



UC Berkeley Zero Municipal Solid Waste to Landfill by 2020

Produced 2013

This UC Berkeley Plan represents an early roadmap to reduce the environmental impacts associated with the campus waste streams and to eventually send zero municipal solid waste to landfills to meet the UC zero waste 2020 goal.

Acknowledgements

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UCB Chancellor's Advisory Committee on Sustainability – Years 2010-2012

UCB Building Sustainability at Cal

UCB Compost Alliance

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Introduction

PURPOSE

The Plan represents an early roadmap to reduce the environmental impacts associated with the campus waste streams and to eventually send zero municipal solid waste to landfills to meet the UC 2020 zero waste goal. This Plan helps to chart a course for the campus of programmatic, service, and education strategies that will both reduce materials coming to campus, and reuse, recycle, or compost materials leaving the campus.

This is the first municipal solid waste reduction plan produced for the campus and as such it organizes various approaches and responsibilities into one document intended to guide the campus on the physical and programmatic actions needed to achieve the goal of zero landfill waste by 2020.

The Plan emphasizes that reaching zero waste relies on the comprehensive participation of the entire campus community - physical plant, planning and design, administration, procurement, administrative and academic departments and units, campus vendors, student initiatives, and individual faculty, staff, and students. The Plan also emphasizes that the majority of actions needed to meet the zero waste to landfill goal rely on existing technologies and services already available on campus – thus our challenges are not awaiting invention but rather for the resources for expansion and institutionalization.

BACKGROUND

UC Berkeley has been working on several fronts to reduce waste over the last two decades. This has been evidenced by both the growth in recycling and reuse programs and a slow but steady decline in the amount

Municipal Solid Waste

Municipal Solid Waste is defined, for the purposes of the UC Policy on Sustainable Practice as:

“Garbage, refuse, sludges, and other discarded solid materials resulting from the residential activities, and industrial and commercial operations, which are legally dumped into permitted landfills. Municipal solid waste does not include any regulated hazardous or medical waste. For the purpose of measuring compliance with UC’s zero waste goal, UC established that campuses need to meet or exceed 95% diversion of municipal solid waste. Ultimately, UC’s zero waste goal strives for the elimination of all materials sent to the landfill by 2020.”

Additionally, solid waste for the purposes of this Plan does not include hazardous material and construction or demolition waste, as these are disposed of and monitored under different processes. The Plan, though, does include pre-construction measures intended to reduce waste over the life of renovated and new buildings.

of waste going to landfills. Despite these efforts the campus municipal solid waste diversion rates have remained below 50%.

Campus efforts are guided by the University of California's Policy on Sustainable Practices that calls for a 75% diversion of waste from landfills by June 2012, and reaching zero waste by 2020. UC Berkeley adopted these goals into our 2009 Sustainability Plan.

In 2011, recognizing that the campus would not meet the 75% diversion goal and was not on a trajectory to reach zero waste, the Chancellor's Advisory Committee on Sustainability (CACS) commissioned a study in partnership with Campus Recycling and Refuse Services (CRRS) and the Office of Sustainability to review current waste disposal practices and identify the challenges and opportunities available to the campus to meet these targets. This research found that the campus can likely meet the near-term goal by expanding the downstream activities, particularly expansion of the food, food container, and paper towel composting program to most campus buildings, and enhancing education efforts and programs to ensure better recycling compliance. This study also touched on the additional upstream measures that will be necessary to reduce the amount of materials coming to campus that end up in the waste stream.

This Plan expands on the findings of the CACS study by identifying current and future downstream and upstream strategies, providing design guidelines, and offering an implementation course to reach zero municipal solid waste. This Plan meets the UC system-wide call for all campuses to produce such planning documents.

SCOPE OF THE PLAN

This Plan focuses on reducing the municipal solid waste produced from all UC Berkeley owned and operated property – buildings and outdoor spaces - in the cities of Berkeley, Albany, and Richmond. This includes the 178-acre core central campus, facilities adjacent to the central campus including the 1,000 acres east of Memorial Stadium (primarily natural open space known as the Hill Campus), campus residence halls and apartments, University Village Family Housing, Richmond Field Station, parking and athletic facilities, and offices and warehouse spaces in the surrounding communities.

It is intended that any new campus buildings and developments at minimum adopt the reduction practices and design guidance provided in this Plan and its updates.

What Is Not Included in This Plan

This Plan does not cover facilities that are leased by the campus and for which the campus does not have operational control. As this is a plan to minimize municipal solid waste, it does not cover waste reduction and disposal strategies related to hazardous and regulated materials such as chemicals, hazardous wastes, and electronic waste. Additionally, this Plan does not address construction or demolition waste, as this is disposed of and monitored under different processes. Further, the Plan does not address larger-scale physical planning and design that can facilitate proper equipment placement, aesthetics, and access for storing and moving material in ways that support zero waste. Further, extensive laboratory-related recycling will require more in-depth analysis than can be accomplished in this Plan at this time.

Working with the other campus entities that manage disposal of the materials described above, it is intended that future updates to this Plan will be more comprehensive in the approach to zero waste and potentially include these other waste streams.

IMPLEMENTATION

Physical Plant-Campus Services (PP-CS) units manage the solid waste and recycling services for the campus. Campus Recycling and Refuse Services (CRRS) currently plays the lead role in implementing this Plan and coordinating the operational services (in-house and vendor contracts) to move the different waste and material streams from campus to landfill, recycling, composting, and other appropriate facilities. Campus and Housing Custodial Services also play a key role in this process, as these groups move most of the materials from the interior of the buildings to the external bins for pick-up. Additionally, Campus and Housing Grounds Services collects materials from outdoor receptacles, as well as green landscape waste and plant debris. CRRS also coordinates waste reduction and recycling education efforts and innovative student-led programs such as ReUSE and Compost Alliance.

While PP-CS, and in particular Campus Recycling and Refuse Services, will continue to provide the leadership role in the implementation of this Plan, it is the intention of this Plan to both recognize and further engage partnerships that have been instrumental in our advancement to date and will be critical to future success. This shared leadership and participation will help ensure the campus can reach zero municipal solid waste to landfill by 2020.

This Plan embodies strategies and initiatives that are recognized today and is only as comprehensive as current understanding affords. As such, it is intended that new innovations and programs will be integrated into this Plan on a rolling basis and at a minimum annually.

RELATED PLANS & POLICIES

This Plan has been informed and/or guided by the following plans and policies:

- UCB 2020 Long Range Development Plan
- UCB Landscape Master Plan
- UCB 2009 Sustainability Plan
- UCB 2009 Climate Action Plan
- UCB Annual Sustainability Reports
- UC Policy on Sustainable Practices
- City of Berkeley 2005 Draft Solid Waste Management Plan Update

Goals, Objectives, & Strategies

GOALS

Campus solid waste reduction efforts are guided by the University of California's Policy on Sustainable Practices that calls for goals of 75% diversion of waste from landfills by June 2012, and zero municipal solid waste by 2020. UC Berkeley adopted these goals into our [2009 Sustainability Plan](#).

The University of California's hierarchy for waste reduction is to reduce, reuse, repair, and then recycle or compost. That means that the first priority is to reduce the generation of waste through what is referred to as upstream strategies. The second and third priorities - to reuse items in their original form and to repair, recycle or compost, are considered downstream strategies.

Generally, downstream strategies will get the campus to 75% diversion from landfills, while upstream strategies will take the campus the rest of the way to zero solid waste. Additionally, education and incentive programs along with continual innovation, monitoring, and reporting on the efficacy of the strategies are essential for success.

The following outlines the strategies UC Berkeley will employ to reach these goals. These strategies are further elaborated in later sections of the Plan.

OVER-ARCHING OBJECTIVES: ACHIEVING ZERO WASTE

- *Foster a culture at UC Berkeley that prioritizes using less, reuse, repair, and considers life-cycle in product purchases.*
- *Be a higher education leader in upstream strategies through initiatives like the student-led zero waste research center.*
- *Continue the tradition of student leadership and innovation as the mainspring of campus waste reduction efforts.*
- *Engage with the surrounding community to advance zero waste on-campus and in the region.*
- *Design new campus buildings and developments to be models of zero waste practices.*
- *Identify funding and resources to implement this Plan.*

DOWNSTREAM STRATEGIES

The campus can reach at least a 75% diversion rate through downstream strategies.

