Harvard Green Campus Initiative
High Performance Building Resource

# Mather Dunster Kitchen Case Study
## LEED-CI Silver
## August 2005





## Summary

Mather Dunster became the nation's first LEED-CI certified kitchen when it achieved a LEED Silver rating in 2006. All thirty of the LEED points attempted were accepted by the USGBC. This project is a 15,870 square foot renovation of the kitchen and serveries for Harvard University Dining Services (HUDS). The primary impetus of the renovation was to make it easier for the thirty members of the kitchen staff to use and to create a more pleasant dining experience for the residents of Mather and Dunster Houses. Replacing and refurbishing kitchen equipment, such as range hood exhaust controls and efficient dishwashers, has improved the kitchen's performance while drastically reducing energy consumption. This was a very fast-paced project, completed entirely during the 2005 summer break while students were away.

## Project Highlights

- **Mather Dunster is the first LEED-CI kitchen in the nation**
- **Food waste is composted using a pulping and dewatering machine**
- **Waste oil is recycled, and will eventually be used in bio-diesel vehicles**
- **Old kitchen equipment sent to Spanish Town, Jamaica for reuse in local orphanages**
- **More than 95% of construction waste was diverted from landfills**

**Summary continued:**

The Mather Dunster kitchen renovation used all low-VOC adhesives, sealants, paints and primers and composite wood without added urea formaldehyde. Throughout the project efforts were made to reuse and refurbish materials. New kitchen equipment was purchased based on its energy efficiency and all old equipment was shipped to Spanish Town, Jamaica for use in area orphanages. Through an aggressive construction and demolition waste plan and with the assistance of the Institution Recycling Network, the project was able to divert more than 95% of construction and demolition materials from landfills. Food is waste composted using a pulping machine and waste cooking oil is saved for use in biodiesel vehicles.

## Project Team

Harvard University Dining Services (HUDS) was the client for the renovation of the Kitchen and Serveries. Students who live at Mather House and Dunster House will use the new serveries. The buildings, including the dining halls, are owned by the Faculty of Arts and Sciences. HUDS uses the kitchens and serveries as would any tenant, though there is no formal lease in place.

*Architect:* Prellwitz/Chilinski Associates, Inc.

*Construction Manager:* Shawmut Design and Construction

*Civil Engineer:* Judith Nitsch Engineering, Inc.

*HVAC Engineer:* Exergen Corporation

*Plumbing, Electrical, Fire Protection Engineer:* Robert W. Sullivan, Inc.

*Structural Engineer:* JKP Structural Engineering Group

*Specifications:* Collective Wisdom Corporation

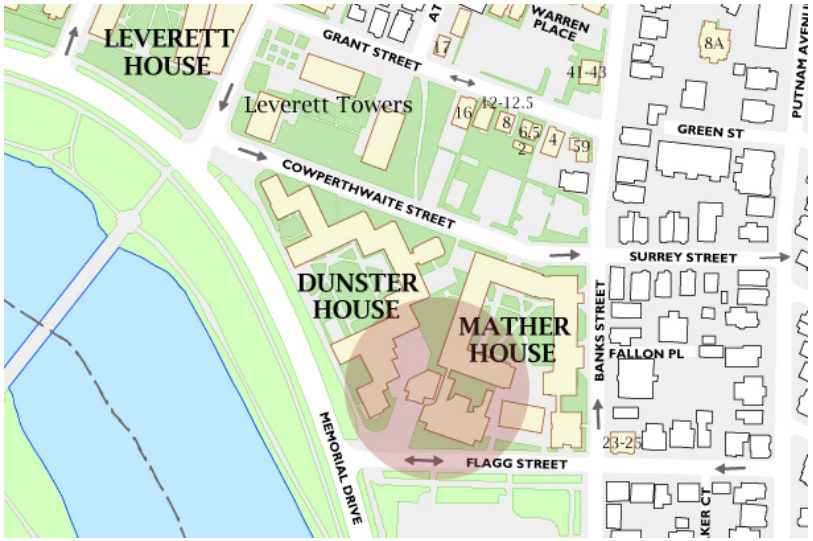
*Commissioning:* Facility Dynamics Engineering

*Sustainability Consultant:* Harvard Green Campus Initiative

## Project Schedule

In the summer of 2003, HUDS worked with an architect to do a feasibility study and developed the conceptual ideas for the renovation of the kitchen and servery. Prellwitz/Chilinski Associates, Inc. was hired in September 2004. Sustainability was introduced as a goal on the project late in schematic design.

