Zero Waste Plan Elements
Short-Term and Long-Term Actions
September 2020

UNIVERSITY OF CALIFORNIA
SANTA CRUZ

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Introduction

The University of California, Santa Cruz (University) has undertaken a planning process to identify the policies, programs and infrastructure needed to comply with state law, and the campus-specific strategies needed to meet the goals of the University of California Office of the President.

Elements of the plan include:

- Materials Characterization Study
- Operational Analysis and Efficiency Review
- Zero Waste Plan Elements – Short-Term and Long-Term Actions

State Law

The California Legislature has recognized the importance of waste reduction, recycling and composting in combating climate change. State laws that directly affect the University include:

California Assembly Bill 341 (Statutes of 2011)

Establishes a statewide goal of 75% source reduction, recycling and composting. Requires large commercial generators and multi-family complexes to recycle.

California Assembly Bill 827 (Statutes of 2019)

Requires businesses, public entities, and schools to provide recycling and organics containers adjacent to trash containers.

Under state law, the University must:

- Recycle and compost
- Reduce disposal of organics
- Provide food service packaging that is reusable, recyclable or compostable

California Assembly Bill 1826 (Statutes of 2014)

Requires large commercial generators and multi-family complexes to divert organics from landfill by subscribing to collection service, managing organics on-site or self-hauling organics to a processing facility.

California Senate Bill 1383 (Statutes of 2016)

Establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025 and establishes an additional target that not less than 20 percent of currently disposed edible food is recovered for human consumption by 2025.

California Senate Bill 1335 (Statutes of 2018)

Prohibits foodservice facilities located in a state-owned facility, operating on or acting as a concessionaire on state-owned property, or under contract to provide food service to a state agency from dispensing prepared food using food service packaging unless it is reusable, recyclable, or compostable.

University of California Zero Waste Policies

The University of California Office of the President has established the following policy goals:[1]

- Achieve Zero Waste (defined as 90 percent diversion from landfill)
- Reduce per capita total municipal solid waste generation:
  - To FY 2015/16 levels by 2020
  - By 25% per capita from FY 2015/16 levels by 2025
  - By 50% per capita from FY 2015/16 levels by 2030
- Prohibit the sale, procurement, or distribution of packaging foam, such as food containers and packaging material, other than that utilized for laboratory supply or medical packaging and products
- Phase out single-use plastic plastics as follows:
  - Jan. 1, 2021: Plastic bags in retail and food service establishments will be eliminated
  - July 1, 2021: Single-use plastic dining accessories (e.g., straws, utensils, stirrers) will be eliminated and replaced with local compostable or reusable alternatives, with exceptions for accessibility needs.
  - July 1, 2022: Dine-in facilities will provide reusable food service items (e.g., plates, cups, clamshell containers) for food consumed on site and to-go facilities will provide reusable or locally compostable alternatives.
  - Jan. 1, 2023: Campus food service operations will phase out the purchase, sale and distribution of single-use plastic beverage bottles. To support this change, UC locations are encouraged to install water refill stations.

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[1] University of California Zero Waste Polices: https://www.ucop.edu/sustainability/policy-areas/waste-reduction-and-recycling/index.html

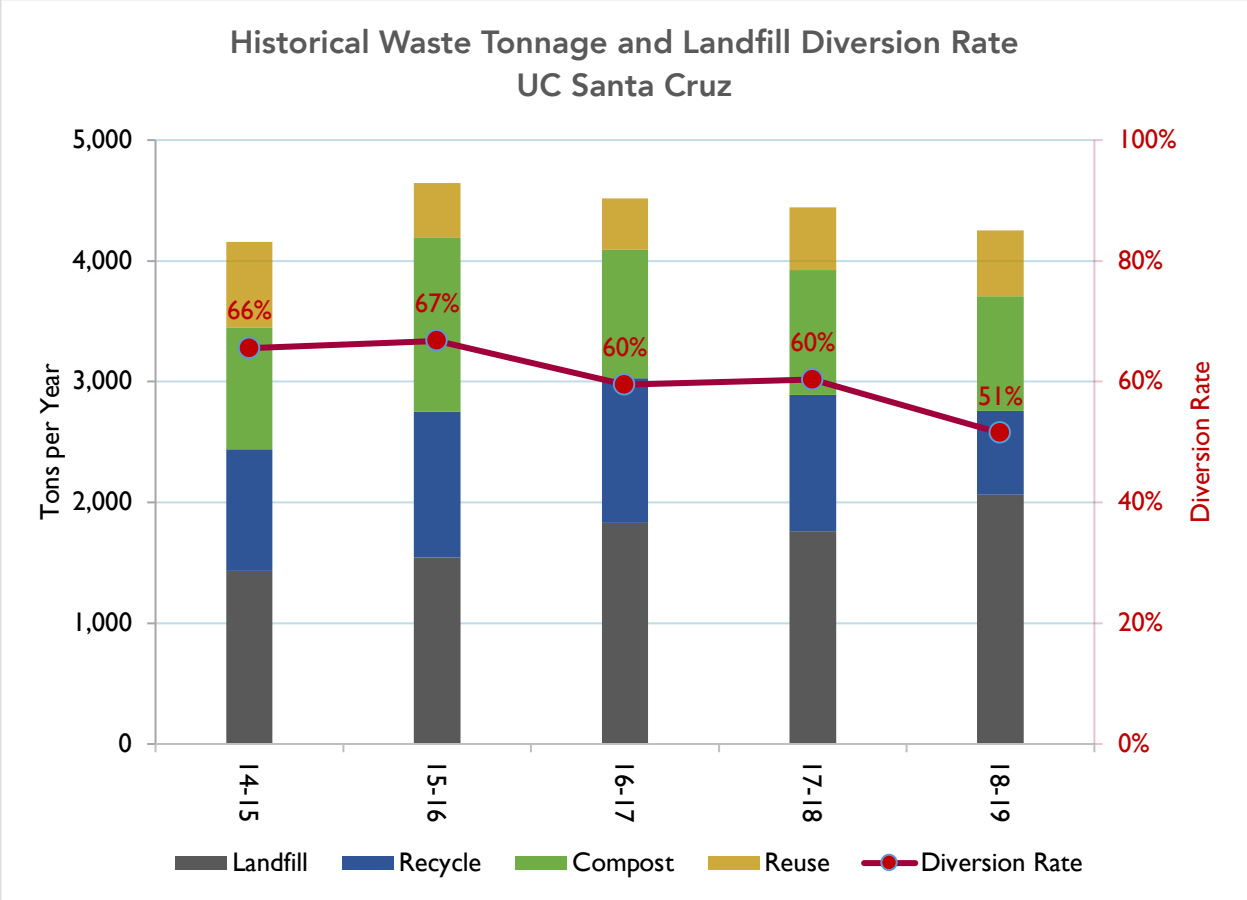
[2] Weighted Campus User: Weighted Campus User: (1 × number of on-campus residents) + (0.75 × number of non- residential or commuter full-time students, faculty, and staff members) + (0.5 × number of non- residential or commuter part-time students, faculty, and staff members). https://www.ucsc.edu/conserving-water/doc/sustainable-water-systems.pdf

The University has made progress toward these goals. Recent disruptions in recycling markets and the limitations of the local recyclables processing facilities have impacted the University's diversion rates. However, the University is on track for reducing overall municipal solid waste generation.