- **Recycling:** Improve user understanding and correct usage of existing recycling programs. Expand recycling services to underserved areas. Provide standardized receptacles and signage throughout campus. Develop more vendor take-back programs. Find alternative recycling programs for plastics 3-7 and laboratory materials.
- **Composting:** Expand organic, food waste, and paper towel composting to campus buildings. Provide standardized receptacles and signage throughout campus. Implement a robust educational program to ensure proper disposal and minimize contamination. Provide composting for animal-related bedding and landscape materials.
- **Reuse:** Expand reuse options including ReUSE stations on campus, the use of exchange programs, the campus Overstock & Surplus services, and partnerships with charitable organizations. Improve and develop repair options and reusable packaging and transport options.
- **Special Events:** Support small and large events to be zero waste, including athletic events, performances, and conferences, in order to minimize or eliminate material that cannot be reused, recycled, or composted.
- **Laboratories:** Due to the complexity of lab waste materials, municipal solid waste reduction strategies will focus on maximizing standard downstream practices in lab buildings, employing reusable alternatives when appropriate, and researching upstream strategies.

UPSTREAM STRATEGIES

The campus will need to employ more creative and complex waste reduction strategies to achieve the final stretch to meet zero waste to landfill.

- **Reduce:** Further instill the principles of using less - stopping the generation of waste before it even becomes a material stream that needs to be dealt with on campus.

- **Green Purchasing:** Improve green purchasing contracts and practices to consider a product's life-cycle and meet standards for minimal packaging and products that are easily recyclable or compostable at end-of-life.
- **Vendors and Tenants:** Contractual arrangements with vendors and tenants in campus-owned spaces will include requirements to provide proper recycling and composting supplies and services and to employ other zero waste strategies.
- **Pre-Construction and Pre-Renovation:** Planning and design for construction and renovation projects will reduce waste over the operational life of the building; this includes providing appropriate recycling and waste management infrastructure, and adopting more waste-conscious move-out practices when campus spaces are vacated for construction projects. The campus will strive for new campus buildings and developments to be models of zero waste practices.
- **Campus Design Guidelines for Waste Management Infrastructure:** Employ campus standardized indoor and outdoor bins, enclosures, centralized re-use and collection areas, and signage to be used throughout campus.

EDUCATION, INCENTIVES, & ENGAGEMENT

Downstream and upstream strategies need to be accompanied by continuous education and incentives to encourage students, faculty, staff and visitors to reduce waste and on proper sorting and disposal.

- **Education:** Develop an educational and outreach toolkit that can be used to inform students, employees, and visitors on proper disposal practices and upstream strategies. Recognizing that on-going education is essential, include re-training strategies in the toolkit.
- **Incentives:** Incentives such as discounts at stores and eateries can be offered to decrease one-time use of materials. Work with suppliers to offer discounts for products that are reusable, easily recyclable, or compostable at end-of-life.

- **Community Engagement:** Share best practices and develop joint programs with the surrounding community to advance zero waste in the region.

TRACKING PROGRESS & CONTINUAL IMPROVEMENT

- In order to understand successes as well as identify areas for improvement, the campus will monitor Plan implementation and transparently report findings. Through mechanisms like on-going waste audits, stakeholder engagement, reporting through the campus annual Sustainability Report, and outreach the campus will continually improve waste diversion until zero municipal solid waste is achieved.

Current Setting

PHYSICAL SETTING & POPULATION

The Plan focuses on the solid waste produced from all UC Berkeley owned and operated property – buildings and outdoor spaces - in the cities of Berkeley, Albany, and Richmond. This includes the 178-acre core central campus, facilities on the hill campus adjacent to the central campus, campus residence halls and apartments, University Village Family Housing, Richmond Field Station, parking and athletic facilities, and offices and warehouse spaces in the surrounding communities.

UC Berkeley's compact 178-acre central campus hosts up to 35,000 students, 15,000 employees, and hundreds of visitors on a daily basis.

Most waste generated on campus comes from buildings and building occupants. Understanding building characteristics and uses provides insight on waste stream types and volumes and can help guide reduction strategies.

The following table shows the types of use found in the most populated 8.5 million square feet of buildings on central campus and provides a sense of activities conducted in these spaces.

Table 1 – Central Campus Building Usage

Building Usage	Square Footage	%
Offices	2,779,074	33%
Research	2,006,211	24%
Libraries	964,608	11%
Public	918,307	11%
Classrooms	691,807	8%
Athletics Facilities	350,370	4%
Other	762,250	9%

Source: PP-CS

Behind central campus buildings, Housing and Dining buildings represent the next largest type of campus building and user. Campus-owned housing serves over 6,200 students in residential hall arrangements; this population is mostly served by campus dining services. The campus also provides family housing located in the City

of Albany – this is a 58-acre complex with 974 one, two and three bedroom apartments.

Although most waste on campus is generated from building users, waste is also disposed of and collected on campus in outdoor spaces and venues, such as walkways, parking lots, athletic venues, and plazas. These areas present different challenges and opportunities for waste management and recycling practices.

BASIC FUNDING STRUCTURES

Landfill, paper, cardboard, and bottle and can recycling collection services for the majority of buildings on the main campus are centrally funded by the State of California and in small part by funds generated from recyclables. Some additional recycling services such as those for metal and wood are also centrally funded. Additional services to State-funded entities such as composting are currently paid for by the user and small grants.

Auxiliaries are entities that are not funded by the state, but rather are self-funded. Major auxiliaries on campus include Cal Athletics, the Associated Students of the University of California (ASUC), and Housing and Dining (Residential Student Services and Programs and Cal Dining). Auxiliaries fund all of their own landfill, recycling, and compost services.

Education, outreach, and reuse programs are primarily provided by CRRS through a robust student staffed program.

MUNICIPAL SOLID WASTE MATERIAL STREAMS

Recycling

The campus has a dual-stream recycling system so paper and cardboard is collected separately from cans and bottles. With proper education, this provides a cleaner stream of diverted material for vendors and results in higher recycling revenues. Some cases from other campuses or programs have reported higher overall recycling rates with the use of single-stream recycling. However, single-stream recycling also decreases the opportunity to teach the campus about purchasing decisions and what is actually recyclable and reusable.

- Mixed Paper & Cardboard – This includes all colored and plain white paper, newspaper, magazines, sticky notes, scrap paper, envelopes, catalogs, paperboard, junk mail, and cardboard.
- Bottles & Cans – This includes plastic #1 and 2, bottles, glass, aluminum (foil), milk jugs, tin, and steel.
- Other – This includes scrap metal, plastic films and pipette tip boxes from labs, printer cartridges & toners, and other recyclable materials.

Composting Organics

- Paper Towels, Food, and Food Containers – This includes food, napkins, paper plates and cups, compostable utensils, and paper towels. Composting services are not included in regular recycling and landfill services and are an extra cost to departments and buildings. Recent small grants are assisting with a portion of the implementation and operational costs for pilot compost programs.
- Green Waste/Wood – This includes leaves, twigs, trimmings, grass, wood (including non-chemical treated pallets), and small trees.

Landfill

This includes anything not recycled or composted through the material systems listed above. Common landfill items include plastics #3-7, non-recyclable cups/containers/packaging, furniture, plastic coffee lids, laboratory plastics, and chip bags.

COLLECTING & DISPOSING OF MUNICIPAL SOLID WASTE STREAMS

Campus Recycling & Refuse Services (CRRS) is the lead department for municipal solid waste management. CRRS manages landfill services and recycling for mixed paper, cardboard, and bottles and cans throughout campus in building interiors and all but landfill waste in exteriors, as well as green waste, metal, and plastic film recycling in select locations. CRRS operates collection trucks for landfill waste and recyclables, and manages most vendor contracts for services like refuse and green waste roll-offs, bottle and can pick-up, metals, and the limited composting services. All waste materials are transported off campus to facilities for processing.

Campus and Residence Hall Custodial Services moves most of the waste materials from the interior of the buildings to the external bins for pick-up. Frequency of recycling, compost, and landfill collection varies building-to-building.

Grounds Operations provides grounds maintenance services to campus including garbage collection from outdoor receptacles, as well as green waste and plant debris.

Overstock and Surplus – Property Management handles sale and disposal of excess campus-purchased material with original value of \$5,000 or more that does not have an immediate use by the campus. Excess material not deemed for donation, trade, or sale is disposed – to landfill or for limited recycling.

Material streams not covered in this Plan include waste reduction and disposal strategies related to regulated materials such as chemicals, hazardous wastes, and electronic waste, or construction and demolition waste. These material streams are managed by various campus units that have their own goals and strategies.

Campus Municipal Solid Waste Profile & Diversion

The diversion of municipal solid waste from landfills has increased steadily from the 33% in 2000 to 46% in 2011. The amount of material sent to landfill waste has fluctuated in the past fourteen years but has decreased by 1,600 tons since 1995 – a 25% drop.

