purchasing, reuse, and other strategies to avoid the generation of waste in the first place. Two main approaches to be considered for the development of the master plan include establishing an in-house campus-wide task force charged by senior leadership and/or hiring an external consultant with demonstrated industry-leading expertise in University waste management operations.

Issues to be Addressed

UGA and FMD annually invest $3.2M in waste management operations, including several innovative waste reduction programs, however overall outcomes are less than desirable. Waste reduction initiatives are not well coordinated and overall landfill tonnage has not decreased considerably in the last decade. Waste management infrastructure, including vehicles and exterior containers, are at or beyond their industry standard useful lifespan. A coordinated campaign is needed to provide consistent education and messaging for operational staff and customers campus-wide, with an emphasis on waste reduction versus recycling. Leadership, roles, and responsibilities for waste reduction operations within FMD need to be more clearly defined.

- Goals and Actual Performance
    - UGA's 2020 Strategic Plan established a goal of 65% reduction in materials sent to the landfill in 2020 versus a 2010 baseline. In FY 2021, UGA Athens Campus landfilled 5236 tons of materials versus 4838 landfilled in FY2010. This represents an 8% increase in landfilled material, falling far short of the stated goal.

- The UGA F&A / FMD 2025 Strategic Plan calls for a 25% reduction in landfilled waste by 2025. Based on past experience, business as usual will not achieve this goal, enhanced commitment is required.

- FMD Waste Management Financial Review
  - FMD spends approximately $3.2M annually to conduct waste management operations, including personnel, vehicles and fuel, servicing of interior and exterior containers, and tipping fees.
  - Current FMD Charge-Out Rates for dumpster service leave a deficit of $110,760 due to recycling costs not being captured.
- Management Structure / Distribution of Responsibilities
  - Multiple units within FMD contribute to waste management operations including Grounds Department, Building Services, Work Request Center and Warehouse, Safety, and the Office of Sustainability. A decentralized structure for waste management requires clear roles and enhanced coordination / communication to ensure proper operational procedures at each step in the process, effective feedback loops internally between each unit and externally with customers campus-wide, and accountability for meeting stated University goals. A current challenge is that operational units do not view waste reduction as a primary responsibility and there is a lack of coordinated leadership and accountability regarding waste reduction goals.
- Infrastructure and Technology
  - A renewal plan and funding source is needed for vehicles, containers, and other waste management infrastructure. 83% of FMD's waste management vehicles are at or beyond their industry standard useful lifecycle. When collection vehicles are out of service, current practice is to landfill materials in all exterior containers, landfill and recycling. Confidence in FMD operations could become eroded if customer-placed recyclable materials are intentionally landfilled.
  - There are *000* stationary exterior recycling containers and *000* stationary landfill containers on the UGA Athens and Health Sciences Campus. Most of these are in need of functional and aesthetic improvement and consistent messaging. In many campus locations where a recycling dumpster is not present, roll carts are used for collection and storage of recyclables. Messaging on roll carts is inconsistent from building to building.
  - UGA Design and Construction Standards do not specify criteria for determining the type or siting requirements for exterior waste management containers. A study should be conducted to analyze costs and benefits of various operational approaches to exterior refuse containers including providing dedicated exterior containers for each building, establishing regional landfill and recycling compactors to serve a cluster of buildings, or a hybrid approach.
  - Costs and benefits of outsourcing portions of the FMD waste management operation should be investigated, such as contracting 8-yd landfill and recycling container service. Technological solutions should be investigated and adopted to enhance safety, collection efficiency, internal and external communications, and tracking of key metrics.
- Specialized Programs
  - FMD offers several specialized waste reduction strategies including the Deskside Waste Reduction Program and collection protocols for hard-to-recycle materials such as film plastic, Styrofoam, and batteries; however, these programs are not widely adopted and current hard-to-recycle material procedures may not be scalable campus-wide. Laboratories present a significant opportunity for expanded waste reduction efforts at UGA, with an emphasis on hard-to-recycle materials. A University mandate for the deskside program should be considered, consistent with other universities.
  - Organics recycling, or composting, is conducted institutionally in dining halls and some retail dining areas on campus. A student-run program currently services compost bins in 32 campus buildings. There is significant opportunity to expand and institutionalize

composting operations campus-wide. Additionally, PLA scraps from our campus Makerspaces / 3D Printers are composted via a partnership with Athens Clarke County Recycling.

- Outreach and Education
    - A lack of consistent messaging on interior and exterior bins may contribute to the gap in knowledge and behavior within the campus community, resulting in improper placement of materials in landfill and recycling waste streams.
    - Clear, effective, and ongoing staff training is recommended for all employees who manage waste on campus. For example, current practice is to landfill contents of 8-yd recycling containers if contamination is observed to avoid excessive fees; updated training would clarify criteria for this determination, a process for documenting what was observed and where, and how to communicate this information to campus customers so that the problem can be addressed.
    - A coordinated campaign is recommended to encourage waste reduction practices campus-wide, from procurement through disposal, and to provide opportunities for customer observation and feedback.
- Data Gaps and Evaluation
    - FMD currently has access to tipping fee and tonnage data through invoices from the ACC Landfill, Recovered Materials Processing Facility (recycling center), and Center for Hard to Recycle Materials (CHaRM). Additional data, such as tonnage per specific vehicle trip, is available through ACC and the recycling center operator. These data should be captured and tracked over time by UGA to measure performance, efficiency, and progress toward waste reduction goals.
    - Sanitation Services staff make judgement calls regarding contamination in single-stream recycling. If a load is determined to be contaminated, it is taken to the landfill instead of the recycling center. Greater clarity is needed to define what constitutes contamination and how much contamination is too much to be accepted at the recycling center. If and when contaminated loads are observed, a system should be implemented to document the offense and provide feedback to customers so that the problem can be avoided in the future.
    - A comprehensive waste characterization study has not been conducted to date at UGA, resulting in limited visibility of what specific waste materials are generated on campus, in what quantities, and from where.
    - UGA should also investigate technology upgrades to achieve industry standards or leadership, such as cameras and scales on vehicles, sensors in stationary exterior containers for on-demand servicing, and software solutions to facilitate route efficiency, internal and external communications, and tracking of key metrics.
    - An Atlas Project Phase 1 Assessment documented waste reduction and reuse practices at UGA and stakeholder knowledge regarding waste management protocols. The assessment focused on Scope 1: Hard Goods such as surplus property and hard-to-recycle materials over which UGA has direct control, and Scope 2: Soft Goods such as food and single-use materials over which UGA may have less control. Recommendations from this assessment should be reviewed and implemented.

EXISTING WASTE MANAGEMENT POLICIES, GOALS, AND PERFORMANCE

Policy - University System of Georgia

9.11.1 Sustainability, Efficiency, and Effectiveness

The Board of Regents is committed to providing sustainability leadership through responsible stewardship of the state's natural and physical resources in order to advance economic vitality, ecological integrity, and social well-being through continuous improvement in campus operations thereby enhancing each institution's education, research, and service missions.

Each University System of Georgia (USG) institution shall:

1. Manage natural and fiscal resources in a responsible and balanced way that intentionally reduces negative environmental impacts, restores natural systems, and promotes long-term prosperity;
2. Design, construct, operate, and maintain facilities in consideration of the environmental, social and economic systems on which our campuses depend;
3. Remain committed to the implementation of best practices related to buildings, climate, energy, food systems, grounds, purchasing, renewable resources, transportation, waste streams, and water;
4. Create a culture of sustainability in thought and action by promoting awareness, encouraging participation, and leading by example; and,
5. Engage in measures to maximize and improve the quality of life within the communities we serve.

Responsibility for overall implementation lies with the institution President, but students, faculty, and staff share in the responsibility to promote these principles. Campuses, as living, learning laboratories, will bring about transformative change for the future generations of the State of Georgia. The USG chief facilities officer shall periodically highlight sustainability achievements and best practices to the Board.