When tracking per capita generation, the University uses the "Weighted Campus User" (WCU) definition of the Association for the Advancement of Sustainability in Higher Education (AASHE). Since FY 2015/16 total generation by WCU has been reduced by 19%.

Fiscal Year	Generation (tons)	Weighted Campus User	Tons Per WCU	Percent reduction
FY 2015/16	4,644	17,735	0.26	--
FY 2016/17	4,517	18,380	0.25	6%
FY 2017/18	4,442	19,010	0.23	11%
FY 2018/19	4,251	20,028	0.21	19%

Source: UCSC Resource Recovery ZW_UCOP_History2019-9



Source: UCSC Resource Recovery ZW_UCOP_History2019-9

The University has implemented several policies and programs to meet the requirements of state law and the expectations of the University of California Office of the President. These include:

- **Surplus food donation and food waste reduction**. Several student-run pantries on campus receive surplus food from Campus Dining and redistribute to hungry students. Student organizations also transport donated food to Santa Cruz Food Not Bombs. Campus Dining has implemented food waste reduction programs and tested technology strategies, such as LeanPath. The Student Environmental Center has conducted student outreach and education to increase awareness and reduce wasted food in the dining halls.

- **Construction and demolition debris recovery**. The University's follows UC policies on sustainable practices for construction projects. Every project is required to follow LEED specifications and projects valued at $5 million and over must obtain LEED Silver certification (and obtain a 75% recycling rate). Contractors are required to recycle and reuse and track recovery and disposal and provide these reports to the University.

- **Recovery of surplus materials**. The University has a 5,000 square foot storage facility for surplus materials owned by the University. Materials are advertised for resale and donation. Students and faculty can purchase surplus materials and furniture and equipment is also sold through online auctions and donated to non-profit organizations. The University also operates an extensive student Move Out program for surplus household goods, clothing, furniture and non-perishable food and partners with Goodwill, Hope Services, Second Harvest Food Bank.

- **Elimination of Styrofoam and plastic bags**. Campus Dining and on-campus retail cafés have eliminated foam food containers and Eco Boxes are offered for reuse in the dining halls. Several colleges and However, some packaging foam is received on-campus from shipping products, such as electronics and furniture. Students successfully lobbied the Bay Tree Bookstore to eliminate distribution of plastic bags for retail purchases.

- **Blueprint for a Sustainable Campus**. The Student Environmental Center publishes an annual update to its Blueprint which identifies the visions and actions to achieve institutional change. These include: reducing single-use

plastics, reducing wasted food, and increasing awareness about where waste goes and how to sort properly.

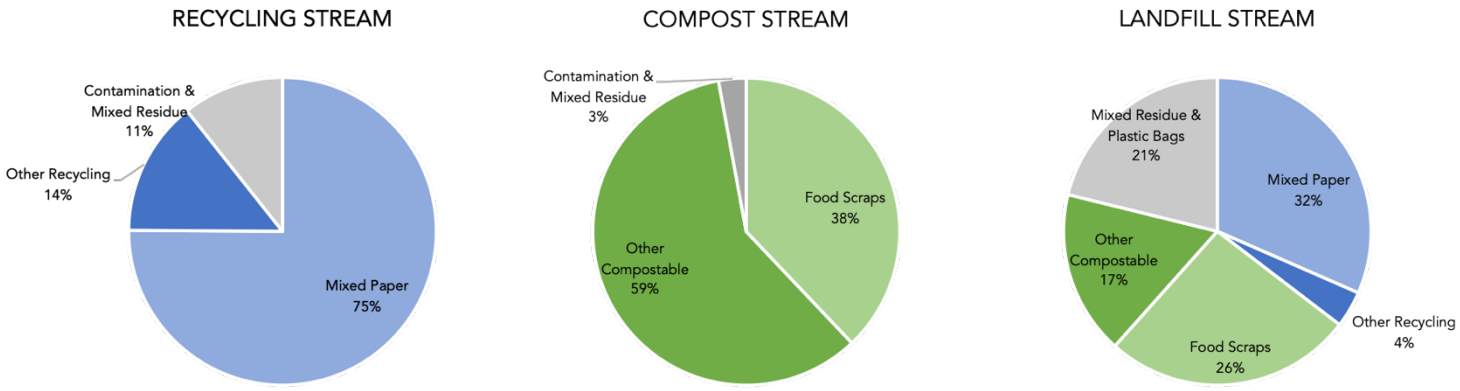
- **Promoting sustainable and reusable practies**. Student Sustainability Adviser projects include: piloting, gathering data on, and creating a model for durables in College Programs and Housing offices to reduce bioware use and associated contamination (Slugware).

Materials Characterization Study Findings

The Materials Characterization Study was conducted in January 2020 to find out how much recyclable (e.g., paper, glass) or compostable (e.g., food, yard trimmings) materials are discarded into the landfill containers and to identify any contamination in the recycling or compost containers. The data was collected by taking samples of materials and sorting them into material types such as mixed paper, mixed plastics, metal containers and glass containers and estimating the proportion of each type.

The study determined the following:

- Recycling and compost streams are fairly clean, but include materials that are not accepted by the current processors (this results in high contamination rates).
- Bagged recyclables are prevalent, particularly in the academic buildings. These materials are typically clean, but because bagged recyclables are not accepted by the current recyclables processor, this results in high contamination rates.
- There is a lot of readily recyclable and compostable material in the landfill stream. This presents a good opportunity to significantly increase diversion, but will require additional outreach, training and infrastructure.



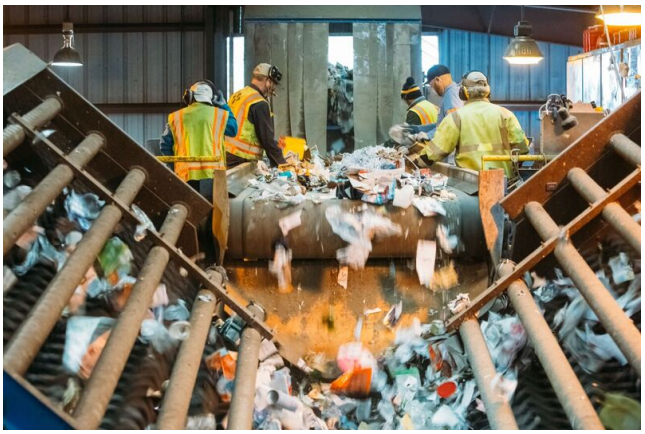
Operations Review Recommendations

The Operations Review was conducted between December 2019 and February 2020, prior to the shelter-in-place requirements due to the impact of the novel coronavirus. The study reviewed the collection services infrastructure on campus and conducted an operational efficiency analysis of the University's Resource Recovery solid waste, recycling and organics collections services.