Table 2 - Annual Material Stream Data (diversion) – 1995-2011

UC Berkeley Municipal Solid Waste					
	1995	2000	2009	2010	2011
Waste to Landfill (tons)	6,414	6,385	4,913	5,001	4,782
Diverted Waste - Recycling (tons)	1,705	2,374	2,316	1,962	2,195
Diverted Waste - Composting (tons)		783	1,218	1,326	1,675
Diversion rate (%)	21%	33%	42%	41%	46%

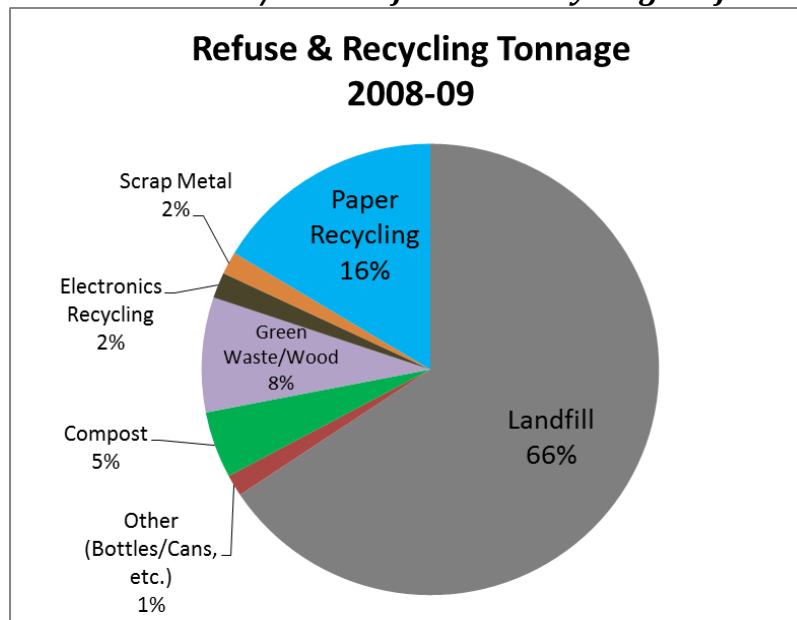
UC Berkeley Sustainability Report 2012.

In the 2008-2009 fiscal-year the campus produced about 10,400 tons of solid waste material. Of the total waste produced about 3,700 tons were diverted from the landfill. The following table and chart provide a further breakdown of the material stream composition during this fiscal year.

Table 3 – 2008/2009 Refuse and Recycling Profile

2008-09	tonnage
Landfill	6,838
Paper Recycling	1,706
Green Waste & Wood	857
Compost (Food & Paper Towels)	497
Electronics Recycling	192
Scrap Metal	168
Other	72
Beverage Containers	52
Special Wastes Recycling	29
Reusables	5
Plastic Film	2
Total	10,418

Chart 1 – 2008/2009 Refuse and Recycling Profile



Chancellor's Advisory Committee on Sustainability Waste Reduction Report 2012

Waste Reduction Potential - Early Studies

The majority of materials generated on campus come from inside the buildings rather than from the exterior; therefore the waste auditing that has been done to date has focused on buildings. Waste audits from four buildings listed in Table 4 below represent the four main campus building usage types – offices, research facilities, classrooms, and library spaces. However, it should be noted that these waste audits profile only one day's worth of material and audit findings are subject to variations in operations and events that may have occurred that day. Although these waste audits are not comprehensive, the resulting data is consistent with [EPA findings](#) for municipal waste streams.

Table 4 – Waste Stream Audits, 2009-2011

Waste Audits					
	Building Type	Audit Date	% of Landfill		
			Paper	Bottles & Cans	Compost
Mulford Hall	Office, Research	Fall 2011	23%	4%	40%
Barrows Hall	Office, Classroom	Fall 2009	39%	2%	39%
University Hall	Office, Library	Spring 2011	26%	1%	43%
Sutardja Dai Hall	Office, Research	Fall 2009	4%	10%	56%
AVG:			23%	4.25%	44.50%

Waste audits conducted by Building Sustainability at Cal.

These waste audits reveal that an **average** of about 23% of material currently heading to the landfill can be recycled as mixed paper, about 4% can be recycled as bottles & cans, and about 45% can be composted. If the campus diverted this additional 71% of materials from the landfill through improved recycling and campus-wide composting, another 3,000 tons of food and paper towels would be composted, and another 1,500 tons of mixed paper and 300 tons of bottles & cans would be recycled.

These preliminary waste audits reveal a potential 81% diversion rate of material from the landfill.

Chart 2 – Potential Diversion with Improved Recycling & Composting

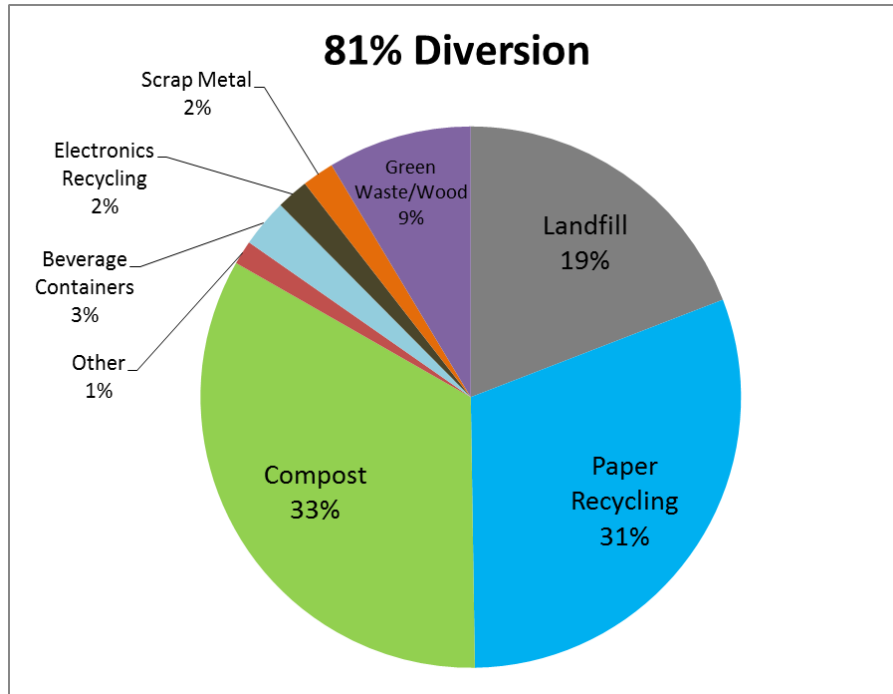


Table 5 – Potential Diversion with Improved Recycling & Composting

81% DIVERSION		tonnage
Landfill		1,959
Paper Recycling		3,270
Compost (Food & Paper Towels)		3,523
Green Waste & Wood		857
Beverage Containers		341
Electronics Recycling		192
Scrap Metal		168
Other		72
Special Wastes Recycling		29
Reusables		5
Plastic Film		2
Total		10,418

Future Waste Audits to Determine More Diversion Options

In 2012, The Green Initiative Fund awarded funding for CRRS to standardize and perform week-long waste audits conducted by student staff. Audits will focus on at least one major building of each building usage type (laboratory, classroom, office, etc.), and will capture more detailed information by using larger sample sizes and sorting into more material categories. This effort will better identify specific diversion potential and guide reduction strategies.

Reducing Waste – Downstream Services & Programs

Generally, the continued and improved implementation of downstream strategies will get the campus to 75% diversion from landfills. Downstream strategies refer to methods of diverting materials after it has already been produced, purchased, and used. The following section describes existing services and proposed improvement options in the categories of recycling, composting, reuse, and several other categories. The described services may not be fully comprehensive yet – and as such new innovations and programs will be integrated into this Plan on an on-going basis.

RECYCLING

Key Strategies: Improve user understanding and correct usage of existing recycling programs. Expand recycling services to underserved areas. Provide standardized receptacles and signage throughout campus. Develop more vendor take-back programs. Find alternative recycling programs for plastics 3-7 and laboratory materials.

Existing Recycling Services:

The campus has a mature and fairly comprehensive set of recycling services that have capacity for better utilization. If use of existing services were maximized – based on waste audits - it is estimated that the majority of mixed paper materials and bottle/can materials could be recycled through today's programs. Improving recycling compliance can be done by enhancing existing programs, increasing awareness about special material recycling already offered on campus to increase participation, and by offering additional services as described below.

Recycling - Best Practice Highlight: Recreation Sports

Recreation Sports has expanded recycling beyond the basics. They offer special recycling collection programs for used tennis balls and canisters and athletic shoes.

Currently the campus offers recycling for:

- Mixed paper and cardboard.
- Bottles and cans, including plastics #1 & #2, glass, tin/steel, aluminum.
- Metals, printer cartridges, and toner.
- A limited program for recycling of plastic films and other lab plastics.

Current recycling infrastructure:

- Some interior and exterior recycling bins and signage of various designs, sizes, and messaging. The current system is not comprehensive or consistent leading to confusion and incorrect disposal.
- Recycling receptacles are not available in most classrooms and are not adequately provided in exterior spaces and public and event areas.
- In residence halls, centralized recycling chutes and receptacles are provided on most high-rise residence hall buildings, though provision of receptacles in-room and in public areas are inconsistent.