Policy – University of Georgia

UGA Design and Construction Standards

UGA Standards for Design and Construction currently include standard interior waste receptacles for common areas (Busch Systems Waste Watcher Series) and standard outdoor pedestrian-scale containers in the campus landscape (Big Belly bins). There is no identified standard container type or siting requirements for exterior containers such as 8-yard, roll-off, or compacting dumpsters.

A list of UGA Design and Construction Standards that address waste management infrastructure is included in Appendix C: Design and Construction Standards.

Goals - University of Georgia

UGA F&A 2025 Strategic Plan

- Strategic Goal 1.1: Expand experiential learning opportunities for all students.
    - Unit Goal: Facilitate the use of campus as a living laboratory for experiential learning by creating natural, social and built environments that support student learning and research while addressing real world challenges.
- Strategic Goal 2.3: Align the human and physical capital of the University to expand the research enterprise and fuel innovation and entrepreneurship at all levels of the organization.
    - Unit Goal: Support research, innovation, and interdisciplinary collaboration through the design, construction, operation, and maintenance of campus facilities and infrastructure to develop innovative solutions to grand challenges

UGA FMD Unit Specific 2025 Strategic Plan

- Unit Goal: Quantify, target, and reduce landfill tonnage and overall waste generation on campus through effective operations, education, prevention, and diversion.
- See performance indicators and annual targets in Appendix D.

UGA 2020 Strategic Plan

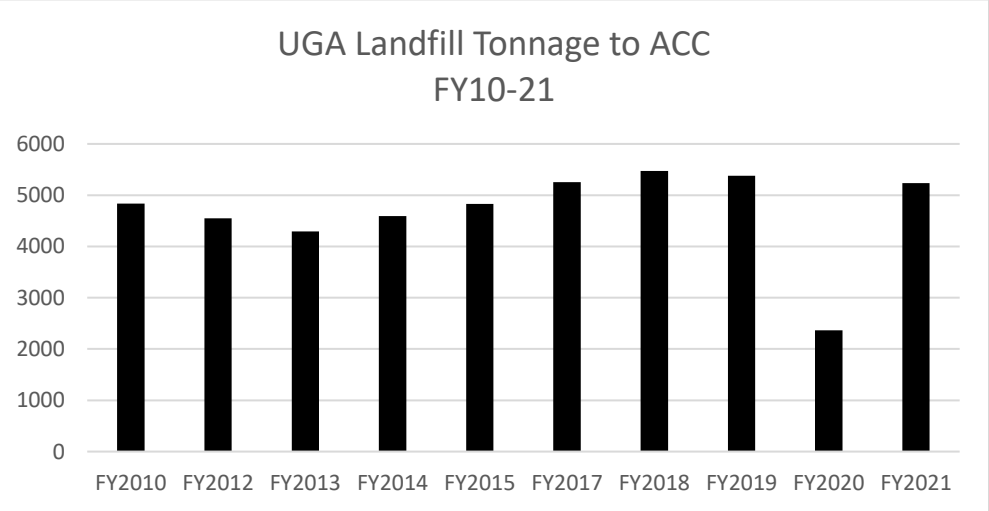
- Strategic Direction VII, Improving Stewardship of Natural Resources and Advancing Campus Sustainability; Priority G, Goal: Decrease waste stream to landfills by 65 percent by 2020

UGA FMD Waste Reduction Working Group

- Guiding Principle: FMD will landfill as little as possible within the areas, programs, and processes that it controls and will provide the waste management infrastructure to support other units' waste reduction efforts.

Actual Performance – UGA Landfill Tonnage and Single-Stream Diversion Rates

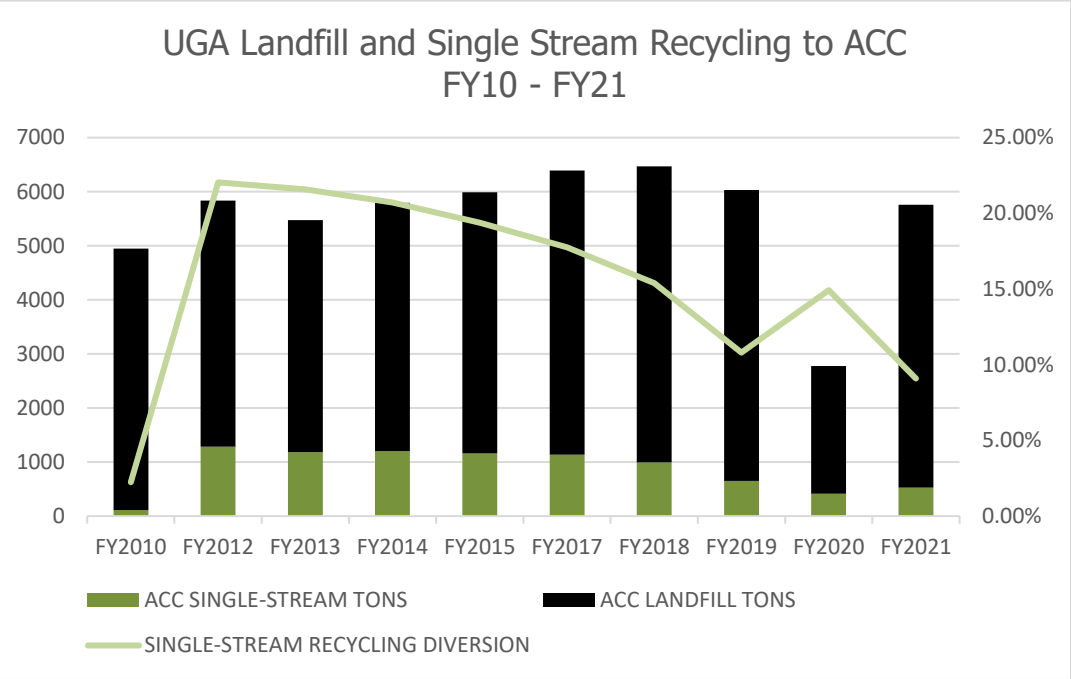
UGA's 2020 Strategic Plan called for a 65% reduction in landfilled materials by 2020 versus a 2010 baseline. Actual performance equated to a 20% increase in landfilled materials sent to ACC in FY2019 versus FY2010, and an 8% increase in FY2021 versus FY2010. (Due to reduced operations during COVID-19, FY2020 is not an accurate comparison.)



UGA Waste Management Baseline Conditions Assessment, November 2021

UGA's recycling diversion rate (the amount of single-stream recycling tons divided by the total combined landfill and single-stream recycling tons) increased from 2.2% in FY2010 to 9.1% in FY2021; however, the single-stream recycling rate has decreased significantly from a peak of 22% in FY2012.

It is important to note that the single-stream recycling and diversion rates only include items accepted in single-stream recycling and do not include other materials recycled at UGA via surplus property, scrap metal, leaf & limb, antifreeze, fuel filters, batteries, tires, motor oil, etc.