Based on this review, the study identified the following scenarios for increasing efficiency and diversion potential:

Scenario 1 Collection Only at Service Locations

- Develop and implement a comprehensive public education and outreach campaign.
- Transfer responsibility of handling materials inside buildings to custodial staff.
- Continue using box trucks where necessary and discontinue using the Perkins vehicle.
- Discontinue weighing individual carts and bins of collected material.
- Discontinue tracking data associated with individual cart and bin weights.
- Commingle white and colored paper and mixed recycling to reduce the burden on custodians and box truck drivers of handling separate material streams.
- Discontinue the practice of periodically sorting recyclable materials using the sort line.
- Continue delivering mixed recycling material to the City of Santa Cruz Material Recovery Facility (MRF).
- Commingling relatively uncontaminated, clean paper (currently picked up separately and consolidated for a private contractor to haul) and cans/bottles from academic and administrative buildings will increase the value and decrease contamination of material delivered to the City of Santa Cruz MRF or another MRF.



City of Santa Cruz Materials Processing

- The box truck routes will become more efficient due to spending more time on route providing collection service since they no longer spend time inside buildings nor weighing each cart collected and logging the weights.

- Results include limited changes to collection services, moderate efficiency gains, and the impact on diversion is primarily limited to the effect of the public education and outreach effort; however, increasing the ease and convenience of participation by allowing generators to commingle all paper and mixed recycling will result in additional diversion.

Scenario 2 Conversion to Front-Load Vehicles for Cart Collection

- Continue with the improvements implemented in Scenario 1
- Discontinue use of the box trucks and Perkins vehicle.
- Commence collecting carts with a Front Load vehicle with the Curotto Can apparatus.
- Redeploy the box truck and Perkins vehicle staff to help with Front-load cart collection.

Front Load Vehicle with Curotto Can Cart Tipper

- The gains in efficiency accrued by implementing Scenario 1 are significantly increased by transitioning to Front-load cart collection and discontinuing current inefficient practices.
- This scenario further results in minimizing inefficiencies associated with extraneous handling of materials, because the Front-load vehicles will deliver materials directly for recycling processing and the former system required an extra step in handling this material.
- Results in advanced collection service changes, advanced efficiency gains, and the impact on diversion is primarily limited to the effect of the public education and outreach effort. However, similar to Scenario 1, increasing the ease and convenience of participation by allowing generators to commingle all paper and mixed recycling will result in additional diversion.

Scenario 3 Conversion to Front-Load Vehicles for Bin Collection

- Transition to single-stream recycling which entails commingling for collection of all cardboard, paper and mixed recycling.
- Collection service remains the same as in Scenario 2.
- Transition from cart-based service to bin-based service to obtain additional collection efficiency where feasible.

- Begin delivering single stream recycling to the Monterey Regional Waste Management District (MRWMD) MRF in Marina.
- Additional diversion will be realized from transition to single stream and inclusion of bagged materials which is not allowed at the City of Santa Cruz MRF, and expanded diversion from organics.

Monterey Regional Materials Processing

- Additional costs are anticipated due to Front Load Vehicle drivers spending time transporting loads of materials to the recycling processor and incurring additional vehicle Operations & Maintenance (O&M) expense and off-route time.
- Results include advanced collection service changes, advanced efficiency gains, and increased diversion due to the transition to single-stream collection which is conducive to processing a wide variety of materials efficiently.
- The efficiencies gained in Scenarios 1 and 2 are enhanced by reducing the labor necessary to collect materials campus-wide; however, some of these gains are offset by the additional time required to transport single-stream recycling to a processor in Marina that is significantly farther away than the City of Santa Cruz MRF on Dimeo Road (i.e., 34 miles vs. 5.3 miles).

Scenario 4 Commence On-site Materials Transfer in Long-Haul Trailers

- Transition to consolidating loads of single-stream recycling into a long-haul transfer trailer for delivery to the MRF for processing.
- Significant efficiency gains realized compared with Scenario 3 related to fewer loads delivered to the MRF for processing.
- Requires site improvements to the Mesa Yard and potentially additional capital cost.
- Resource Recovery Services can purchase equipment and haul materials directly or contract this function to a third party.
- The increase in operating costs associated with improvements to the Mesa Yard, single-stream materials processing expense and transportation expense

associated with this scenario are partially offset by the labor savings gained from collecting materials more efficiently and reduced time transporting loads for processing.

The scenarios build upon each other and include low or no cost options and identify future investments that can further increase efficiency.

Near-Term, Short-Term and Long-Term Actions

This plan identifies the near-term, short-term and long-term actions that the University can undertake to further its progress toward Zero Waste[2] and achieve the goals of the University of California Office of the President.

- **Near-Term Actions** can be initiated in the 2020-21 fiscal year.
- **Short-Term Actions** can be undertaken within the next few years based on currently available regional recyclables processing infrastructure.
- **Long-Term Actions** can be implemented over the next 10 years building on successful Zero Waste pilots, campus-wide training, campus-wide expansion of three-stream collection infrastructure and regional organics processing infrastructure.

These actions were developed by staff in Sustainability and Resource Recovery and vetted through individual interviews with over 25 stakeholders across the campus from multiple departments, including:

Vice Chancellor Business & Admin Services	**Dining**
Colleges, Housing and Educational Services	**Physical Planning, Development & Operations**
Conference Services	**Procurement**
Dean of Students	**Student Environment Center**

[2] Definition of Zero Waste, Zero Waste International Alliance: "Zero Waste: The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health." http://zwia.org/zero-waste-definition/

Costs and Staffing

The University spends approximately $1.57 on waste management each year (which could increase annually without intervention). Pursuing a Zero Waste future lets the University look for opportunities to control disposal costs through waste reduction, reuse, rethinking purchasing decisions, and expanding recycling and composting.

Many of Zero Waste actions will come at a cost, but also have significant triple bottom line benefits.

Fully implementing the Zero Waste actions will require increased staff support, collection and processing of many more recyclable and compostable materials, and deployment of new collection infrastructure.

Staff Support needed:

- Colleges and department effort to identify and appoint a point of contact and implement department-level Zero Waste actions
- Procurement effort to sustainable purchasing policy
- Sustainability effort to implement Zero Waste training and Zero Waste engagement actions
- Resource Recovery and Custodial effort to redeploy staff resources and streamline operations

Infrastructure needed:

- Purchase of standard internal bins and bin enclosures – costs dependent on standardization
- Updated signage to enhance source-separation – design and labor costs
- Construction to modify spaces in existing buildings and enclosures to provide convenient collection areas on floors and staging areas accessible to generators and collection staff

Twenty-two Zero Waste actions were identified for implementation in the near-term (2020-2021), short-term (2021-2024) and long-term (2025-2030).