Proposed Recycling Services:**Near-term/In-Progress Strategies:**

- Increase the use of a standardized recycling bin and signage to increase recycling rates. New and straightforward signage and interior and exterior bins are being piloted and will continue to be phased in to buildings and exterior locations throughout campus.
- Provide consistent custodial and grounds collection system for recyclables.
- Expand existing recycling programs to classroom areas that currently do not have bins, signage, or pick-up services.
- Have outside vendors that are located in UCB owned building space offer recycling services comparable to campus practices.
- Encourage the growth of department sponsored programs such as tennis shoe and ball recycling.
- Improve education and outreach on proper recycling.

Longer-Term Strategies:

- Develop comprehensive take-back programs with vendors so they retrieve and recycle products after campus no longer has a use for the materials. This is particularly useful in the recycling of furniture that Overstock & Surplus cannot take, and other building materials such as carpeting from minor

renovations. This program would also increase the awareness of product designs for the full life cycle of the product.

- Secure recycling bins to ensure the campus receives all of the recyclable materials for revenue.
- Establish recycling programs for basic laboratory materials. This will especially help to capture the one-time-use materials such as pipettes and other plastics that do not have to be disposed of as hazardous materials.
- Find recycling options for plastics #3-7 and Styrofoam, potentially adopting emerging technology that can turn them back into raw materials.

COMPOSTING

Key Strategies: *Expand organic, food waste, and paper towel composting to campus buildings. Provide standardized receptacles and signage throughout campus. Implement a robust educational program to ensure proper disposal and minimize contamination. Provide composting for animal-related bedding and landscape materials.*

Existing Composting Services:

There is limited food scrap and paper towel composting programs on campus. The majority of composting is done by Housing and Cal Dining. Composting on campus has also been implemented in select departments and buildings that have requested and paid for this service, or have been implemented by the Compost Alliance – a student initiative - through grant funding from The Green Initiative Fund and other sources.

Composting programs in campus departments are fairly new, and correct disposal of the organic materials can be improved with better and consistent signage and bins.

Composting - Best Practice **Highlight: Cal Dining**

Cal Dining operates four residence hall dining commons and eight campus restaurants, and provides catering services and serves as the concessionaire for Cal Athletics. Cal Dining locations offer food scraps composting “behind the counter” for kitchens and in eating areas for diners. To-go containers and utensils from dining commons and campus restaurants are all compostable, and dining commons have also “gone tray-less” to significantly reduce food waste. Campus eateries encourage customers to reduce waste generated from single-use coffee cups by giving a discount on drinks for those with a reusable mug.

Current composting services are provided for:

- Food scraps, including dairy and meat
- Paper towels/napkins, paper plates/cups, paper wrappers
- Compostable utensils

Proposed Composting Services:

Expanded composting is a key component of meeting the zero municipal solid waste goal. While the following proposed strategies are straight-forward in concept, they do require a shift in how campus waste services are provided as well as equipment shifts to accommodate the organic materials.

Near-term/In-Progress Strategies:

- Continue to evaluate food and paper towel composting to campus buildings and exterior spaces. Have outside vendors in UCB-owned building space offer composting services comparable to campus practices.
- Provide on-going education to improve composting understanding and use.

Longer-term Strategies:

- Expand food and paper towel composting to campus buildings and exterior spaces, requiring:
 - Comprehensive distribution of interior and exterior composting bins.
 - Adjustment of custodial and grounds services scope of work to include removing compostable materials from buildings to exterior pick-up locations. Compost presents a new separated waste stream for custodial, grounds services, and CRRS to remove in larger volumes. This additional work, though, will over time be offset by reducing the landfill waste stream.
- Expand current composting exterior pick-up and off-site disposal by the current vendor or bring the service in-house, just as refuse and paper recycling services are provided directly by CRRS.
- Expand on-going education to improve composting understanding and use.
- Develop composting programs for laboratory animal waste, including animal bedding and related feed scraps.
- Better understand where material go/how they are processed once they leave campus and consider a closed-loop composting program for some

materials. Closed loop programs could include some on-site composting or developing a partnership with a farm that can use our compost.

- Explore new technologies that generate energy from food waste such as anaerobic digestion and composting, and ways we might benefit from this.
- Reduce the amount of composting, and instead emphasize reusing or other upstream diversion methods.

REUSE

Key Strategies: *Expand reuse options including ReUSE stations on campus, the use of exchange programs, the campus Overstock & Surplus services, and partnerships with charitable organizations. Improve and develop repair options and reusable packaging and transport options.*

Existing Reuse Practices:

The UC Policy on Sustainable Practices prioritizes the reuse of items in their original form. UCB has begun to embrace this - reuse is encouraged and supported by several creative programs – some instigated and operated by students. The existing programs have the potential to be improved, greatly expanded, and used as models for new programs.

Current programs include:

- [ReUSE](#) is a student-run program housed under CRRS and includes these services:
- ReUSE Stations on campus include both public and department-only stations to facilitate the free exchange and reuse of office supplies and other materials.
- Move-Out Reader and Clothing Collection in residence halls and subsequent reader giveaways and used clothing sales.
- “Reuse before Demolition” building surge projects in partnership with Capital

Reuse - Best Practice Highlight: Move-Out Clothing & Reader Collection

The student run ReUSE Program, in collaboration with Residential Student Services, organizes an end of year Move-Out Collection in residence halls for students to donate reusable clothing and course readers. At the beginning of each semester, the previously collected course readers are provided for free to students and the clothing is sold at the campus Second Chance Clothing Sale for \$1 – 3 apiece, and proceeds go towards ReUSE programs. Remaining clothing is donated to local charities and shelters.

Projects, to facilitate reuse of furniture and office supplies before buildings are demolished.

- Online Materials Exchange website connects registered students, faculty, and staff to post and search for used items members are giving away.
- Overstock & Surplus catalogs and sells used large inventory from campus. In 2010-11, they diverted 282 tons from the landfill through recycling (192 tons of metal recycled and 90 tons of e-waste de-manufactured).
- Chemical Exchange (CHEX) Program, hosted by the College of Chemistry, allows campus laboratories to post and obtain needed chemicals at no cost. The CHEX Program sorts sealed and reusable chemicals from the hazardous waste program. Though hazardous waste is excluded from the scope of this plan, CHEX provides an important service that facilitates the reuse of chemicals that would otherwise become a costly waste stream.
- ASUC Art Studio collects, treats, and reuses scrap clay and excess glazes.
- A design studio materials exchange is provided in College of Environmental Design.

Proposed Reuse Practices:

Near-term/In-Progress Strategies:

- Expand use of used furniture in remodels and newly constructed facilities.
- Improve the reuse potential of items at Overstock & Surplus.
- Provide additional public ReUSE stations throughout campus, and in new buildings and developments.
- Encourage campus departments to establish their own ReUSE stations.
- Offer more decant/surge events to divert and reuse more furniture and large items from building renovation and demolition projects.
- Offer more general free give-away events to promote broader re-use.
Research and develop reusable supply and transport options (i.e. reusable plastic pallets and totes) and packaging reuse options.
- Develop more robust repair options and programs to extend the useful life of products and materials.
- Improve and expand on-going education on the value of material reuse and how to access available programs.

Longer-Term Strategies:

- Develop program in partnership with the UCB Procurement and Overstock and Surplus to resell reusable materials back to departments for discounted prices.
- Build partnerships with charitable organizations for further reuse opportunities.

SPECIAL EVENTS APPROACH

Key Strategies: *Support small and large events to be zero waste, including athletic events, performances, and conferences, in order to minimize or eliminate any material that cannot be reused, recycled, or composted.*

Existing Event Practices

The campus holds thousands of events – large and small – each year that generate many tons of landfill waste. While strides are being made to reduce this waste, event planning and the services provided will need to be improved to make zero waste events a norm.

Currently:

- Services: Large events can order disposable waxed-lined cardboard garbage bins from Grounds Services for an additional fee. Recycling carts are offered for free through CRRS, but composting carts are provided at an additional cost. This pricing structure results in inconsistent waste, recycling, and composting utilization and is dependent on

Events - Best Practice Highlight: Summerfest

Hundreds of campus staff attended Summerfest 2012, UC Berkeley's annual staff appreciation event. This outdoor event featured free food and drinks, which could have generated large volumes of waste. Working with event planners early in the process, zero waste became an integral part of the day.

- *Event caterers provided menu items with no packaging or included packaging that was recyclable or compostable.*
- *Numerous waste diversion stations with standard bins and customized diversion signs were provided.*
- *Student volunteers staffed the diversion stations to educate event participants about proper disposal.*

the event organizer's budget and attention to waste diversion.