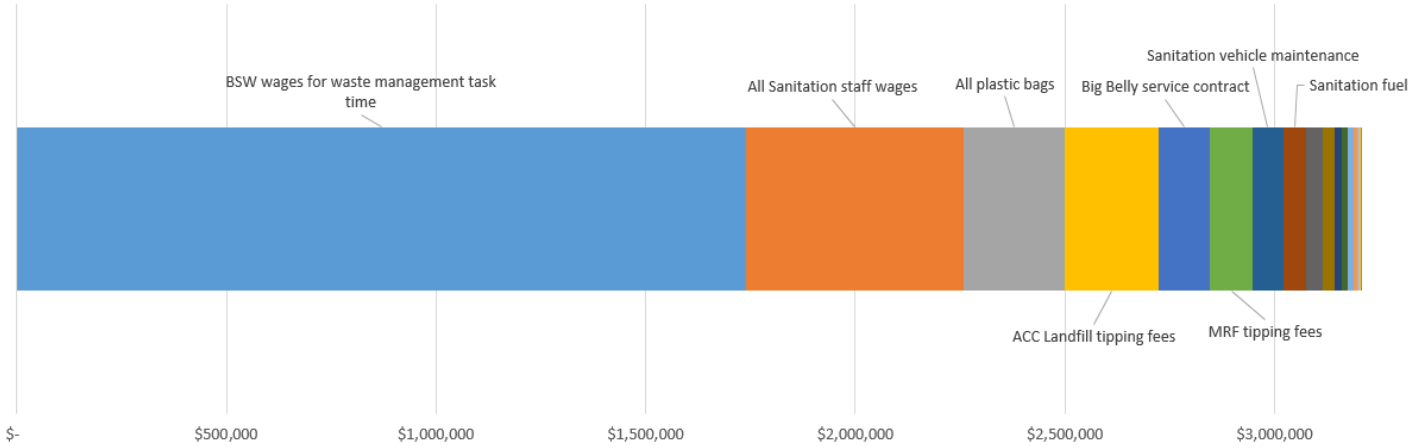


FMD WASTE MANAGEMENT FINANCIAL REVIEW

Waste Management Cost Summary

UGA spent $3.2 million to manage waste in FY2019 based on FMD accounting data. Eight items make up the top 96%:

- FMD building service worker wages for waste management tasks[1] (54.3%, $1.74 million)
- FMD Sanitation Department staff wages (16.1%, $517k)
- Plastic bags issued from the FMD Warehouse (7.5%, $241k)
- Clarke County landfill tipping fees (7%, $226k)
- Big Belly service contract (3.8%, $122k)
- MRF (recycling) tipping fees[2] (3.1%, $100k)
- Maintenance (2.3%, $75k) and fuel (1.7%, $54k) for FMD Sanitation Department vehicles.



The remaining four percent includes some composting costs (Bioconversion Center wages, Campus Compost intern wages and supplies), fluorescent lamp and automotive tire disposal costs, wages to collect and process shipping pallets for recycling, estimated wages to discard surplus property, Oconee County landfill fees, and Zero Waste intern wages.

Costs not yet quantified include non-FMD custodial staff time, gameday cleanup, hazardous waste management and noncompliance fees, dumpster and compactor maintenance, Bioconversion Center equipment costs, plastic bags from sources other than the FMD Warehouse, and compostable can liners for dining commons organics collection.

Charge-Out Rates

FMD provides sanitation collection services to RI facilities as part of its appropriated budget, and to non-RI campus facilities on a reimbursable basis. The charge-out rates are the same for RI and non-RI

[1] Building service worker waste management wages are estimated as 29% of the total BSW wages ($6 million). This is based on an estimate from the FMD Services leadership that one quarter to one third of BSW time is devoted to waste management tasks (trash removal from offices, collection of common area trash and recycling, removal from building).
[2] This figure has been adjusted from the actual FY19 recycling fees to reflect rising costs at the material reclamation facility.

container service. An 8-yard landfill container is charged at $16.15 per lift (billed monthly).[3] Landfill rolloff container service is charged at $150 per removal plus the landfill tipping fee per ton.

FMD does not charge out or capture costs at the building level for single stream recycling collection service, regardless of container or RI/non-RI status.

Hauling Service Cost Study

8-Yard Containers

The average cost to service an 8-yard container on campus in FY2019 was just over $12 per lift for both landfill and recycling. The table below summarizes a study of FY2019 costs associated with 8-yard landfill and recycling service on campus using UGA front-load trucks and personnel.

The purpose of the study was to set a baseline to compare with potential proposals from outside service providers. The figures in the study include vehicle crew wages and benefits, vehicle maintenance and fuel costs, and landfill and recycling tipping fees.

	Landfill	Recycling	Total/*avg*
Crew Wages + Benefits	$ 91,621	$ 82,459	$ 174,079
Truck Operating	$ 21,640	$ 21,640	$ 43,280
Tipping Fees	$ 203,400	$ 90,000	$ 293,400
Total cost per year	**$ 316,661**	**$ 194,099**	**$ 510,759**
8-yard lifts per year	24,768	15,840	40,608
Cost per 8-yard lift	$ 12.79	$ 12.25	*$ 12.58*

While the cost per ton for recycling is higher than that for landfill waste, the volumetric cost of service per lift is roughly the same between the two.

With 24,768 landfill 8-yard lifts per year, at a charge-out rate of $16.15 per lift UGA accounted for $400,000 in charges, while the actual cost was $316,661. However, the surplus does not offset the $194,099 in costs associated with servicing 8-yard recycling containers, leaving a deficit of $110,760 due to recycling costs not being captured.

Rolloff Containers

The average cost to service a 30 – 40 yard rolloff container in FY2019 was $101 per removal, not including tipping fees which are charged separately. This figure was derived using truck 95301 as a representative sample, taking into account the wages and benefits for the operator ($47,532) and the fuel and maintenance costs for the truck ($25,469). Truck 95301 went to the landfill 522 times and the recycling facility 201 times in FY2019.

Truck 95301 hauled 1,311 tons to the landfill in FY2019, with total tipping fees of $56,365. It hauled 135 tons of recyclables to the MRF, with total tipping fees of $17,892. The total cost of the activities of

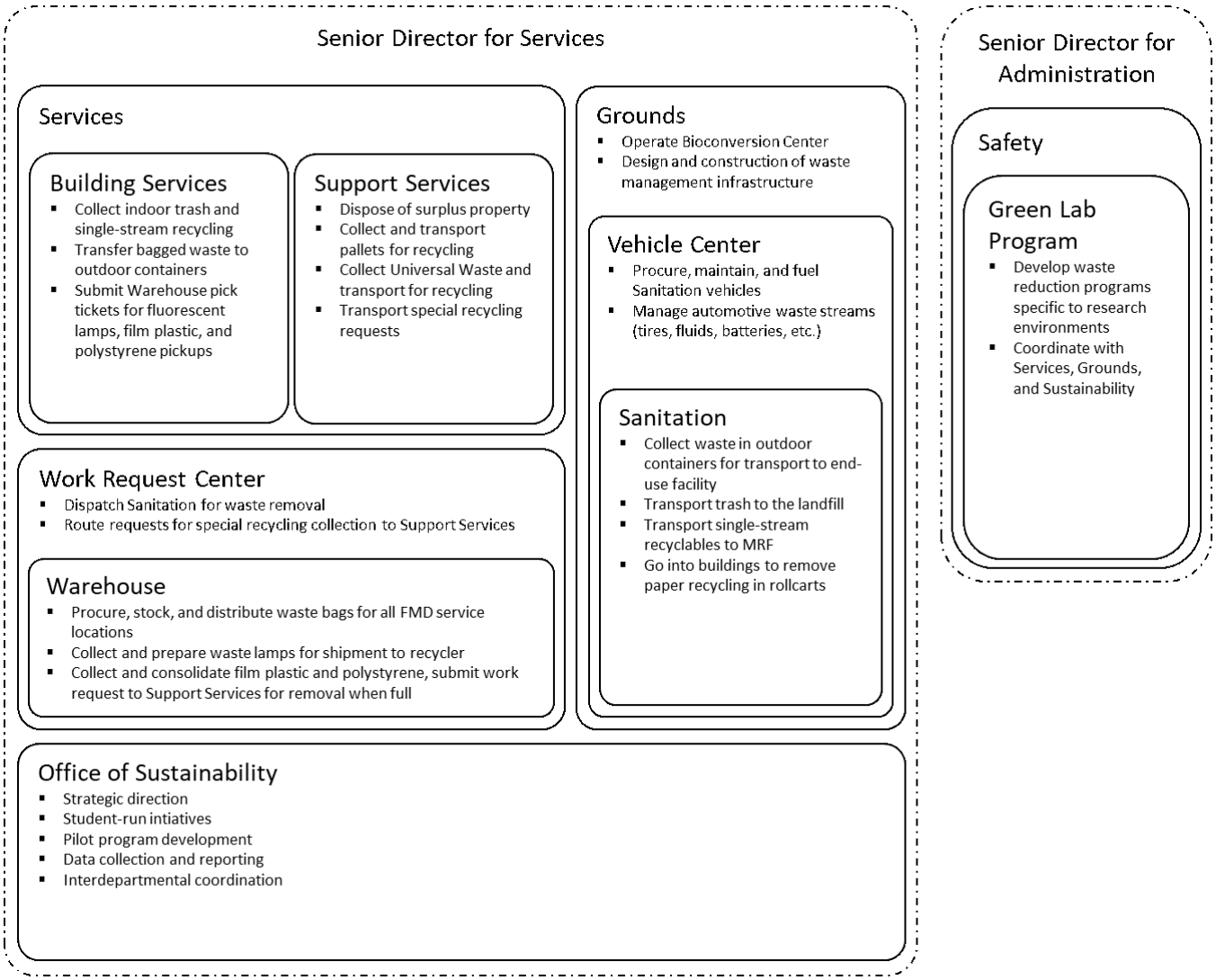
[3] This is based on FMD's scalable monthly service charge of $70 per 8-yard landfill container per number of scheduled weekly service visits.

truck 95301 for FY2019 was $147,258, including labor, fuel and maintenance, and tipping fees for the landfill and MRF.