For each action, the following impacts have been identified and estimated:

- Potential landfill diversion tons - annual
- Greenhouse gas (GHG) emissions reduction potential in metric tons of carbon dioxide equivalent (MTCO2e) - annual

Zero Waste Actions	Projected Diversion	Projected GHG Reduction	Estimated Annual Costs FTE=Full Time Equivalent $ = Supplies and Equipment	
	(Tons)	(MTCO2e)	FTE	$
1. Transition to "single stream" recycling	104	392	See note[1]	
2. Expand public education and outreach campaign	295	651	0.2	
3. Discontinue on-route weighing of all materials and charge fees based on volume and frequency	NA	NA	See note[1]	
4. Zero Waste College Pilot	16	43	0.2	$10K
5. Select standards and implement container and signage replacement	79	217	0.1	$10K
6. Transfer handling all materials generated inside buildings and courtyards to custodial staff	NA	NA	See note[1]	
7. Reduce points of collection within building	NA	NA	See note[1]	
8. Mandatory training for staff, faculty and students	98	217	0.2	$10K
9. Eliminate single use disposables, expand reusable take-out containers and reusable cups	18	65	0.1	
10. Expand conversion to electronic documents	62	235	0.1	
11. Sustainable purchasing program	31	87	0.1	
12. Provide technical assistance to departments and colleges	98	217	0.2	
13. Expand Zero Waste curriculum campus-wide	197	434	0.1	
14. Provide wrap-around support at special events	15	43	0.2	$25K
15. Build a Zero Waste network of support in each building	98	217	0.2	
16. Expand online materials exchange	11	26	0.1	
17. Implement Lessons Learned Zero Waste College Pilot throughout the University	157	434	0.2	$50K
18. Expand three-stream separation (recycling, organics, landfill) at all buildings, offices and residences	157	434	See note[1]	
19. All paper towels to compost	9	34	0.05	
20. Expand organics collection campus-wide	85	170	See note[1]	
21. Zero Waste events and venues at all colleges	15	43	0.2	$10K
22. Zero Waste requirements for retail tenants	7	25	0.05	
Total	1,552	3,984	2.3	$115K

[1]The Operations Review identified the additional costs that are estimated to be needed for the collection, transportation and processing of single stream recycling and organics. Approximately, $230,000 in additional annual funds will be needed by Resource Recovery to fully implement the recycling and compost programs required by state law.

Near-Term Actions (2020-2021)

1. Transition to "single stream" recycling

Transition to "single stream" - where all recyclable materials are commingled for collection to streamline operations and standardize training. Both the City of Santa Cruz and Santa Cruz County (where many staff and students reside) provide single stream recycling. Match these local standards and reduce sorting requirements to increase participation and simplify outreach and education.

Diversion Potential	104 Tons
GHG Emissions Reduction Potential	392 MTCO2e

2. Expand public education and outreach campaign

Provide standardized signage throughout the campus, "trash-talkers" at public events staffed at all recycling stations, and Zero Waste ambassadors in every residence hall. Create Zero Waste culture through community-based social marketing techniques, identify the barriers and benefits of the desired actions, pilot strategies for overcoming barriers and realizing benefits, and celebrate successes.

Cal Poly Zero Waste Ambassadors

Diversion Potential	295 Tons
GHG Emissions Reduction Potential	651 MTCO2e

3. Discontinue on-route weighing of all materials and charge fees based on volume and frequency

Create staff capacity for implementing new operational activities, programs and infrastructure by discontinuing on-route weighing. Charge fees for collection services based on volume and frequency of collection.

Short-Term Actions (2021-2024)

4. Zero Waste College Pilot

Zero Waste Station at Chou Hall

Recruit a college or sister pair to conduct a comprehensive Zero Waste Pilot. Test the best containers, locations, and collection methods for the sister pair conditions. Remove trash containers from as many locations as possible (e.g., outdoor common areas and classrooms) and promote "carry in, carry out" and "leave no trace" programs as was done at UC Berkeley's Chou Hall. Review research from Leave No Trace (lnt.org) and UC Berkeley and solicit their help to promote that message. Identify a building or buildings for TRUE Zero Waste Certification.

Diversion Potential	16 Tons
GHG Emissions Reduction Potential	43 MTCO2e

5. Select standards and implement container and signage replacement

UCLA Zero Waste Stations

Select a standard suite of receptacles and signage to be deployed throughout buildings on campus as resources allow. Systematically, remove non-standard containers and signage and replace them with standard stations. Ensure that all three streams (recycling, compost and trash) can be collected or added in the future. Reduce overall number of receptacles and replace with Zero Waste stations prominently located in hallways and common areas.

Diversion Potential	79 Tons
GHG Emissions Reduction Potential	217 MTCO2e

6. Transfer handling all materials generated inside buildings and courtyards to custodial staff

Custodial Collection at Boston University

As Zero waste stations are deployed throughout the buildings and courtyards, begin to transfer responsibility of handling all materials to custodial staff. Provide training and equipment to reduce effort and streamline operations.

7. Reduce points of collection within building

Centralized Stations at City College of San Francisco

Consider eliminating receptacles in offices and classrooms and encourage students, faculty and staff to discard materials in hallways, common areas and breakrooms. Centralized stations provide the opportunity for everyone to contribute to the success of the program by sorting properly. This approach streamlines collection operations and maximizes diversion by discouraging wasteful practices and encouraging waste reduction, recycling and composting.

8. Mandatory training for staff, faculty and students

Incorporate Zero Waste awareness and training at New Employee & Student Orientations. Draft version of Zero Waste and training materials for a University-wide online training module, Student Orientation, New Employee Orientation and Orientation managers to provide to their staff. Identify existing positions that are related to Zero Waste and add environmental stewardship responsibilities to job descriptions specific to those positions. Incorporate Zero Waste performance factors in the annual review process for all employees. Provide customized trainings for different groups of people that match their evaluation criteria.

Diversion Potential	98 Tons
GHG Emissions Reduction Potential	217 MTCO2e

9. Eliminate single use disposables, expand reusable take-out containers and cups

Strive for reusables and elimination of single use products. Phase out single-use disposable foodware throughout campus, in dining halls and with retail vendors. Modify catering practices to eliminate single use disposables and fully align with Zero Waste. Incorporate Zero Waste language into retail dining contracts and large-scale event communications. Increase water bottle filling stations, as resources allow.

Humboldt State University has replaced paper cups with Mason jars

Diversion Potential	18 Tons
GHG Emissions Reduction Potential	65 MTCO2e

10. Expand conversion to electronic documents

Continue conversion of printed paper documents to electronic documents. Work with faculty to expand online resources to replace "readers." Invest in technology to transition all paperwork that is sent to or received by University departments that are either large in size (e.g., RFPs, bids, contracts) or need to be completed by more than 100 people (e.g., Housing and Residential Life forms) to electronic documents. Include in any printing orders asking the user to 'Rethink before they Print' and reference Zero Waste goals. Review all large printing orders to figure out electronic alternative or how to do without paper in the future for those tasks. Meet with all departments to review past purchases of paper and determine if there are electronic alternatives or how the task can be done without paper.

Diversion Potential	62 Tons
GHG Emissions Reduction Potential	235 MTCO2e

11. Sustainable purchasing program

Implement a campus-wide Sustainable Purchasing Program that supports social and environmental objectives as well as local markets where possible. Require suppliers report sustainability data to University.