- **Waste Generation:** The amount of waste generated largely depends on the food vendor for the event, and on decisions regarding packaging, types of plates, and cutlery offered.
- **Green Event Certification:** Events can apply for and be recognized by Zero Waste Event certification through the Office of Sustainability by reusing, recycling, and composting most materials generated at the event that would otherwise go to landfill.
- Athletics piloted zero waste basketball events in spring 2012 and zero waste football games in fall 2013. Cal Athletics is working to institutionalize this practice to all other sporting events.

Proposed Event Practices:

Near-term/In-Progress Strategies:

- Work with event organizers in advance to review what types of materials are expected to be generated at the event, and possible alternatives to materials that must be sent to landfill.
- Work with campus and outside caterers to provide zero waste options.
- Work with campus event facilities to become zero waste facilities.
- Develop a standardized special event service bundle for event planners that provides landfill, recycling, and composting at a set cost for events. Services can include student staff to help monitor bins to ensure proper sorting and diversion of their waste.
- Use standardized and easy to transport event landfill, recycling, and composting bins.
- Ensure events have clear signage and education about proper disposal.
- Shift away from one-time-use plates, cups and utensils to reusable versions or at minimum ensure they are compostable.
- Ensure annual campus events are Zero Waste Event Certified.

Longer-Term Strategies:

- Provide customized education and services to enable small events to be Zero Waste Event Certified.
- Develop programs with food vendors to minimize food waste.

BASIC LABORATORY APPROACH

Key Strategies: *Due to the complexity of lab waste materials, municipal solid waste reduction strategies will focus on maximizing standard downstream practices in lab buildings, employing reusable alternatives when appropriate, and researching upstream strategies.*

Existing Laboratory Practices

Research laboratories use a large amount of disposable plastic materials for experiments and laboratory procedures. Basic recycling services for mixed paper, cardboard, and bottles and cans are usually provided in each building. A special plastic recycling collection dumpster is provided in some locations by CRRS. Due to the vast array of materials used in labs and the regulated and hazardous nature of some of these materials, downstream disposal of lab waste is complex.

The following represents some of basic programs that can be implemented - deeper disposal opportunities do exist and are likely to be further vetted through a campus green labs initiative.

Proposed Laboratory Strategies

Near-term/In-Progress Strategies:

- Recycle paper animal feed bags.
- Continue and expand wooden pallet recycling and develop reusable pallet program.

Labs - Best Practice Highlight: Rine Lab

Research laboratories generate waste from one-time-use supplies such as pipettes, toothpicks, flask lids, and reagent bottles. The Rine Lab, a genetics research lab in Stanley Hall, has taken the initiative in reducing the amount of waste they produce by:

- *Purchasing and using glass pipettes, which they wash and reuse.*
- *Replacing disposable flask lids with durable and reusable rubber lids.*
- *Collecting aluminum foil and other recyclables to bring out to central collection areas.*

- Ensure lab buildings have can & bottle recycling bins and frequency of collection accommodates larger aluminum foil recycling (currently, some labs autoclave it and bring it to bins in break room).
- Utilize campus zero waste research center to research reusable or recyclable alternatives for single-use clothing, gloves, protective equipment, and laboratory supplies.

Longer-Term Strategies:

- Use washable and reusable alternatives to single-use materials such as saran-wrap flask covers, toothpicks, plastic pipettes, etc.
- Adopt a recycling bin set-up that incorporates more of the material streams in each lab – including accommodation for large volumes of paper towels, food waste, and animal bedding.
- Work with animal cage vendors to develop a take-back program for cracked and worn cages to repair and reuse, or at least recycle.
- Develop a reuse program for laboratory equipment to facilitate redistribution of equipment to other laboratories, departments, or schools.

Reducing Waste – Upstream Services & Programs

While downstream strategies will get the campus to 75% to 80% diversion from landfills, upstream strategies will be needed to get the campus the rest of the way to zero municipal solid waste. The campus will need to employ more creative and complex reduction services and programs to achieve the final stretch to meet zero waste to landfill.

The University of California’s hierarchy for waste reduction is to reduce, reuse, and then recycle or compost. That means that the first priority is to reduce the generation of waste from the onset. While programs and policies are key elements to using less and procuring products with a long useful life, behavior change and a cultural shift in how individuals make choices is also essential.

Upstream strategies, while challenging, also offer new and exciting and even visionary opportunities. The following section provides an initial view of how the campus can institute upstream measures – but it is only the beginning. New upstream innovations and programs will be integrated into this Plan on an on-going basis.

REDUCING MATERIALS

Key Strategy: *Further instill the principles of using less - stopping the generation of waste before it even becomes a material stream that needs to be dealt with on campus.*

Existing Reduction Practices

- Food waste has been reduced through two Cal Dining programs:
 - Trayless Dining Commons has reduced consumer food waste by encouraging students to only take as much food as they need.
 - LeanPath ValuWaste program helps kitchen staff at dining commons track food waste generated during meal preparation, and use the information to reduce or eliminate pre-consumer kitchen waste by 43%. In 2013, Cal

- One-time use waste has been reduced through Cal Dining's Chews to Reuse pilot program at Foothill Dining Commons, which is expanding to all residential dining operations. This program replaces one-time use compostable take-out containers with reusable containers.
- Campus-wide paper use has decreased due to shifts from paper to digital and/or online record-keeping, online ordering via the new campus e-procurement system (BearBuy), timekeeping, and other processes. In addition, newer Energy-Star rated printers and copiers have double-sided printing and copying capabilities.
- Efforts to reduce plastic water bottle waste include:
 - Capital Projects and the I Heart Tap Water Campaign have developed design standards for and installed over 15 tap water refill stations across campus.
 - The ASUC senate passed a bill supporting "Take Back the Tap" to eliminate the bottled water on campus by 2014 and educate students about the social and environmental harms of dependence on disposable water bottles. In response, Cal Student Store stopped selling bottled water.

Reduce - Best Practice
Highlight: Textbooks Going Digital

Textbook publishers come out with new editions every few years, making older versions more likely to end up in the waste stream. The Cal Student Store recently implemented an option for students to purchase e-textbooks, which allows students to access textbooks on their computers instead of purchasing a physical copy. Educational Technology Services on campus is participating in a nation-wide e-textbook pilot program. Participating departments and programs include Business, College Writing, Engineering, History, Mathematics and Statistics.

Proposed Reduction Practices

Near-term/In-Progress Strategies:

- Shift from paper publicity for events to online or digital advertising – for example, green event certification offers a point for eliminating paper promotion, a good number of events have pursued this option.

- Green Department Certification: Departments can apply for and be recognized as green through the Office of Sustainability. Certification points include measures that promote reduction such as having a scanner available to all employees to minimize the need for printing and training employees on how to use it.
- Expand digital textbook pilot programs and textbook rental programs.
- Continue to employ strategies to increase the use of tap water and reduce bottled water.
- Eliminate the use of paper faxes as default and use electronic documents as much as feasible.
- Expanding understanding about the value of using less is essential to reducing materials - more detail is provided in Education and incentives section.

Longer-Term Strategies:

- Replace paper towel dispensers with air dryers in high volume areas. Consider the costs as well environmental impacts - paper vs. the electricity demands – as part of the decision-making process.
- If paper towel dispensers are used, select models which provide pre-cut recycled towels.
- Provide or encourage the use of re-usable silverware, lunch-boxes, etc.
- Encourage professors to use electronically-available textbooks or articles instead of printed out books and readers.

GREEN PURCHASING

Key Strategy: *Improve green purchasing contracts and practices to consider a product's life-cycle and meet standards for minimal packaging and products that are easily recyclable or compostable at end-of-life.*

Existing Green Purchasing-Waste Reductions Practices

Procurement requests for proposals (RFPs) and resulting agreements include standard sustainability language such as soft language on goals for reduced packaging or implementing sustainability practices at the supplier level, but these often lack specific requirements or accountability. Although sustainable products and items with less packaging are often available, the campus' decentralized

procurement model leaves it up to each buyer or department to choose to purchase the less wasteful option.

In addition to changing campus behavior towards Green Purchasing, Procurement Services is faced with challenges in the supplier base and in the availability and/or affordability of green options. Oftentimes, suppliers from which the campus purchases products are not necessarily the manufacturers, and thus, Procurement Services may have little influence on the manufacturer's decision to provide sustainable product and/or packaging alternatives (i.e. lab supplies). Also, for some products, the marketplace may not offer affordable, environmentally-preferred alternatives.

A few pilot programs have targeted waste reduction:

- Returnable tote program, the Boomerang Box™ with the campus main office supply company to reuse delivery boxes for multiple shipments.
- Carpet "Reclamation and Recycling Program" with UC agreement suppliers.

Proposed Green Purchasing-Waste Reductions Practices

Near-term/In-Progress Strategies:

- Provide sustainable cost-effective product options at the top of search results in Campus e-procurement system, BearBuy, or otherwise clearly indicate which items are more environmentally-preferred (less packaging, made with recycled content, reusable or refillable, etc.) to enable departments to easily select the best option.
- Work with suppliers to offer discounts for products that are reusable, or easily recyclable or compostable at end-of-life so that the green alternatives are offered at competitive pricing.