With a $150 per removal charge-out rate for landfill rolloff service, FMD accounted for $78,300 in service charges and $56,365 in landfill tipping fees through the activity of truck 95301 in FY2019, leaving a deficit of $12,593 due to recycling costs not being captured.

MANAGEMENT STRUCTURE / DISTRIBUTION OF RESPONSIBILITIES

Facilities Management Division currently employs a decentralized management structure for waste management operations. The two units with primary operational responsibilities are FMD Grounds Department – Sanitation Services, which is responsible for exterior waste management operations, and FMD Building Services, which is responsible for interior operations. The FMD Office of Sustainability provides strategic waste reduction and communication support for waste management operations, as well as a student-run campus composting program. The Green Labs Program, situated within FMD Administration – Safety, leads pilot waste reduction projects in laboratory facilities. Current structural challenges include limited communication between units, operational units do not view waste reduction as a primary responsibility, and a lack of coordinated leadership and accountability regarding waste reduction goals.



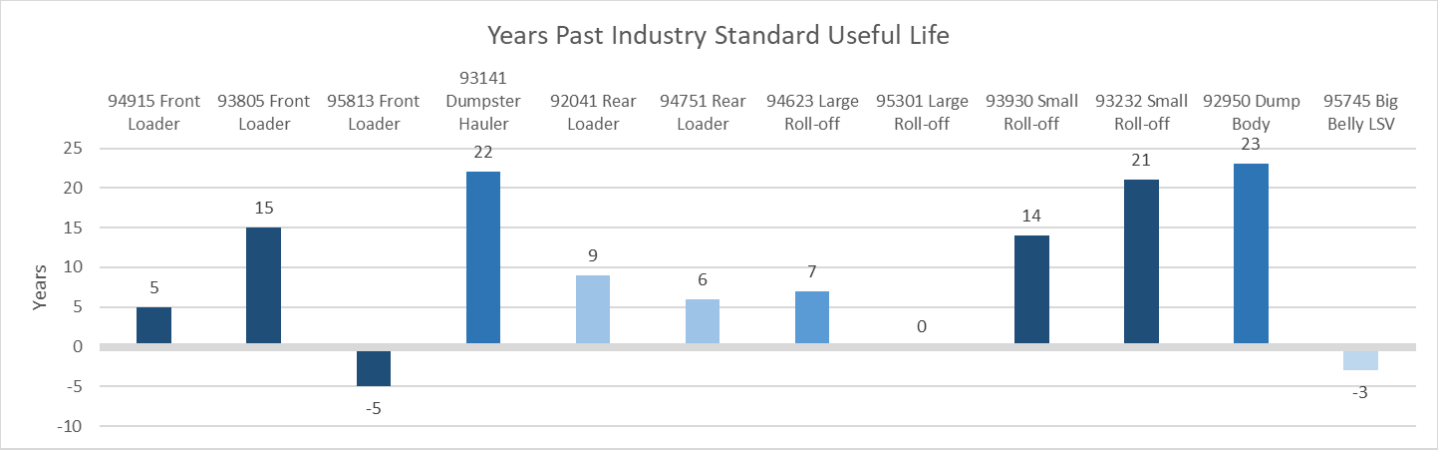
INFRASTRUCTURE AND TECHNOLOGY

Sanitation Vehicle Fleet

This section is a summary of the UGA Sanitation fleet conditions.

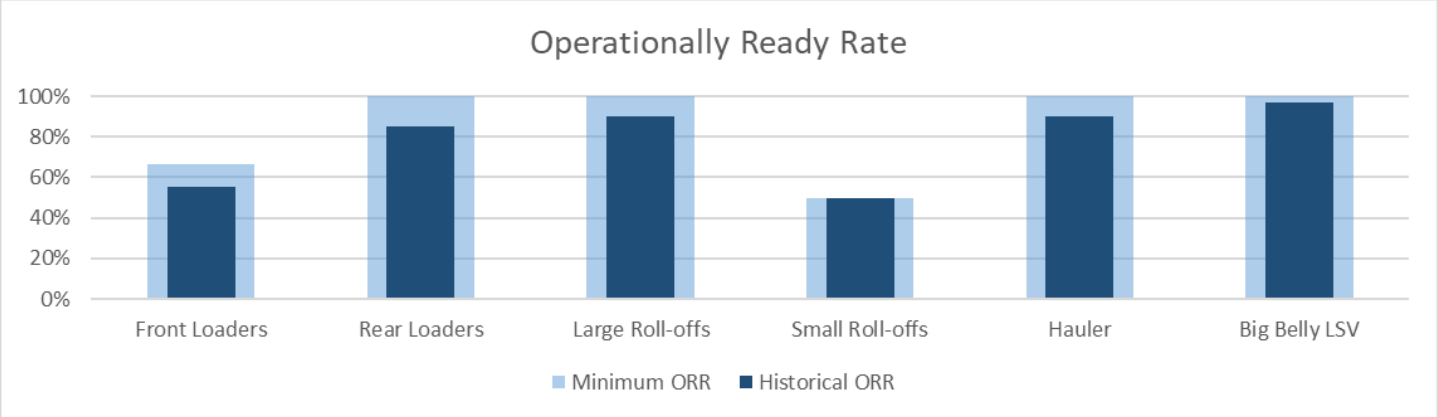
Fleet Age

Ten out of 12 of the UGA Sanitation fleet vehicles are at or beyond the industry standard useful life based on the individual vehicles' model year and standard useful life for vehicles in their class.