- Work with suppliers to completely eliminate packaging foam.
- Phase out purchases of single-use plastic (consistent with University of California, Office of the President goal). Transition away from plastic bags in

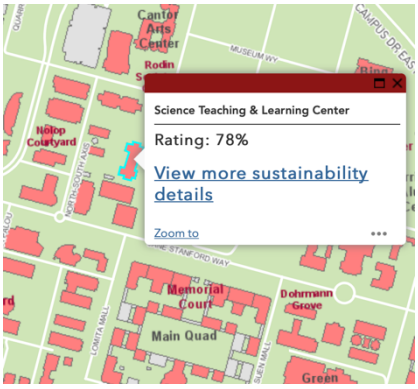
retail and dining locations. Eliminate all single-use plastic food service items and plastic bottles.

- Empower departments to make more sustainable choices when purchasing goods. Provide training in sustainable purchasing.

Diversion Potential	31 Tons
GHG Emissions Reduction Potential	87 MTCO2e

12. Provide technical assistance to departments and colleges

Provide direct technical assistance to college and building operations staff to ensure compliance with mandatory recycling and composting requirements and University goals. Conduct waste audits and publish waste reduction reports and monitor progress for each college, building or department. Colleges or buildings falling below the established benchmarks will receive extra support and resources.



Publishing Building Metrics at Stanford

Diversion Potential	98 Tons
GHG Emissions Reduction Potential	217 MTCO2e

13. Expand Zero Waste curriculum campus-wide

Convene a working group of students, faculty and staff to develop outreach and education programs focused on waste reducing and recycling. Show the connection between Zero Waste and natural resource preservation and climate resiliency. Develop signage and program resources to emphasize waste reduction and recycling messages. Support colleges and departments to incorporate waste reduction and recycling modules into the curriculum.

Diversion Potential	197 Tons
GHG Emissions Reduction Potential	434 MTCO2e

14.Provide wrap-around support at special events

Provide three-stream collection at all special events. Dedicate containers, such as ClearStream. Incorporate delivery and maintenance of containers, training and management of discarded materials into special event protocols. Support special event coordinators to plan for Zero Waste events. Consider storing special event containers on site at each college and venue to avoid delivery and collection costs.

Special Event
Three Stream Containers

Diversion Potential	15 Tons
GHG Emissions Reduction Potential	43 MTCO2e

15.Build a Zero Waste network of support in each building

A network is needed to support groups around campus who are directly responsible for implementing, monitoring, and maintaining Zero Waste initiatives. Individuals in different buildings and departments should be identified and tasked with being a point of contact on matters related to Zero Waste. The Points of Contact will champion Zero Waste within their departments, engage their co-workers in Zero Waste initiatives, liaise with facilities and custodial staff to address recurring issues, help train others in proper Zero Waste sorting, develop targeted engagement activities and departmental Zero Waste Plans and get feedback on Zero Waste initiatives on all campuses.

Diversion Potential	98 Tons
GHG Emissions Reduction Potential	217 MTCO2e

16.Expand online materials exchange

Expand the online materials exchange for use by the entire campus community for material and equipment sharing. Manage a broader reuse effort to improve communications, push notifications to end users when goods are available, and allow end-users to post items themselves.

Diversion Potential	11 Tons
GHG Emissions Reduction Potential	26 MTCO2e

Long-Term Actions (2025-2030)

17. Implement Lessons Learned from Zero Waste College Pilot throughout the University

Based on the results of the Zero Waste College pilot, expand the pilot campus-wide.

- Eliminate litter can or stranded trash cans (where there is no recycling or organics).
- Convert to reusable and refillable to-go containers in all dining areas.
- Ensure universal training at on-boarding.
- Communicate "new norms" (carry in-carry out)

Diversion Potential	157 Tons
GHG Emissions Reduction Potential	434 MTCO2e

18. Expand three-stream separation (recycling, organics, landfill) at all buildings, offices and residences

Develop an integrated recycling and waste system for the University to reduce the number of times materials are handled, increase efficiency, and increase the amount of material that is properly recycled. Expand access to composting. Establish consistent collection systems across all colleges: recycling, compost, and landfill. Custodians should be responsible for collecting trash and recycling from inside all buildings and depositing in appropriate centralized collection containers for Resource Recovery staff pickup. Identify and resolve barriers to making this change. Reorganize existing stations and procedures for diversion of various "special" material types including but not limited to universal waste, batteries, ink/toner, mattresses, mattress pads, pallets, white goods, scrap metal, scrap wood, furniture, and cardboard bales. Engage students, faculty and staff to identify gaps and opportunities.

Diversion Potential	157 Tons
GHG Emissions Reduction Potential	434 MTCO2e

19.All paper towels to compost

Conduct an inventory of restrooms and identify opportunities for reducing paper towel waste. Where appropriate:

- Ensure that paper towels are included in compost program (when available)
- Replace paper towels dispensers with hand dryers, cloth towel rolls or sanitizers
- Provide dual dollies or other collection equipment for custodial staff that service restrooms to ensure that paper towels are separated from other restroom waste

Paper Towel Collection at East Bay Regional Park District

Diversion Potential	9 Tons
GHG Emissions Reduction Potential	34 MTCO2e

20.Expand organics collection campus-wide

Ensure that all organics, including food scraps, compostable foodware, and compostable paper towels, generated on campus are addressed through the expansion of organics collection. Provide organics collection at all building locations that generate two cubic yards or more of discarded materials per week or arrange for Resource Recovery staff to transfer loads of compostable materials to centralized collection points.[3]

Diversion Potential	85 Tons
GHG Emissions Reduction Potential	170 MTCO2e

21.Zero Waste events and venues at all colleges

Model Zero Waste strategies at all public events and venues at the University. Require concessionaires, food service vendors and caterers to use food service packaging that is reusable or compostable. Require all contractors to follow the Zero Waste guidelines and properly separate all recyclable and compostable materials. Incorporate these requirements into University agreements. Ensure that all special

[3] State law (Assembly Bill 1826) requires commercial and intuitional generators with two cubic yards or more per week of discarded materials to self-haul compostable materials, compost the materials on-site, or arrange for collection of compostable materials.

events and activities that require an agreement or reservation follow Zero Waste guidelines, which will include:

- Mandatary separation of recyclable and compostable materials
- Reusable or compostable foodware (no single use plastics)
- A list of prohibited materials such as Styrofoam, confetti, plastic table liners, or helium tanks

Diversion Potential	15 Tons
GHG Emissions Reduction Potential	43 MTCO2e

22.Zero Waste requirements for retail tenants

Leases are renewed every five years. Ensure that all new or renewed leases require retail tenants to incorporate the Zero Waste policies and programs established by the University, including:

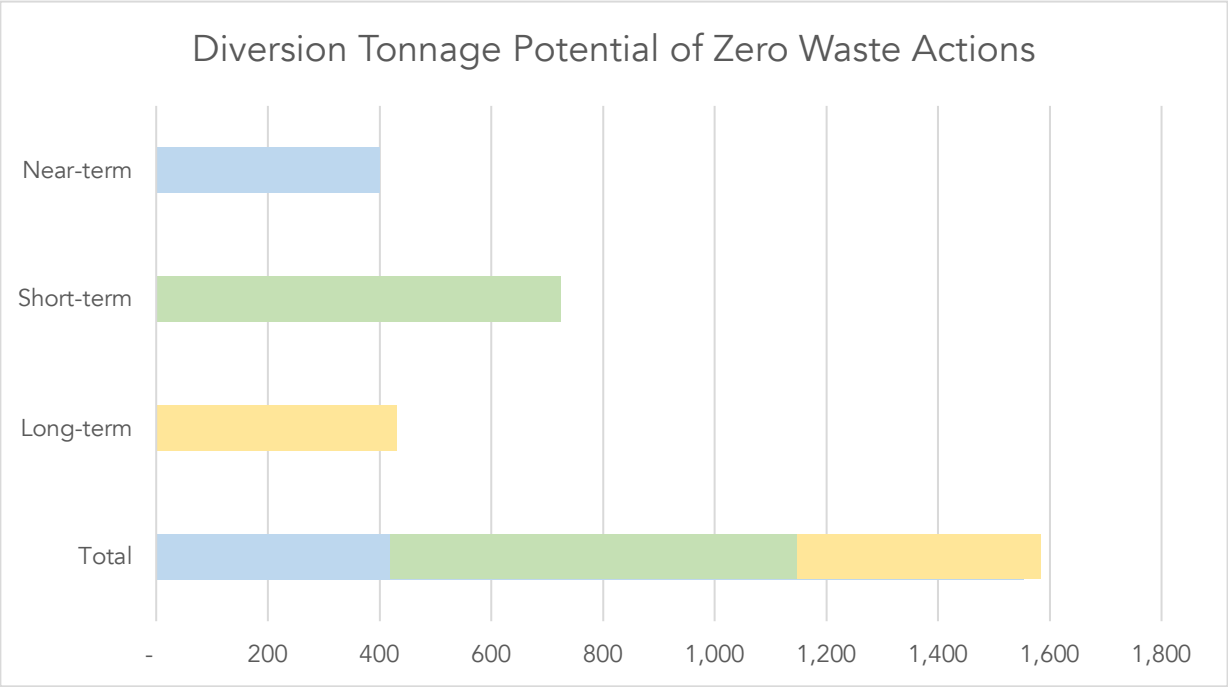
- Three-stream separation for recycling, organics and trash (both for staff - back of the house and for customers – front of the house)
- Phase out purchases of single-use plastic (consistent with University of California, Office of the President goal)
- Eliminate all single-use plastic food service items and plastic bottles
- Strive for reusables and elimination of single use products

Diversion Potential	7 Tons
GHG Emissions Reduction Potential	25 MTCO2e

Impact

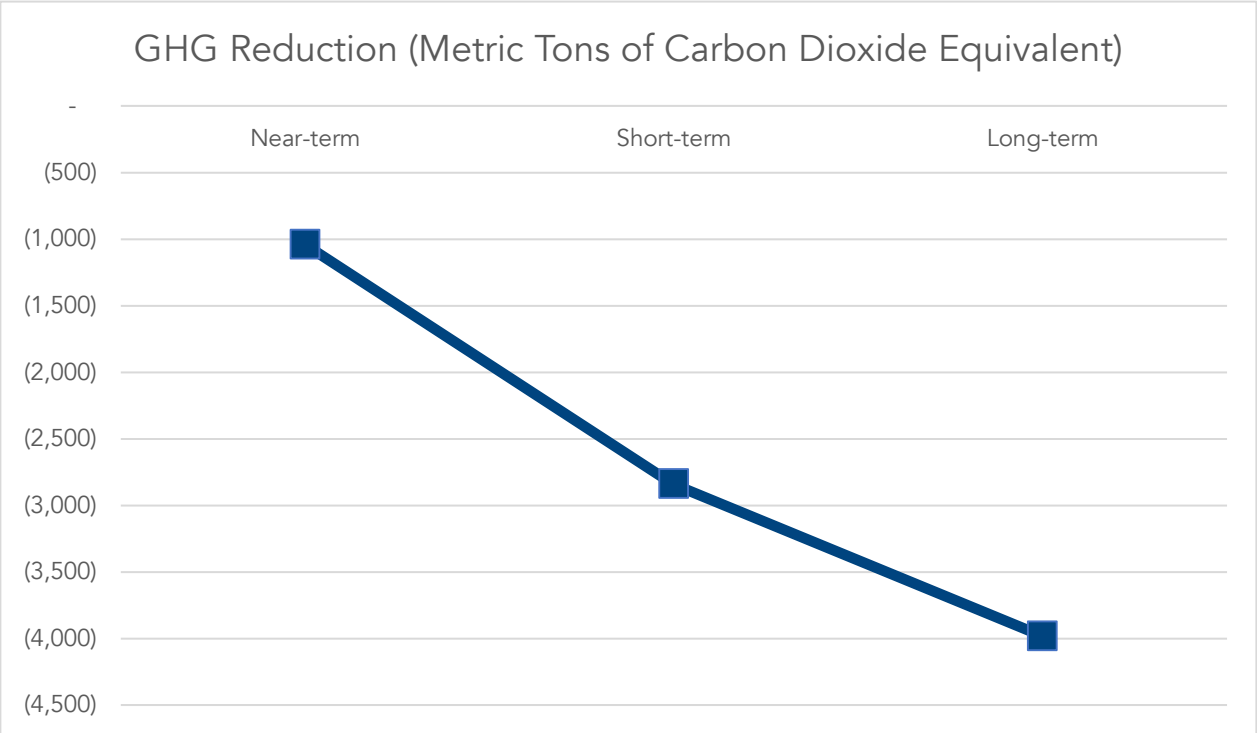
Implementing the near-term, short-term and long-term actions will increase the University's diversion rate. Using conservative estimates for capture rates by material type, the Zero Waste actions would result in an additional 1,550 tons per year diverted from landfills.

This would increase the University's diversion rate from 51% to 88% by 2030.



To estimate the diversion potential of the Zero Waste actions, a "capture rate" by material type was determined. For example, transitioning to single stream was estimated to eliminate 15% of mixed paper from the trash. This would result in an additional 93 tons of material diverted from disposal annually. The capture rate estimates were based on results from similar programs or best estimates. It is possible that implementation of this program will result in much higher capture rates. However, conservative assumptions were used for these calculations. The University will track the real impacts of each implemented program and provide updated progress metrics and impact analysis.

The waste prevention, recycling, and composting initiatives will also reduce greenhouse gas emissions. Using the U.S. EPA Waste Reduction Model (WARM), the Zero Waste actions to be undertaken by the University are estimated to reduce emissions by approximately 3,980 metric tons of carbon dioxide equivalent.