Purchasing - Best Practice Highlight: Reusable Delivery Boxes

OfficeMax launched a new nationwide delivery program, the Boomerang Box, to reuse and recycle boxes it uses for delivery to participating customers, including UC Berkeley. Orders are packed and delivered in Boomerang Boxes. Customers collect and stack empty boxes in designated locations for pickup with the next order delivery. When the boxes – constructed of corrugate with minimum 50% post-consumer material - can no longer be reused for shipment, OfficeMax will recover the boxes for recycling.

- Utilize Styrofoam cooler take-back programs already offered by some suppliers.

Longer-Term Strategies:

- Develop guidelines that promote the purchase of items (that have a cost-effective alternative) that can be recycled at end of use.
- Implement a program that consolidates multiple orders from departments into fewer shipments to reduce transportation and packaging waste, while maintaining a process to address the delivery of time-sensitive orders.

CONTRACTUAL ARRANGEMENTS WITH VENDORS AND TENANTS

Key Strategies: *Contractual arrangements with vendors and tenants in campus owned spaces will include requirements to provide proper recycling and composting supplies and services and to employ zero -waste reduction strategies.*

Existing Contract Arrangements:

Property that the university owns but leases to outside vendors, such as cafes, are included in the scope of the University of California zero waste policy. In most cases, these leases state that the campus will bill the building for landfill and recycling services, and the building will then bill the private entity. Currently, these leases have varying language regarding landfill and recycling expectations and costs, which leads to inconsistent diversion efforts, infrastructure, and signage from location to location. While lease arrangements will continue to vary, efforts are underway to

Contracts - Best Practice Highlight: Zero Waste in Venue Contracts

Cal Performances is UC Berkeley's performing arts producer and manages major venues. They included a rigorous fifteen point "Pro-Environment Practices" section in their contract with Another Planet Entertainment, the promoter for the Greek Theatre, which apply to all concessionaire sub-contracts at the theatre. These practices include that they:

- *Provide and utilize only biodegradable, compostable cups, utensils, plates, and garbage bags.*
- *Ensure maximum use of recycling containers and compost services for all areas through signage and staffing.*
- *Donate leftover food from every performance to local charities.*

improve diversion by incorporating appropriate guidance specific to the space and vendor.

Proposed Contract Arrangements:

Near-term/In-Progress Strategies:

- Standardize language in new leases to clarify which party is financially responsible for landfill, recycling, and composting services, and specify requirements in leases for recycling and composting services.
- Include spaces that the university leases in recycling and composting infrastructure upgrades and educational outreach efforts.
- Have vendors/tenants use campus approved bins and signage to ensure consistency across campus.
- Use the Lower Sproul Redevelopment Project as a model on how to implement comprehensive contract language including zero waste requirements with vendors.

Longer-Term Strategies:

- Have vendors use and provide materials (such as to-go containers), that are reusable, compostable, or recyclable.
- Include zero waste considerations in vending machine contracts – for example, include guidelines or restrictions in contract language about the types of packaging and food that can be sold in vending machines on campus.

NEW CONSTRUCTION AND RENOVATIONS

Key Strategies: *Planning and design for construction and renovation projects will reduce waste over the operational life of the building; this includes providing appropriate recycling and waste management infrastructure, and adopting more waste-conscious move-out practices when campus spaces are vacated for construction projects. The campus will strive for new campus buildings and developments to be models of zero waste practices.*

Existing Pre-Construction and Pre-Renovation Practices:

Campus policy requires that all new buildings and major renovations achieve a minimum LEED™ Silver rating, and all new laboratory buildings must also be built

to the same LEED™ standard and/or the Laboratories for the 21st Century (LABS21) Environmental Performance Criteria. Both programs include waste management credits that are applicable in helping to ensure buildings minimize landfill waste once they are operational. Campus policy requires that projects divert a minimum of 50% of construction waste. Additionally, the campus has developed “Trash and Recycling Enclosure Specifications.”

Proposed Pre-Construction and Pre-Renovation Practices:

Near-term/In-Progress Strategies:

- Work with building leadership and occupants well in advance of move-out preceding renovation or demolition, to responsibly remove and potentially reuse their furniture and other supplies in their new or renovated building.
- Develop a set of comprehensive waste reduction design guidelines to be used by project managers.
- Use standardized indoor and outdoor recycling bins, enclosures, and signage.
- Extend waste diversion strategies to smaller campus renovations projects. Require construction projects to divert a minimum of 75% construction waste.

Longer-Term Strategies:

- Develop more extensive campus design guidelines to support zero waste.
- Strive for new campus buildings and developments to be models of zero waste practices.
- Make recycling functional spaces as important as “form” is in building design.

CONTINUOUS IMPROVEMENT

Key Strategy: *Continuous research and implementation of waste reduction best practices will be accomplished through continued evaluation and support for programs like the student-led zero waste research center.*

The Green Initiative Fund provided a grant to kick-start the zero waste research center and Plastics Disclosure Project (PDP). This project supports five student interns to address the issues surrounding upstream waste and solutions. The research center in the near-term will:

- Use expanded waste audits to identify the materials that the campus does not have an existing method of diverting from the landfill (ex. plastics #3 – #7).
- Work with stakeholders to research alternative products and policies that promote use of materials that can be easily diverted.
- Research vendor take-back programs for reuse / repair of products.
- Through PDP, track the campus' plastics footprint on campus and create a long-term plan of action to both reduce plastic use and find ways to re-purpose or recycle plastic that is currently thrown away.

The intention is that the Zero Waste Research Center will continue into the future, addressing new issues, identifying solutions and partnering with other initiatives, such as the campus green labs project, addressing related matters.

Best Practice Highlight: Plastic Disclosure Project

UC Berkeley was the first University in the world to commit to the Plastics Disclosure Project. Student interns will audit and track plastic waste from multiple sources on campus, which is currently estimated to comprise around 25% of the waste stream. As part of the commitment, the campus will make full disclosure of this plastic use and devise innovative strategies for disposal.

Education, Incentives, & Engagement

Downstream and upstream strategies need to be accompanied by continuous education and outreach to students, faculty, staff, and visitors on proper sorting and waste reduction concepts. Educational and incentive programs should aim to not only teach the campus community to properly sort and divert materials after use, but that also encourages using less and reusing.

EDUCATION

Key Strategies: *Develop an educational and outreach toolkit that can be used to inform students, employees, and visitors on proper disposal practices and upstream strategies. Recognizing that on-going education is essential, include re-training strategies in the toolkit.*

Existing Education Programs:

Currently, no one-stop shop training or education program is in place for students, faculty, or staff regarding waste reduction or proper sorting and diversion efforts. Additionally, limited education is focused on the hundreds of visitors coming to campus daily. While numerous education efforts are available – creating a more comprehensive toolkit and outreach program will be important going forward to ensure that systems in place to reduce landfill waste are maximized.

Current Programs

- Waste reduction and recycling topics are sometimes included as a one-lecture topic in various environmental or sustainability-related courses and through student facilitated

Education - Best Practice

Highlight: Student Educators

The Building Sustainability at Cal Program trains and utilizes students to help reduce the environmental footprint of campus buildings by educating building inhabitants and identifying changes that can be made to buildings and campus as a whole. They have conducted numerous waste audits, and from the audit results, interns have developed educational consumption and waste newsletters for the building. They have also conducted building occupant surveys and worked as “Trash Talkers” at zero waste events to help reach out to even more people.

for credit DeCals like “The Secret Life of Garbage.”

- CRRS staff assistants provide waste diversion education and training for building occupants, students, and participants at special events.
- Building Sustainability at Cal students work on campus to conduct waste audits and provide waste diversion education to building occupants.
- Residential Sustainability Program helps students living in the residence halls get involved with sustainability projects, including educating their peers at events in the residence halls.
- Green Event and Green Department Certification Programs identify a set of conditions and actions that can be followed in order to be certified. Department waste reduction related points include offering composting, setting double-sided printing as the default for each public printer, establishing a mini ReUSE station, and providing a one-side clean paper bin near each printer/copier. On-going education provided by a department’s green team is a pre-requisite of the program.

Proposed Education Programs:

Near-term/In-Progress Strategies:

- As the recycling and composting systems are upgraded and added building by building, announcements introducing the new composting program or improved recycling bins and signage can be posted in bathrooms, central bulletin boards, and/or electronically shared with building inhabitants.
- Presentations at staff meetings and workshops to train building users how to properly utilize the bins and increase waste diversion and answer questions.
- Provide more general marketing and publicity about available programs.
- Bring guest speakers and demonstrations to campus.
- Provide comprehensive waste diversion information on the web and use advertising opportunities on campus shuttles and shelters.
- Develop a system that provides continuing feedback from building occupants on programs so that education stays useful and relevant.