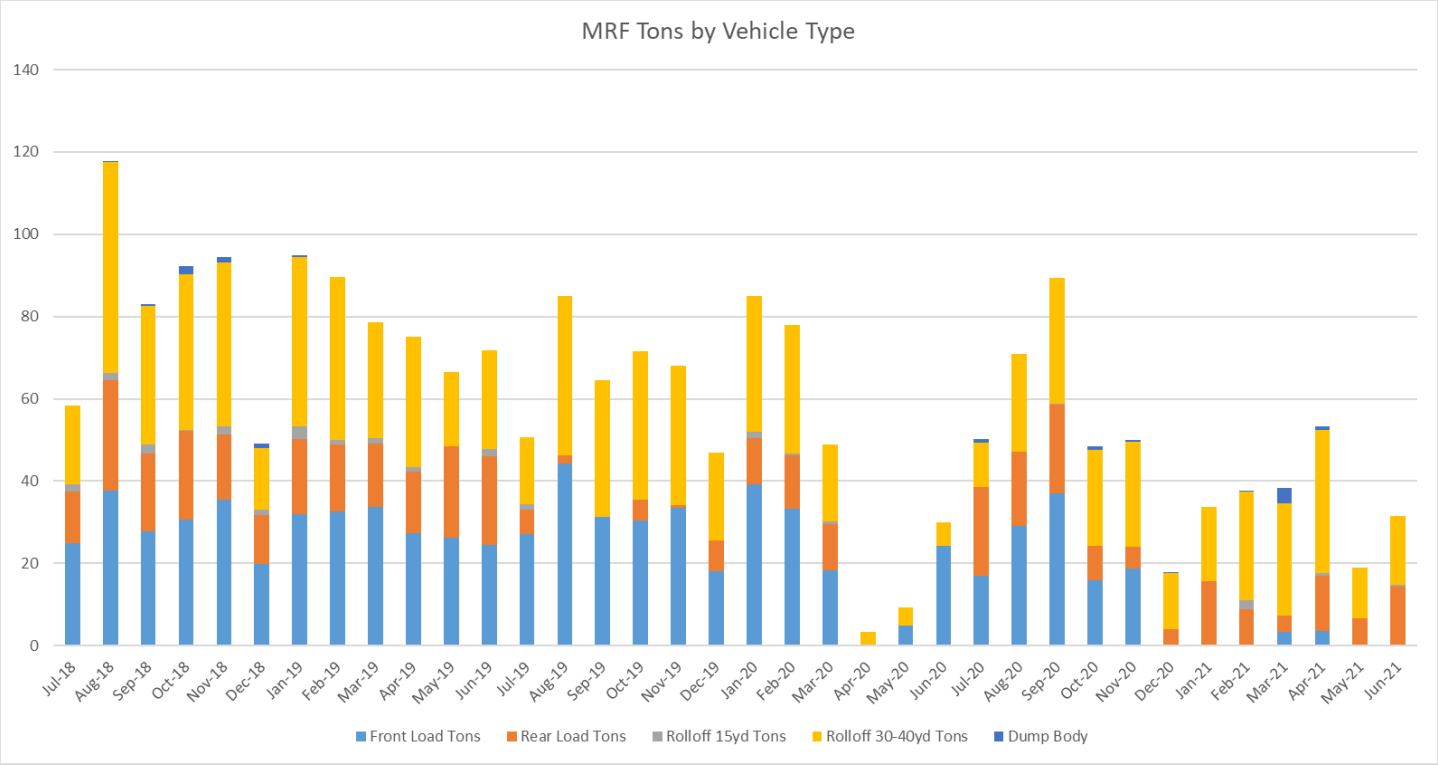
Fleet Reliability

Fleet reliability affects service continuity. The minimum operationally ready rate (ORR) indicates the percentage of vehicles within a class that needs to be fully functional to avoid lapses in service. For example, there are three front loaders, but two are necessary at any given time to ensure continuity. The minimum ORR for front loaders is therefore 2/3 or 67%. However, the historical ORR for UGA front loaders is between 55% and 60%, meaning less than two of the three are always operational. Most of the UGA Sanitation vehicle classifications (front loader, rear loader, rolloff, etc.) have a historical ORR that is below the minimum ORR, indicated in the chart below by a dark inner bar that is shorter than the light outer bar.



Single-Stream Recycling Vehicle Utilization

Front-load vehicle trips to the ACC MRF reduced significantly since December 2020 and in the preceding spring. This appears to be due to two primary factors: unreliable or inoperable vehicles and/or observation of contamination in single-stream recycling.



Vehicle Replacement

FMD does not have a sanitation vehicle recapitalization program. Establishment of such a program will be critical to replace existing vehicles that have exceeded their useful life and ensure functional waste management vehicles in the future.

Containers

Map of Outdoor Containers

FMD has historically not kept up-to-date container location data, rather relying on institutional knowledge to plan routes and ensure continuous collection service. During the summer of 2021 multiple FMD departments collaborated to develop and ground-truth a current GIS map of containers that includes identification by material stream and container type. Since containers tend to move rather frequently, this map should be routinely updated.

Container Types

UGA uses a variety of outdoor and indoor container types and configurations. There is not a consistently applied standard for outdoor container colors, signage, or placement. A list of commonly found interior containers is included in Appendix G: Exterior Containers. Indoor container types are generally consistent in common areas such hallways and restrooms within UGA facilities on main campus. A UGA standard 2-bin system for landfill and mixed recycling is used in most common areas,

excluding restrooms. A UGA standard landfill container is used in restrooms. Although a Deskside Waste Reduction Program with standardized bins exists for office areas, this system is not widely adopted and a variety of containers can be found in offices across campus. A list of commonly found interior containers is included in Appendix H: Indoor Containers.

Technology

UGA FMD has not invested in technology to enhance data collection and efficiency of waste management operations. Technological solutions to increase collection safety, measure collected waste materials, and streamline collection routes and frequency should be investigated. Technological solutions could include cameras and scales on trucks, sensors in exterior containers, as well as software to facilitate staffing and route efficiency, internal and external communications, and tracking of key metrics.

SPECIALIZED WASTE PROGRAMS

Dining Services food donation program

UGA Dining Services is a major contributor to both the Food Bank of Northeast Georgia and Full Plate. These organizations ensure that our surplus food is distributed to human-service agencies in the Athens area. Dining Services was recognized with the 2003 Community Champion award for its support feeding people experiencing homelessness in the community. In FY19, 10,117.5 pounds of edible food was donated to Full Plate.

Campus Compost Programs

Organics collection is a point of pride for UGA and also an opportunity for expanded waste reduction operations. While significant efforts are underway to capture organic waste in dining halls, collection efforts could be expanded to incorporate institutionalized post-consumer compost bins campus-wide and in food areas in particular.

Dining Halls and Retail Food Areas

UGA Dining Services leads by example, capturing pre-and post-consumer organic materials from each UGA Dining Hall. Organic materials from UGA dining halls is hauled by FMD Grounds – Sanitation Services to the UGA Bioconversion Center, or the ACC Commercial Composting Facility as needed. Dining Services also collects back-of-house organic materials in retail dining areas in Tate Center. ACC Solid Waste is contracted to haul these materials to the ACC Commercial Composting Facility.

Campus Buildings

The Office of Sustainability runs a departmental compost program in which food scraps from campus break rooms (coffee grounds, fruit peels, etc.) are collected weekly by student interns on an electric trike. Participation has reduced to 32 campus buildings during COVID-19. Due to permitting concerns at the UGA Bioconversion Center, ACC Solid Waste is contracted to haul these materials to the ACC Commercial Composting Facility.

Events

UGA Campus Catering composts at each event they serve. Departments that host large events can borrow compost bins from the Office of Sustainability and deposit compostable materials at Athens-Clarke County compost drop-off locations.

Deskside Waste Reduction Program

Each UGA unit is encouraged to take responsibility for managing waste within their office environments to enable FMD staff to focus on increased cleaning and disinfecting of restrooms and common areas. Participants receive new deskside recycling and "side saddle" trash bins and commit to empty them into nearby common area bins. Bins are provided free of charge to Resident Instruction facilities and are available for purchase by Non-RI units. More than 775 deskside container sets have been distributed, resulting in 1.5 FTEs in redirected staff time. Mandated use of this system and/or discontinuation of office waste service by FMD staff has been requested but has not been implemented; this practice is currently in place at many other universities including Georgia Tech.

Green Labs Program

The University of Georgia Green Labs program is committed to making UGA research labs more sustainable and efficient by reducing resource use, decreasing waste, and implementing best practices and technologies. Research laboratories have a substantial environmental footprint, using up to 10 times the resources of a classroom or office, and generating an estimated 25 times the waste. Thus, they afford a great opportunity to achieve sustainability efforts at UGA.

A 6-week laboratory waste reduction pilot conducted in the Environmental Health Science building during spring 2021 resulted in more than 300 pounds of recyclables diverted from the landfill. Common lab materials collected for recycling include ice packs, pipette tip boxes, Styrofoam coolers, cardboard, and other plastic containers. While lab occupant buy-in was high, the pilot program exposed operational challenges that eroded confidence in FMD's waste management operations within that building.