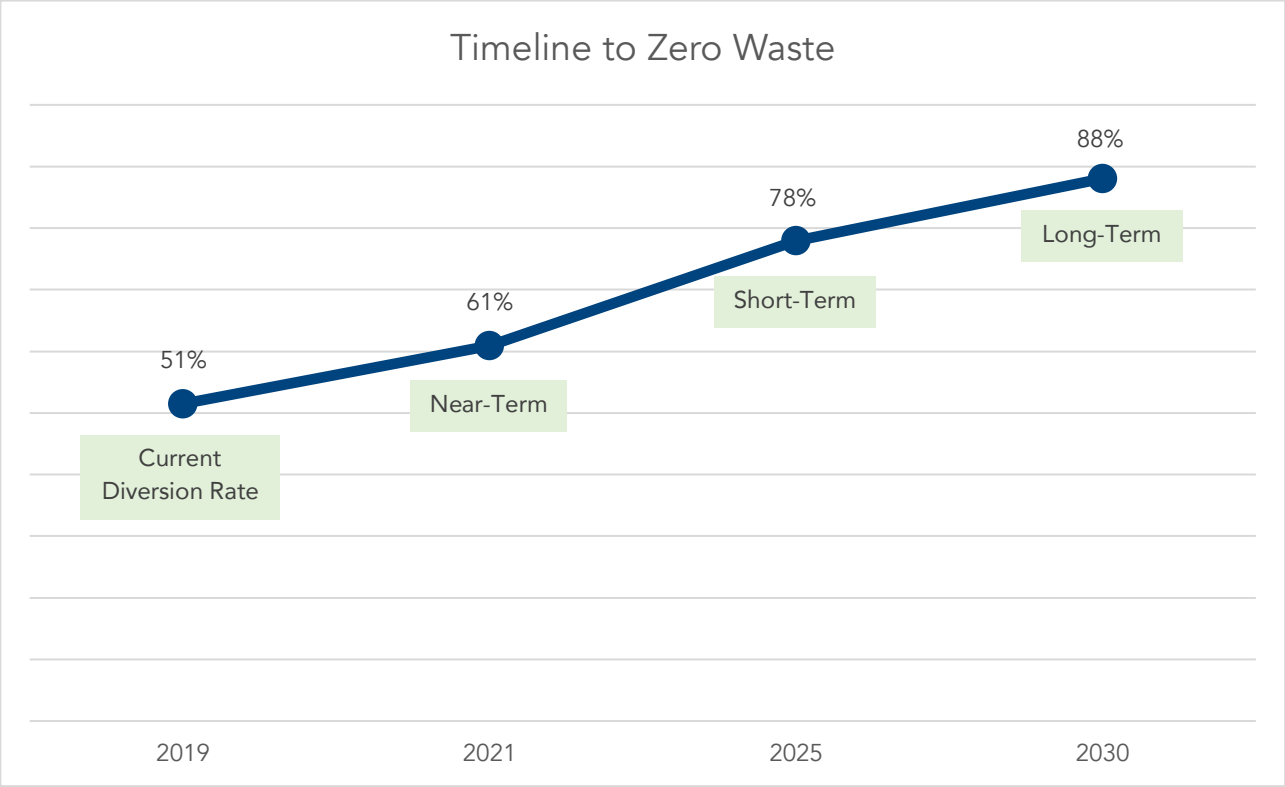
Implementation

Timeline

Full implementation of the Zero Waste actions identified in this plan is expected to increase the University's diversion rate from 51% to 88%. This goal is achievable based on implementation of the Zero Waste actions and the experience of other leadership institutions. The following table lists each Zero Waste action and the timeframe for implementation. Some actions, such as expansion of organics collection will begin in the short-term and will be completed in the long-term.

Near-Term (2020-2021)	Short-Term (2021-2024)	Long-Term (2025-2030)
Cumulative Diversion Rate		
61%	78%	88%
1. Transition to "single stream" recycling 2. Expand public education and outreach campaign 3. Discontinue on-route weighing of all materials and charge fees based on volume and frequency	4. Zero Waste College Pilot 5. Select standards and implement container and signage replacement 6. Transfer handling all materials generated inside buildings and courtyards to custodial staff 7. Reduce points of collection within building 8. Mandatory training for staff, faculty and students 9. Eliminate single use disposables, expand reusable take-out containers and reusable cups 10. Expand conversion to electronic documents 11. Sustainable purchasing program 12. Provide technical assistance to departments and colleges 13. Expand outreach and education campus-wide 14. Provide wrap-around support at special events 15. Build a Zero Waste network of support in each building 16. Expand online materials exchange	17. Implement Lessons Learned Zero Waste College Pilot throughout the University 18. Expand three-stream separation (recycling, organics, landfill) at all buildings, offices and residences 19. All paper towels to compost 20. Expand organics collection campus-wide 21. Zero Waste events and venues at all colleges 22. Zero Waste requirements for retail tenants

The University will continue to pursue the long-term goal of 90% diversion of discarded materials from landfills. This goal is consistent with the University's ambitious goal of carbon neutrality. The University will measure and monitor its waste reduction and recycling levels, identify new or expanded Zero Waste actions, and update and revise the Zero Waste Plan as appropriate.



Action Steps

The following table lists all of the action steps necessary to undertake the Zero Waste Plan, including the tasks, implementation schedule and lead responsibility.

Office of Sustainability = Sustainability
Colleges, Housing and Educational Services = CHES
Physical Planning, Development & Operations = PPDO
Real Estate, Resource Recovery and Custodial are units within PPDO

Task	Schedule	Lead Responsibility
1. Transition to "single stream" recycling		
Arrange for regional processing capacity	Fall 2020	Resource Recovery
Consolidate recycling containers/eliminate separate paper collection	Fall 2020	Resource Recovery
Re-sticker, relabel all recycling containers	Fall 2020	Resource Recovery
2. Expand public education and outreach campaign		
Sticker and signage redesign	Fall 2020	Sustainability
Update online recycling guide	Fall 2020	Sustainability
Incorporate single stream program into campus trainings	Winter 2020	Sustainability
3. Discontinue on-route weighing of all materials and charge fees based on volume and frequency		
Develop fee methodology	Fall 2020	Resource Recovery
Implement new fee structure	Fall 2021	Resource Recovery
4. Zero Waste College Pilot		
Recruit Sister College Pair	Spring 2021	Sustainability
Create working group (students, CHES, PPDO, Dining)	Spring 2021	Sustainability
Design Zero Waste College Pilot	Spring 2021	Pilot Working Group
Implement Zero Waste College Pilot	Fall 2021	Sister College Pair
5. Select standards and implement container and signage replacement		
Develop budget and rollout plan	Spring 2021	Resource Recovery
Select uniform stations for different scenarios (indoor, outdoor, special events)	Summer 2021	Resource Recovery
Deploy by region (based on budget and rollout schedule)	Fall 2021-2023	Resource Recovery
6. Transfer handling all materials generated inside buildings and courtyards to custodial staff		
Establish timeframe based on custodial operations review/union negotiations	Spring 2021	Custodial
Establish standard operating procedures	Summer 2021	Custodial
Purchase equipment to aid segregation	Fall 2021	Custodial
7. Reduce points of collection within building		
Modify collection points based on uniform rollout plan	Fall 2021-2023	Custodial
8. Mandatory training for staff, faculty and students		
Convene working group (Staff Human Resources, Academic Personnel Office, CHES)	Spring 2022	Sustainability
Develop training modules	Summer 2022	Training Working Group
Implement training program	Fall 2022	Staff Human Resources, Academic Personnel Office, CHES
9. Eliminate single use disposables, expand reusable take-out containers and reusable cups		
Select reusable take-out approach based on Sister College Pair pilot plan	Spring 2021	Pilot Working Group
Expand reusable take-out program campus-wide	Fall 2023	CHES, PPDO, Dining