Longer-Term Strategies:

- Develop a pre-packaged education/training that can be used to introduce new services such as composting to the campus community and to inform new students, staff, and faculty.
- Provide materials that can be used for on-going or re-training of building occupants to address improper disposal practices.
- Create specific messaging/materials to use in public spaces serving large events and visitors not familiar with the campus system.
- For new students include waste reduction, recycling, and composting training in CalSO (Cal Student Orientation, mandatory for all new students) and educate Residence Assistants (RA) so they can work with the new students on proper diversion.
- For new employees, include waste reduction, recycling, and composting training in New Employee Orientations.

INCENTIVES

Key Strategy: *Incentives such as discounts at stores and eateries can be offered to decrease one-time use of materials. Work with suppliers to offer discounts for products that are reusable, easily recyclable, or compostable at end-of-life.*

Existing Incentives:

Several programs are available to encourage the campus community to reduce waste by providing incentives and discounts for positive behavior.

Current Programs

- Bring Your Own Mug (BYOM) – this campaign educates the campus about the environmental benefits of bringing your own mug. This program also produced BYOM-logoed mugs which were distributed to the campus community through subsidized sales and free giveaways.

- Discounted beverages – many campus and local cafes offer a small discount on coffee and other beverages if customers bring their own reusable mug rather than using a single-use cup.
- Cal Student Store has offered programs for free or low-cost re-usable bags.
- The Green Initiative Fund and the Chancellor’s Green Fund Grants support numerous programs focused on reducing waste. These grants have provided the kick-start funding for related incentives.

Proposed Incentives:

Near-term/In-Progress Strategies:

- Continue to maintain and expand existing incentive programs listed above, and increase incentives, publicity and education around these programs.
- Highlight and give recognition to departments on campus that have shown significant improvements in reducing waste, and share best practices and innovations with other departments.

Longer-Term Strategies:

- Work with vendors on campus to offer more discounts or incentives to customers who bring their own bag, mug, or other items to reduce one-time use materials.
- Work with suppliers to offer discounts for products that are reusable, or easily recyclable or compostable at end-of-life.

Incentives - Best Practice Highlight: TGIF Supports Waste Reduction Start-Ups

The Green Initiative Fund – a student program funding over \$1 million in sustainability projects – has supported 19 waste reduction projects to date. These have included incentive-based programs such the BYO Mug campaign as well as other innovative measures including:

- *Support for pilots of exterior and indoor multiple waste stream collection systems - showcasing a standardized approach to bins, signage, and education intended to then be adopted campus-wide.*
- *Support Compost Alliance who took the lead in installing composting services in 12 buildings in an effort to bring composting campus-wide.*

COMMUNITY ENGAGEMENT

Key Strategy: *Share best practices and develop joint programs with the surrounding community to advance zero waste in the region.*

The campus has made efforts with local community to reduce waste. A few examples of this include campus donations to charitable organizations, student interns working on related measures for the City of Berkeley and non-profits, and a new program to bring recycling education to apartment buildings in Berkeley. Additionally, UC Berkeley has been the recipient of several grants from local organizations to advance recycling and composting on campus.

As the campus gets more traction on implementing the strategies outlined in this plan, it will be better situated to engage in more robust and innovative efforts with the community.

Design Guidelines for Waste Management Infrastructure

Design standards are an integral strategy in reaching zero waste to landfill. These guidelines will assist planners, project managers, departments, vendors, facility managers, and others in using approved and uniform equipment and materials. These guidelines cover interior and exterior bin specifications, signage and stickers, special event materials, hand-dryer/paper-towel dispensers, public ReUSE stations, and exterior collection enclosure areas. As these guidelines are not comprehensive this section of the Plan will continue to evolve and expand.

It is intended that these standards will be employed throughout campus – phased in over time as opportunities and funding become available. New construction and renovation projects can integrate these standards into the facilities.

Campus Recycling and Refuse Services can provide guidance as well as provide signage/sticker materials related to these standards – to ensure appropriate use of products, sizing, placement, and ergonomics. It is advised to bring CRRS early in the planning phase.

The guidelines that follow have been vetted and those that are still in pilot phase are indicated.

COLORS

Following general practice, campus signage and bins should reflect this standard color scheme:

Recycling = Blue

Composting = Green

Landfill = Grey or Black

E-Waste = Yellow

Particular Pantone/PMS colors are not provided as the shades of these colors vary slightly by product manufacturer.

INTERIOR BINS

Interior Office Desk-Side Mini-Landfill Saddle Bins and Mixed Paper Bins with Labels

This bin system is currently being piloted in campus buildings. It is intended that this system will be deployed campus-wide.

Design: Blue desk-side paper recycling bin with a saddle black landfill bin. Both clearly labeled with standard Mixed Paper and Landfill stickers.



Placement: Every office desk, to replace any existing desk-side landfill bin. These can also be used in common areas that have smaller waste volumes such as conference rooms or copy rooms.

Interior Common Space Bins

Design: 23-gallon “slim-jims” each for mixed paper recycling, bottle and can recycling, composting, and landfill. Large laminated signs to be displayed on the side of each bin, along with a corresponding laminated sign on the wall directly above the bin.

Placement: In common areas such as staff kitchenettes and large conference rooms. Bins should be placed in groups so that each “waste station” has a bin for each material stream. Bin types should be ordered in a standard way throughout the campus.



Interior Public Space Bins

Interior free standing bins for public spaces are currently being piloted in two campus buildings; these are pictured below and may become models of a campus standard.

Design: Bins – custom designed for campus– that include separated streams for mixed paper recycling, bottle and can recycling, composting, and landfill, which are color-coded and labeled. Custom bins will be made from recycled plastic and metal materials.

Placement: In centralized, high traffic public areas such as building ground floor lobbies or major indoor eating areas. Bin types should be ordered in a standard way throughout the campus.

These free-standing bin styles are currently being piloted in two campus buildings.



Bin enclosures are also an alternative to free-standing bins. When opportunity affords, cabinets or casework can be built/placed that hold slim-jims.

EXTERIOR BINS

Outdoor Public Space Bins

Design: Custom designed black metal outdoor bins have been developed for campus that include mixed paper recycling, bottle and can recycling, landfill, and composting (to be added at a later time) in separated streams, which are color-coded with restrictive deposit openings for each material. They have a front opening service door for easy retrieval. Signage is integrated into the bins.

Placement: These large volume bins will be placed throughout campus paths building entrances/exits and patios.