A lab-specific waste audit conducted in spring of 2018 by the UGA Green Labs program examined the waste streams of 4 different types of research laboratories, representing UGA's diverse research enterprise (e.g., a for-profit pathology lab, a molecular genomics lab, a plant pathology lab (BSL), and a plant biology lab.) These labs were reviewed and selected in order to capture the differing waste streams produced by different types of research laboratories at our main campus. This audit spanned a three-day period. Materials were categorized into four categories: Avoidable, Recoverable, Non-Recoverable, Compostable. All recoverables were categorized with consideration of local recovery options, specifically the offerings of ACC Recycling and CHaRM. 63% of waste streams were found to be recoverable, 15% avoidable, 15% compostable and only 7% non-recoverable. When scaled up to project the potential impact of all labs on campus, this audit revealed approximately 300 metric tons of waste could be diverted annually by simply engaging in local recycling/recovery options. It also illuminated the need to divert specific hard-to-recyle materials prior to them arriving in our research facilities via procurement policies which would require greater extended producer responsibility, take back programs or the use of more sustainable alternatives.

Lab Glass Rehoming Program

The UGA Green Labs program strives to divert laboratory waste from our landfills and simultaneously supports the education of our future scientists, by collaborating with our local Teacher Reuse Store (TRS) located at the CHaRM. As many of our local highschools are underfunded, and most lab glass is quite expensive, teachers often are unable to lead the curriculum they desire. Donated equipment helps to change that by providing free shopping for lab items for local teachers. Unbroken, clean, non-inventoried lab equipment and lab glass leaving UGA's research labs, which would otherwise go to landfill, is taken to the TRS to be rehomed and remain in use.

Universal Waste

FMD manages proper collection and recycling of universal waste materials including batteries and waste lamps. Strict protocols for collection, storage, labeling, and disposal are followed. Batteries are taken to the ACC CHaRM for a fee. While battery buckets are technically available in each UGA building, knowledge of this program is limited.

Film Plastic, Polystyrene, and PLA Filament

FMD established a protocol for on-demand collection of film plastic, polystyrene (Styrofoam), and PLA filament scraps. Campus customers may collect these materials within their facility and request a pick-up through their Building Services Building Supervisor. Supervisors submit a pick ticket to the FMD Warehouse and materials are collected during the next standard supply delivery to that facility. Once a sufficient quantity of materials is collected in the FMD Warehouse, Support Services transports the materials to the ACC Center for Hard to Recycle Materials (CHaRM). These programs are implemented in relatively few campus locations; staffing and vehicle availability may be limiting factors to scaling up.

Surplus Property Disposal

Surplus state property is managed by UGA Asset Management or shared among UGA peers though the UGA Surplus Property Listserv. Unclaimed and unsellable furniture items are disposed in a compacting landfill dumpster at the Chicopee Complex, representing 3% of UGA's total waste stream.

Animal Bedding and Vivaria Waste

Animal bedding and vivaria waste has been captured for composting in multiple UGA research facilities. This program is currently on hold due to costs associated with compostable bags and permitting challenges at the UGA Bioconversion Center.

FMD Materials Reclamation Center (proposed)

A proposal has been developed to convert underutilized portions of the Chicopee Complex "Boneyard" into the FMD Materials Reclamation Center to enhance safety, efficiency, and landfill diversion within Facilities Management Division operations. Initial material streams to be captured for reuse or recycling include metal, masonry, single-stream recycling, and potentially other common commodities with identified end-of-life uses. There is internal buy-in for the program among multiple FMD departments; implementation is on hold due to time constraints within FMD Grounds Sanitation.

OUTREACH AND EDUCATION PROGRAMS

Waste reduction education and program information is available on the Office of Sustainability website and shared with campus customers upon request. A more proactive and coordinated waste reduction campaign would help to increase awareness and action.

Common Area Bin Signage

Bin signs to educate customers on what is – and is not – recyclable are installed on standard common area landfill and recycling bins in some campus locations. In FY21, bin signs were installed on more 150 bin sets in more than 5 buildings. Clear and consistent messaging should be installed in each UGA building, and potentially at each point of disposal.

Dawgs Ditch the Dumpster and Donate

Dawgs Ditch the Dumpster and Donate is an annual landfill diversion initiative and student volunteer opportunity that reflects housing's commitments to sustainability and student leadership. The program allows residents living on campus to donate unwanted items that may otherwise end up in a landfill. Every year, Dawgs Ditch the Dumpster and Donate saves an average of 60,000 lbs. of material from ending up in the landfill, equivalent of filling up eight 53-ft trailers or 40 roll off dumpsters.

Swap Shop

To reduce landfilled materials, Swap Shop at UGA encourages reuse, repair, and circular economy practices at no cost to campus community members. Located in MLC Room 278, Swap Shop at UGA is a place for students to trade personal items, which keeps usable goods out of landfills and recirculates them back to the campus community. During its inaugural season in spring 2021, Swap Shop facilitated 322 swaps totaling 222.4 pounds of items that might have ended up in the landfill. This program is new and appears to offer promise in cultivating a culture of reuse among students.

Greek Goes Green

Greek Goes Green leverages passion, commitment, and leadership among UGA's Greek organizations to create an increasingly just and sustainable campus and community. Participants report progress in community service, racial unity, resource conservation, and innovation to become recognized as official UGA Green Chapters. Chapters must provide recycling bins and education for members and are encouraged to eliminate Styrofoam, compost food scraps, and replace single-use plastic items with reusable or compostable alternatives. In FY21, 22 chapters were certified as "green chapters". Continuous re-education of students is a consistent challenge, and the Greek Goes Green program helps to reach a target audience at UGA.

Sustainable Purchasing Guideline

In alignment with USG Board of Regents policy and UGA Finance and Administration strategic goals, sustainable purchasing considers a product's environmental and social attributes along with performance, quality, service, and price. The Office of Sustainability collaborated with UGA Procurement and Sustainability Certificate students to develop guidelines for cost-effective, sustainable purchasing that maximizes state resources and long-term value for the university. Additional partnerships and an approved policy should be developed and widely distributed to encourage compliance with best practices.

Zero Waste Event Guide

Guidance is available on the Office of Sustainability website to help UGA departments plan and implement waste-free events on campus. This should be enhanced through partnerships with Office of Special Events, Campus Reservations, and other key stakeholders to maximize adoption and ensure effectiveness.

DATA GAPS AND EVALUATION

Data Gaps

FMD currently has access to tipping fee and tonnage data through invoices from the ACC Landfill, Recovered Materials Processing Facility (recycling center), and Center for Hard to Recycle Materials (CHaRM). Tonnage and tipping fees are recorded from invoices from the ACC Landfill and MRF/Reclaimed Materials Processing Facility (recycling center) but that data is not regularly reviewed or analyzed. Tonnage data from CHaRM is not currently documented separately by UGA, and there is not a consistent system for tracking quantities of pallets, film plastic, Styrofoam, PLA scraps, batteries, other hard-to-recycle materials, or organics / compostable materials.

Tonnage and vehicle data in this report was obtained directly from ACC (landfill) and vendor/operator (recycling). UGA should investigate opportunities for partnership to receive this data routinely. FMD should implement a strategy to review, analyze, and track data over time to measure performance, efficiency, and progress toward waste reduction goals.

A comprehensive waste characterization study has not been conducted to date at UGA, resulting in limited visibility of what specific waste materials are generated on campus, in what quantities, and from where.

Sanitation Services staff make judgement calls regarding contamination in single-stream recycling. If a load is determined to be contaminated, it is taken to the landfill instead of the recycling center. Greater clarity is needed to define what constitutes contamination and how much contamination is too much to be accepted at the recycling center. If and when contaminated loads are observed, a system should be implemented to document the offense and provide feedback to customers so that the problem can be avoided in the future.

UGA should also investigate technology upgrades to achieve waste management industry standards or leadership, such as cameras and scales on vehicles, sensors in stationary exterior containers for on-demand servicing, and software solutions to facilitate route efficiency, internal and external communications, and tracking of key metrics. Sanitation does not actively track vehicle route utilization and there is currently no mechanism for collecting quantitative or qualitative data regarding container weights or fullness during collection routes. Qualitative driver observation data such as when, where, and how much contamination is seen in exterior recycling containers is not documented or communicated to end users.