Design Development: January 2005.
Bid Document:s March 2005
Construction: June 13, 2005
Completion: August 2005




## Location

Mather House and Dunster House are located along Memorial Drive, between Cowperthwaite Street and Flagg Street. Mather is located at 45 Flagg Street and Dunster is at 945 Memorial Drive.

Google map location of Mather Dunster

## Program

Mather House and Dunster House are separate dormitories, each with its own dining hall. The two buildings share a common kitchen and loading area. The old yellow tile, dim lighting in the servery, and aging equipment in the kitchens led to the renovation of the servery and kitchens. Much of the kitchen equipment was near the end of its useful life, and there were many opportunities to replace outdated equipment with modern, more energy efficient models. Also, the old serving areas for both houses were small and they isolated students from the kitchen. The new areas are much more inviting and allow students to watch food being prepared. Large skylights were installed above the Mather House culinary display to improve lighting. New food islands serving hot entrées were built in each servery. New lighting was installed throughout the kitchens and serveries.

The renovation includes an accessible ramp outside Dunster House and re-grading of the site to comply with the American with Disabilities Act. A new loading dock was also created.

## Sustainable Strategies

### *Site*

The site is in close proximity to public and campus transportation. Bicycle parking and employee showers and changing rooms promote bicycling to work. The project did not add parking spaces, and employees who carpool are given preferential parking in nearby parking facilities.

### *Water*

The water efficiency measures installed at the Mather Dunster kitchens should result in water savings of over 32% compared to code. This reduction was achieved by installing 0.5 gallon per minute hand wash fountains and dual-flush toilets with a 0.8 gallon per flush "liquid" flush. The kitchen renovation includes four staff restrooms. Caroma ADA 270 Caravelle dual-flush toilets are used.

**Hobart CRS86A Dishwashers with Opti-Rinse:** Each kitchen was equipped with a new efficient dishwasher. While these did not contribute to LEED credits, HUDS expects to save a total of over 500,000 gallons of hot water each year, saving over $18,000 annually, based on Y2006 utility rates. This includes savings for the associated steam to heat the water.

## *Energy*

**Melink Exhaust Hood Controls** monitor smoke in the new range hood and adjust variable speed drive exhaust fans according to actual conditions determined by a laser beam. This ability to adapt to usage has a pronounced environmental benefit in a college kitchen where most of the cooking is centered around three specific times per day, with lulls in activity between meals. The hood exhaust fan is tied to the makeup air units by new DDC controls which adjust make-up air accordingly and provide significant energy savings.

Lighting is designed to be 16% more efficient than code.


## *Materials and Waste*

The project diverted over 95% of construction and demolition waste from disposal. Salvage materials were sent to Food for the Poor in Spanish Town, Jamaica.

**Somat Pulper and Hydra-Extractor:** allows grinding of all organic wastes from the kitchen. Waste is ground into a slurry and piped to the Hydra-Extractor near the loading dock. Water is then extracted and the resulting semi-dry pulp is relatively odor-free and ready to be composted. The system is expected to divert over 240,000 pounds of waste from landfills each year.

**Frontline International Waste Oil Tank:** Another green feature of the project that does not affect the LEED rating is the addition of a 150 gallon stainless steel storage tank for waste vegetable oil. The kitchen's fryers are directly plumbed to the tank so that waste vegetable oil can be filtered and collected without risk of spill. Harvard's Recycling and Waste Management department converted a recycling truck to run on straight vegetable oil (SVO). The storage tank has been fitted with a "Harvard Valve" to fuel the recycling truck or collect the vegetable oil for onsite conversion to biodiesel.

File and wall cabinets were salvaged from other buildings on campus.

44% of the materials were manufactured within 500 miles, which earned the project an Innovation and Design LEED credit.

## *Indoor Environmental Quality*

An Indoor Air Quality Management Plan for Mather Dunster was implemented during construction.

Low-emitting flooring, adhesives, sealants, and composite wood were used. Products used include Shaw Fusion Carpet, Benjamin Moore Ecospec paint, Hoover/Georgia Pacific Pyro Guard, Roseburg Pheno-

## *Lessons Learned*

The budget and project scope was determined during the feasibility study in fall of 2003. The project manager pointed out that sustainability “should be discussed and a decision made to go for it by the owners, before they select an architect.” This can be achieved by including sustainability language in the RFP for architects and stressing sustainability in clearly documented project goals.

Working closely with the sustainability consultant for LEED documentation helped the project achieve a successful LEED submission in which all credits applied for were accepted by the USGBC. It is important to have leadership in the LEED documentation process.