Task	Schedule	Lead Responsibility
10. Expand conversion to electronic documents		
Convene working group (Copy, Mail & Receiving Services, academic departments with large print orders, Information Technology Services)	Spring 2023	Sustainability
Establish protocols for reducing printing and expedite conversion to electronic documents	Spring 2023	Print Reduction Working Group
Implement working group recommendations	Fall 2023	Copy, Mail & Receiving Services, academic departments, Information Technology Services
11. Sustainable purchasing program		
Eliminate Single use plastic dining accessories	Summer 2021	Dining, Real Estate, all venues
Transition to all reusable or compostable food services items	Summer 2022	Dining, Real Estate, all venues
Identify sources of expanded polystyrene on campus	Spring 2022	Resource Recovery
Ensure that campus purchases (furniture, electronics) specify prohibition on expanded polystyrene	Spring 2022	Procurement
Incorporate prohibition of expanded polystyrene and single use plastics into staff, faculty and student training	Fall 2022	Staff Human Resources, Academic Personnel Office, CHES
Incorporate sustainable purchasing into staff, faculty and student training	Fall 2022	Staff Human Resources, Academic Personnel Office, CHES
12. Provide technical assistance to departments and colleges		
Identify operations staff for each building/college responsible for program oversight	Spring 2022	Sustainability, CHES
Establish metrics for monitoring program achievement	Summer 2022	Sustainability, CHES
Provide training and technical assistance	Fall 2022	Sustainability
Report Zero Waste program metrics by building/college	Spring 2023	Sustainability, Resource Recovery
13. Expand Zero Waste curriculum campus-wide		
Convene a working group of students, faculty and staff to develop outreach and education programs focused on waste reducing and recycling	Fall 2021	Sustainability
Identify strategies for incorporating waste reduction and recycling modules into the curriculum	Winter 2021	Education Working Group
Conduct outreach (faculty meetings, seminars)	Spring 2022	Education Working Group
14. Provide wrap-around support at special events		
Evaluate options for three-stream collection at special events and venues (based on uniform rollout plan)	Spring 2021	Resource Recovery

Task	Schedule	Lead Responsibility
Convene working group to evaluate options for purchase, service, storage, and maintenance of special event containers (CHES, Quarry, Conference Services, commencement planners)	Summer 2021	Resource Recovery
Purchase and rollout containers based on uniform rollout plan	Fall 2021-2023	Resource Recovery
15. Build a Zero Waste network of support in each building		
Build on technical assistance program with operations staff for each building/college responsible for program oversight to create Points of Contact as Zero Waste champions or Zero Waste ambassadors	Fall 2023	Sustainability, CHES, Resource Recovery
Identify Points of Contact to champion Zero Waste within their departments, engage their co-workers in Zero Waste initiatives, liaise with facilities and custodial staff to address recurring issues, help train others in proper Zero Waste sorting, develop targeted engagement activities and departmental Zero Waste Plans and get feedback on Zero Waste action in all colleges	Winter 2023	Sustainability, CHES, Resource Recovery
Provide opportunities for collaboration through quarterly meetings, trainings, seminars, webinars	Spring 2024	Sustainability, CHES, Resource Recovery
16. Expand online materials exchange		
Recruit student intern to research alternatives for expanding the online materials exchange on campus	Fall 2023	Sustainability
Convene a working group of staff involved in materials exchange on campus (CHES, Copy, Mail & Receiving Services)	Winter 2023	Sustainability
Evaluate alternatives and provide input to Sustainability	Winter 2023	Materials Exchange Working Group
Implement recommended approach for materials exchange	Spring 2024	CHES, Copy, Mail & Receiving Services
17. Implement Lessons Learned Zero Waste College Pilot throughout the University		
Evaluate results from Sister College Pair Zero Waste Pilot	Summer 2022	Pilot Working Group Sister College Pair
Develop plan for campus-wide rollout, budget, schedule	Fall 2022	Pilot Working Group Sister College Pair
Expand to each subsequent Sister College Pair	Fall 2023-2027	Pilot Working Group
18. Expand three-stream separation (recycling, organics, landfill) at all buildings, offices and residences		
Walk the campus to review every location where materials are separated to ensure that there is appropriate signage, bins and collection systems. Fill in gaps where needed.	Summer 2024-2025	Resource Recovery

Task	Schedule	Lead Responsibility
Reorganize existing stations and procedures for diversion of various "special" material types including but not limited to Universal Waste, batteries, ink/toner, mattresses, mattress pads, pallets, white goods, scrap metal, scrap wood, furniture, and cardboard bales	Summer 2025-2026	Resource Recovery
Engage students, faculty and staff to identify gaps and opportunities	Fall 2024-2026	Resource Recovery
19. All paper towels to compost		
Ensure that regional compost facility can accept paper towels	Summer 2024	Resource Recovery
Rollout paper towel composting in every building with paper towels, provide signage and stickers	Fall 2024-2025	Resource Recovery
Ensure that custodial staff have the training and equipment to segregate paper towels for composting	Fall 2024-2025	Custodial
20. Expand organics collection campus-wide		
Walk the campus to review every building and enclosure where materials are aggregated to ensure that there is space/availability for organics	Summer 2024	Resource Recovery
Conduct waste audits to see if recyclable or organic materials are being disposed inappropriately	Fall 2024	Resource Recovery
Provide organics collection at all building locations that generate two cubic yards or more of discarded materials per week or arrange for Resource Recovery staff to transfer loads of compostable materials to centralized collection points	Fall 2024-2025	Resource Recovery
21. Zero Waste events and venues at all colleges		
Require concessionaires, food service vendors and caterers to use food service packaging that is reusable or compostable	Fall 2024	Procurement, Dining, CHES
Require all contractors to follow the Zero Waste guidelines and properly separate all recyclable and compostable materials. Incorporate these requirements into University agreements.	Fall 2025	Procurement, Dining, CHES
Ensure that all special events and activities that require an agreement or reservation follow Zero Waste guidelines	Fall 2026	Procurement, Dining, CHES
22. Zero Waste requirements for retail tenants		
Ensure that all new or renewed leases require retail tenants to incorporate the Zero Waste policies and programs established by the University	Fall 2021-2029 (as leases renew)	Real Estate