Evaluation - Atlas Project Stage 1 Report

An Atlas Project Phase 1 Assessment was conducted during spring 2021 by Office of Sustainability student interns in collaboration with the Post-Landfill Action Network (PLAN). The assessment documented adoption of waste reduction and reuse practices at UGA and stakeholder knowledge regarding waste management protocols. The assessment framework focused on Scope 1: Hard Goods such as surplus property and hard-to-recycle materials over which UGA has direct control, and Scope 2: Soft Goods such as food and single-use materials over which UGA may have less control. UGA scored 41.5% in Scope 1 and 52.9% in Scope 2, which is considered to be average among US campuses. Contact the Office of Sustainability for the complete Atlas Project Phase 1 Report.

Key recommendations from the Atlas Project Assessment include:

- Establish a Zero Waste Task Force, review current conditions and develop a strategic vision for zero waste operations at UGA
- Ensure reliable and effective waste management infrastructure and staff training
- Employ at least one full-time employee dedicated to reducing waste reduction initiatives
- Establish a timeline to achieve measurable progress toward specific Scope 1 and Scope 2 waste reduction strategies regarding surplus property, hard-to-recycle materials, sustainable procurement, reusable dining ware, elimination of single-use plastic, and expanded compost collection campus-wide.

Appendix A – List of FMD Waste Reduction Working Group Members

The UGA Waste Management Baseline Conditions Assessment was developed by the Facilities Management Division Waste Reduction Working Group, comprised of:

Bill Brinn, FMD, Fleet Manager

Brett Ganas, FMD, Director – Grounds

Todd Kerzie, FMD, Director - Building Services

Kevin Kirsche, FMD, Director - Sustainability

Jason Perry, FMD, Sustainability Specialist

Star Scott, FMD, Green Labs Program Manager

Hope Thomas, FMD, Safety Manager

Kim Thomas, FMD, Senior Director - Services

Clayton Wilcox, FMD, Senior Director - Administration

Chadwick Wilson, FMD, Director – Work Request Center

Appendix B – Abbreviations and Glossary of Terms

Abbreviations

ACC	Athens-Clarke County
BSW	Building Service Worker
FMD	Facilities Management Division
FY	Fiscal Year
GIS	Geographic Information System
MRF	Material Reclamation Facility (see RMPF)
PLAN	Post Landfill Action Network
RMPF	Recovered Materials Processing Facility (see MRF)
RI	Resident Instruction

Glossary

8-yard	An outdoor waste container with a volume of eight cubic yards, typically emptied by a front-load truck.
30 –yard / 40-yard	An outdoor waste container with a volume of thirty or forty cubic yards, typically emptied by a large roll off truck.
Container	In this report, a container is any stationary exterior vessel intended to store waste materials, such as an 8-yard or 40-yard.
Front Loader	A waste truck with a lifting mechanism mounted to the front that tips the contents of a waste container into the top of the truck
Non-Resident Instruction	State owned buildings listed in the Facilities Inventory Database (FIDB), that are under the control of UGA entities and do not receive direct funding support from the State, e.g. Athletics, Auxiliary Services, Parking, Food Services, and Housing.
Rear Loader	A waste truck with a lifting mechanism mounted to the rear that tips the contents of a waste container into the rear of the truck.
Resident Instruction	State owned buildings listed in the Facilities Inventory Database (FIDB) that are funded for maintenance by state appropriations; also, all campus utility infrastructure, and all roads, hardscape and grounds in and around these same facilities.
Roll Off	A waste truck that lifts a container onto the bed of the truck for transport to a proper disposal location.

Appendix C - Design and Construction Standards

Waste management infrastructure is referenced in three sections of the UGA Design and Construction Standards as summarized below.

01 81 00 Facility Performance Requirements

Section 1.I.i requires "convenient facilities" for waste management:

> The University of Georgia is committed to drastically reducing waste and diverting 65% or more of the campus waste stream from landfills. For new construction and major renovations, the project shall provide convenient facilities for recycling for building occupants and facilities management staff to reduce waste and increase collection of recyclables. See section 01 74 19 Construction Waste Management & Disposal.

12 93 23 Trash, Litter, and Recycling Receptacles

Section 1.B specifies how new outdoor public receptacle locations will be approved:

> UGA Athens Campus Only: Proposed new trash and recycling receptacles in this section are to be provided in high-use areas on the UGA Athens Campuses shall be coordinated with the Project Manager and the UGA FMD Services Department.

Section 2 specifies "Big Belly Duo-station (for trash and recycling) WS-BB-DBL-1YR" as the outdoor public receptacle standard.

12 46 33 Interior Waste Receptacles

Section 1.B generally specifies waste station locations:

> UGA Athens Campus Only: The Design Professional shall plan for locations for trash and recycling receptacles. Generally, they are provided in high-use areas. Locations and procurement shall be coordinated with the Project Manager and the UGA FMD Services Department.

Section 2 specifies Busch Systems Waste Watcher waste stations.

Section 2.E allows for alternatives to the above:

Alternatives to the standard interior trash and recycling bins will be considered by FMD on a case-by-case basis. Requirements for alternatives to the UGA standard interior "waste reduction station" include co-located trash and recycling facilities, consistent messaging denoting "landfill" for trash and "mixed recyclables" for recycling, and 23-gallon containers that accommodate FMD's standard bin liner. Requests for alternative bins shall be submitted as a variance to the Project Manager.

Appendix D – UGA FMD Unit Specific 2025 Strategic Plan (excerpt)

Unit Goal: Quantify, target, and reduce landfill tonnage and overall waste generation on campus through effective operations, education, prevention, and diversion.

Key Performance Indicator: Project milestones to assess campus waste streams, waste management, and operational practices

Data Source: Facilities Management Division, Office of Sustainability

Annual Targets:

FY2021	• Assess and establish baseline waste management program costs • Perform campus-wide waste audit and implement a waste data tracking system • Assess and address equipment, facility, and personnel gaps • Develop and expand programs to address food waste and organics, laboratory waste via the UGA Green Lab program, construction and demolition materials, and other hard to recycle materials • Transition to campus-wide occupant management of desk side and office waste materials • Launch targeted waste reduction education campaigns for operational staff, students, and new hires
FY2022	• Document equipment needs, identify funding, and purchase equipment to provide an optimized waste management program • Publish sustainable purchasing guidelines to prevent commonly discarded materials from entering campus • Implement diversion strategies where non-landfill options exist for commonly discarded materials • Optimize UGA Bioconversion Center to enhance processing capacity for additional organic materials • Audit and continue to develop targeted waste reduction strategies to support research areas through access of specialized recycling, education of research staff, procurement guidelines, inventory management, take-back programs, green chemistry, and tracking and assessment of lab waste and recycling
FY2023	Document and address equipment and staffing needs to provide an optimized waste management program
FY2024	Document equipment and staffing needs, identify funding, purchase equipment and pursue staffing to provide an optimized waste management program
FY2025	Perform follow-up assessment to evaluate progress and identify new target areas

Key Performance Indicator: Combined Landfill and Single Stream Recycling tons

Data Source: Facilities Management Division

Annual Targets:

FY2021	6,100 (2019 baseline: 6,435 tons)
FY2022	5,800
FY2023	5,500
FY2024	5,200
FY2025	4,900

Key Performance Indicator: Recycling Rate (percentage of Single Stream tons in the combined Landfill and Single Stream waste stream)

Data Source: FMD Grounds, Office of Sustainability

Annual Targets:

FY2021	12% (2019 baseline: 11% recycling rate)
FY2022	15%
FY2023	19%
FY2024	22%
FY2025	25%

Appendix E – Sanitation Vehicle Data

The following is adapted from an informational presentation prepared by UGA Fleet Manager Bill Brinn in June 2021.