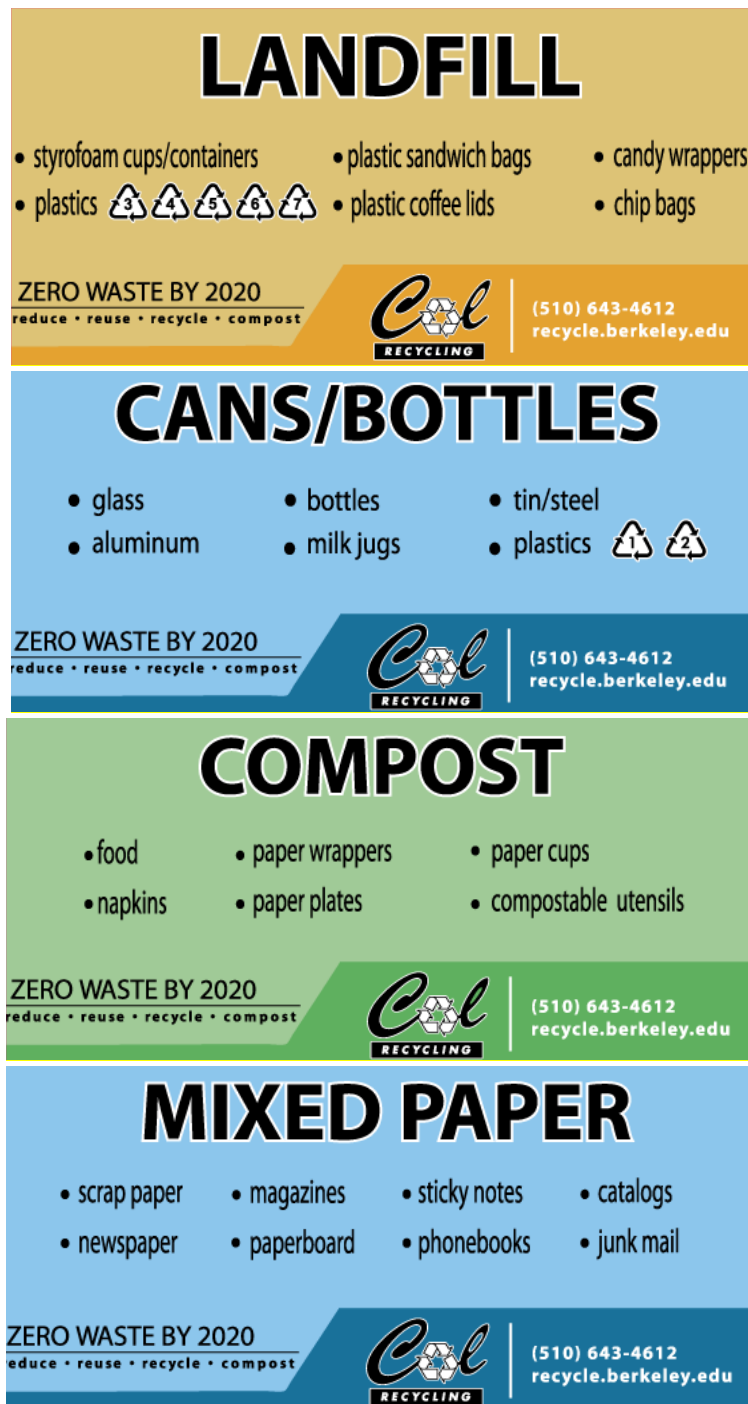
SIGNAGE AND DECALS

Design: Standard interior, exterior, and special event signs and labels for mixed paper recycling, bottle and can recycling, composting, and landfill have been developed and are available from CRRS. Custom signing may be appropriate in some instances – custom designs can be created in consultation with CRRS.

Placement: The following signs are to be used with interior bins to direct user to the appropriate bin for disposal. They can be displayed above or on the bin itself.



Placement: The following decals are to be adhered to interior bins to direct user to the appropriate bin for disposal.



PAPER TOWEL DISPENSERS & HAND AIR DRYERS

Design: New buildings and renovations, or bathroom upgrades should consider installing hand air dryers rather than paper towel dispensers. Hand air dryers may be most appropriate in high-use bathrooms. Air dryers save custodial time due to the daily refill of paper towels and reduce waste in bathrooms.

If air dryers are not feasible or appropriate, dispensers that use pre-cut paper towels can reduce the amount of materials used. The campus has not made recommendations to date on type of hand air dryer for use on campus. The following images are just samples of hand air dryers. The image below of paper towel dispensers that provide pre-cut towels is a model currently being used on campus.

Placement: For locations with paper towel dispensers, small standardized signage should be placed on the dispenser reminding patrons to use sparingly and compost paper towels after use. Bins in the restrooms should be converted into compost bins (including the bins directly beneath the paper towel dispensers) with clear standardized signage. Small landfill bins should remain in the bathrooms.



PUBLIC REUSE STATIONS

Design: Public stations are either mid-height or tall bookcases, with official laminated ReUSE station signage (pictured in the photo), and posted above the station (if the bookcase is medium height) or at the top edge overhanging the front (if the bookcase is tall). Stations are stocked with reusable office supplies and other gently-used material for free exchange. New ReUSE stations should be approved by the ReUSE Program, who will add the station to the website list of locations and map. ReUSE will partner with building facilities managers to monitor and provide volunteer assistance in maintaining each station.



Placement: Campus buildings with sufficient student and public traffic will establish, space permitting and as feasible, a ReUSE station with facilities manager's approvals. Central and easy locations such as a main lobby, library / study room, or cut-out in a major hallway, keeping in mind fire code regulations.

SPECIAL EVENT BINS & SIGNS

Design: Bins that are color coordinated with the campus standard (blue, green, black) with appropriate restrictive opening lids and signage hanging above. Event planners can work in advance with CRRS to design signage specific to materials that will likely be generated at the event or use the standard signage.

Placement: These bins should be in sets of three, with a composting, bottle and can recycling, and landfill bin next to each other. Event planners can coordinate with CRRS on the number and strategic locations of these stations (sets of three) in high traffic areas to ensure they are easily accessed by grounds services for collection.



EXTERIOR DUMPSTER LANDFILL, COMPOSTING, AND RECYCLING ENCLOSURES

Construction guidelines for the campus will include specifications for enclosure design and placement for the exterior dumpsters for landfill, compost, cans and bottles recycling, and paper recycling. These standards are currently being developed.

The following images depict older campus dumpsters that have recently been repaired, painted, and labeled – extending their useful life.



Implementation

Implementation of this Plan is crucial to reaching zero municipal solid waste at UC Berkeley. The Plan outlines a set of strategies – downstream, upstream, and educational – intended to get us to this goal by 2020.

This Plan emphasizes that reaching zero waste relies on the comprehensive participation of the entire campus community - physical plant, capital projects, administration, procurement, administrative and academic departments and units, campus vendors, student initiatives, and individual faculty, staff, and students. The Plan also emphasizes that the majority of actions needed rely on existing technologies and services already available on campus – thus our challenges are not awaiting invention but rather are the resources required for expansion and institutionalization.

While all of the funding and resources needed to implement the Plan have yet to be identified, it is feasible that in the next seven years with broad participation, new commitments, and investment, the campus can reach this milestone of zero landfill waste.

RESPONSIBILITIES & ACCOUNTABILITY

PPCS units, and in particular Campus Recycling and Refuse Services, manages the major portion of operations covered in the Plan. As such CRRS will take the lead role in implementing this Plan and coordinating the operational services (in-house and vendor contracts) to move the different waste and material streams from campus to landfill, recycling, composting, and other appropriate facilities. CRRS will also coordinate waste reduction and recycling education efforts and student-led programs such as ReUSE and Compost Alliance.

Campus Custodial Services as well as Housing Custodial Services also play a key role in Plan implementation, as these groups move materials from the interior of the buildings to the external bins for pick-up. Additionally, both Campus Grounds Services and Housing Grounds Services collect materials from outdoor receptacles, as well as green landscape waste and plant debris.

Through the process of developing this Plan, over 25 groups and departments on campus have become invested in taking action to reach zero municipal solid waste. These groups and departments too will have responsibility for making zero waste second nature at UC Berkeley.

ZERO WASTE GROUPS

While PPCS will have many implementation responsibilities, it is the intention that there will be shared accountability across campus.

The Zero Waste Working Group (ZWWG) – with broad campus representation (see Plan Acknowledgements for detail) – was created to inform this Plan. With the Plan complete the group will continue but in modified form.

The larger group will continue in an advisory capacity as the Zero Waste Stakeholder Group - meeting one to two times a year to share information, help track Plan implementation progress, and inform Plan updates. The Office of Sustainability and CRRS will continue to convene this group.

A sub-set of the group will remain the Zero Waste Working Group and will be comprised of those with larger operational and implementation responsibilities. The Working Group will meet on an on-going basis to coordinate and advance waste reduction measures. This group will include representatives from PPCS/CRRS, Capital Projects, Office of Sustainability, Housing and Dining, building managers, Athletics, Overstock and Surplus, and others as needed.

PROJECT & PROGRAM PRIORITIES

This Plan has identified strategies that are considered near-term/underway and those that are longer-term. These categorizations are not based on least-cost or ease to implement, but more related to current opportunity, fulfilling a need, and student/staff initiation.

Based both on quantitative evaluation from waste audits and from broad campus interest – **the one most impactful strategy that could be implemented in the future is campus-wide organic waste composting.** Expanding composting throughout the campus, along with better education on how to recycle and compost, will get the campus half-way to the goal. While very effective in reducing waste,

composting is also the strategy that likely has the greatest initial cost and operational changes required. Fortunately, some related costs could be offset by reduced landfill expenses over-time.

FUNDING

It is important to note that Plan ownership and accountability does not necessarily imply parallel funding responsibilities. Appropriate business cases will need to be developed in the near-future to chart a cost-effective, operationally feasible course to zero waste. Physical Plant-Campus Services (PPCS) will continue to evaluate the financial feasibility of campus-wide composting – an integral component of our success in meeting the goal.

While internal campus investment will be necessary, this Plan will also enable the campus to be more competitive for grants and outside funding. UCB has been successful in obtaining grants from The Green Initiative Fund and Stopwaste.org and going forward will seek out additional local, state, federal, and private funding sources.

TRACKING PROGRESS & CONTINUAL IMPROVEMENT

In order to understand successes as well as identify areas for improvement, the campus will need to continue and expand on its waste monitoring and assessment practices and transparently report findings. Each year the Office of Sustainability produces a sustainability report and monitors the climate impacts of waste sent to landfills through the greenhouse gas emissions reporting. These instruments, along with other communications tools, will be engaged to track progress. Publicizing and promoting UC Berkeley's efforts will highlight our leadership to the larger community and help advance the zero waste movement. On-going research into how to implement best practices on campus can be accomplished through multiple strategies including initiatives like the student-led waste audit team and zero waste research center.

This Plan embodies strategies and initiatives that are recognized today and is only as comprehensive as current understanding affords. As such, it is intended that new innovations and programs will be integrated into this Plan on a rolling basis.