Front Loaders

- Three (3) front loaders – trash and recycling
- Average age 13 years (1998/2008/2018)
- Industry standard useful life 8 years
- Minimum Operationally Ready Rate (ORR) 67%
- Historical ORR 55% - 60%
- Services 165 eight yard containers 2-5 x/week

Rear Loaders

- Two (2) rear loaders - recycling
- Average age 18 years (1992/2007)
- Industry standard useful life 8 years
- Minimum ORR 100%
- Historical ORR 85%
- Services 300 ninety-six gallon containers 2x/week

Large Roll-Off (30 – 40 yards)

- Two (2) large roll off trucks - trash
- Average age 13 years (2006/2013)
- Industry standard useful life 8 years
- Minimum ORR 100%
- Historical ORR < 100%
- Services 45 thirty/forty yard containers 2x/week

Small Roll-Off (15 yards)

- Two (2) small roll off trucks - trash
- Average age 23 years (1992/1999)
- Industry standard useful life 8 years
- Minimum ORR 50%
- Historical ORR 50%
- Services 10 fifteen yard containers 1x/week

Hauler

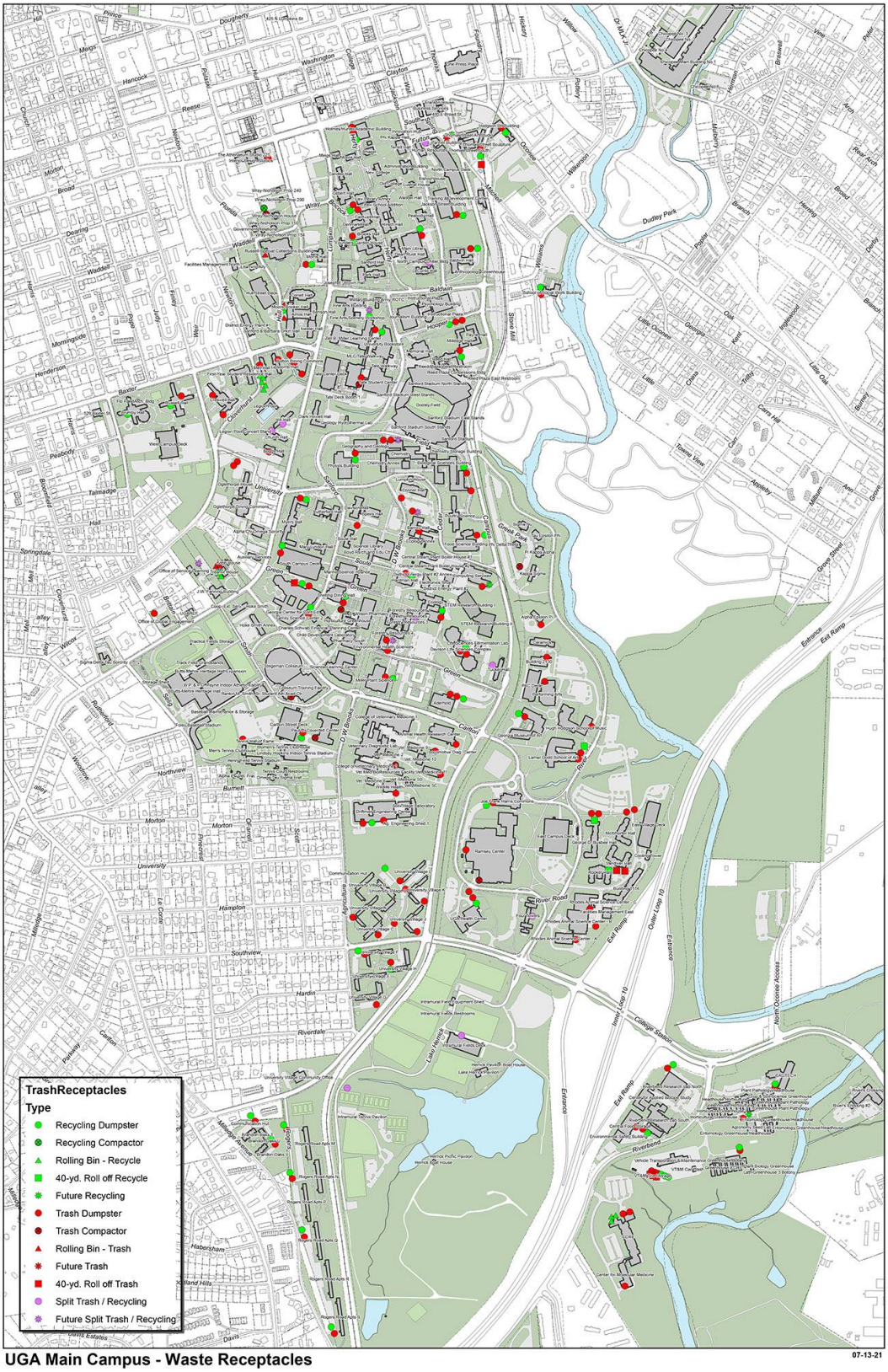
- One (1) hauler
- Age 30 years (1991)
- Industry standard useful life 8 years
- Minimum ORR 100%
- Historical ORR < 100%
- Moves 8 yard containers daily

Big Belly LSV

- One (1) Low speed vehicle – trash and recycling
- Age 4 years (2017)
- Industry standard useful life 5-7 years
- Minimum ORR 100%
- Historical ORR 97%
- Services 75 Big Belly containers daily

Appendix F – Container Map

UGA Main Campus Container Map, dated 07-13-2021



UGA Main Campus - Waste Receptacles

Appendix G – Outdoor Containers

8-Yard Containers

000 total 8-yard containers on UGA Athens Campus (*00* Landfill, *00* Recycling, *00* Split Landfill/Recycling). Below is a sample of existing containers on campus.

	Landfill container in a corral near Service Learning
	Single stream recycling outside of the Miller Learning Center
	Plastic containers at the Main Library

	Landfill container in East Campus Village

Roll-Off Containers & Compactors

00 total Roll-Off containers on UGA Athens Campus (*00* Standard, *00* Compacting; of the total *00* Landfill, *00* Recycling, *00* Metal Recycling). Below is a sample of existing containers on campus.

	Single stream recycling in East Campus Village
	Single stream recycling outside of the FMD Warehouse at Chicopee

	Metal recycling outside of the Surplus Department at Chicopee

96-Gallon Rollcarts

Roll Carts are typically used for outdoor recycling collection when there is insufficient space for a stationary recycling container. Below is a sample of existing containers on campus.

	Single stream recycling rollcarts adjacent to a landfill container near Oglethorpe House.
	Single stream recycling rollcarts outside of Creswell Hall.

Appendix H – Indoor Containers

Hallway and Common Area Containers

Standard co-located landfill and mixed recyclables containers are placed in common areas, such as hallways and other shared spaces, in most buildings on UGA's main campus and Health Sciences Campus. The goal of these containers is to make it equally as easy to recycle as it is to throw an item away, and to provide an opportunity for all campus visitors to make the right choice. These bins are intended to be located so that building occupants have reasonably convenient access from any point in the building.

Deskside Containers

Most offices in RI facilities use legacy metal (below left) or plastic deskside trash cans with liners. Building Service Workers remove office trash for the occupants. With this legacy system there is no provision for in-office recycling containment or service. Individual occupants or departments may opt in to the Deskside Waste Reduction System (above right). Participants receive new deskside recycling and "side saddle" trash bins and commit to empty them into nearby common area bins. This opt-in system eliminates plastic liners and allows BSWs to focus on critical cleaning tasks.

The FMD Warehouse stocks both a black 7-gallon plastic trash can as well as the components for the Deskside Waste Reduction System.

Plastic Bags

In FY2019 the FMD Warehouse stocked nine different plastic bags. They released 6,248 cases of plastic bags with a total value of $241,389 through 1,743 individual transactions.

FMD Building Services has standardized the use of black bags for landfill waste and translucent bags for single stream recyclables. Translucent bags allow inspection for contaminants and provide an easy visual cue for Building Service Workers. Black bags in the recycling stream also provide a quick way to identify contamination in recycling containers. (Note: The Deskside Waste Reduction System is unlined and eliminates one use of plastic bags.)