HARVARD
GRADUATE SCHOOL OF EDUCATION

GREEN
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HARVARD GRADUATE SCHOOL OF EDUCATION
LARSEN HALL
14 APPIAN WAY , CAMBRIDGE, MA 02138

LEED-CI v2.0
GOLD

Originally constructed in 1965, Larsen Hall was the first new classroom and office building for Harvard Graduate School of Education (HGSE). The eight story brick building houses seven floors of classrooms, along with faculty and staff office space. It was named for Roy E. Larsen, a major voice in education reform and major HGSE supporter.

Larsen Hall Exterior
Photo: Harvard Office of Sustainability 2007

Renovations of second floor classrooms 210 and 212 began in August and concluded in September of 2007. A second phase of renovations focused on classrooms 402, 513 and 615, and was completed in August of 2008.

The renovations provided the opportunity to upgrade the finishes, furniture, lighting and technological capabilities of each classroom to bring them up to HGSE current standards. Restrooms on each floor were also retrofitted with low-flow fixtures to better improve water efficiency and reduce consumption.

The project team was committed to sustainability from the onset and throughout the duration of the project. This dedication ultimately allowed the Larsen Hall renovated classrooms to achieve a LEED Gold Certification.

PROJECT HIGHLIGHTS

89.6% of construction waste was recycled.

60% of the interior non-structural components were retained.

40% of restroom water consumption was eliminated by using duel-flush toilets and low-flow aerators.

25% Of materials used in the project consist of materials with recycled content.

100% of composite wood is free of urea formaldehyde

LEED® Facts

Larsen Hall
Harvard GSE
2007 Classroom Renovation

Location……Cambridge, Massachusetts
Rating System……..Commercial Interiors v2.0
Certification Achieved……Gold
Total Points Earned……35

Sustainable Sites……6/7
Water Efficiency……2/2
Energy and Atmosphere……6/14
Materials and Resources……8/14
Indoor Environmental Quality……8/17
Innovation and Design……5/5

Please print this project profile only if necessary.
If printing is required, please print double sided and recycle when finished. Thank you!

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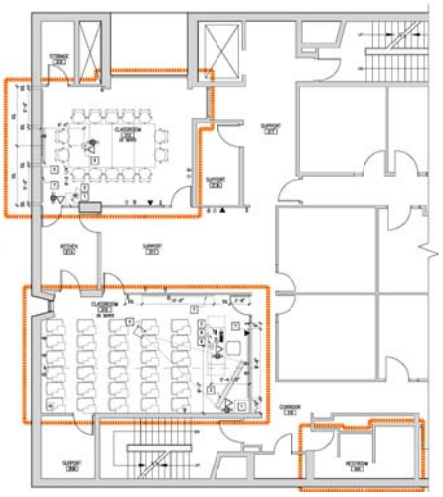
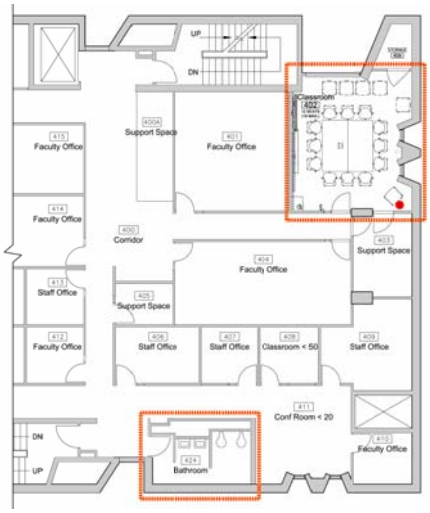
PROJECT OVERVIEW

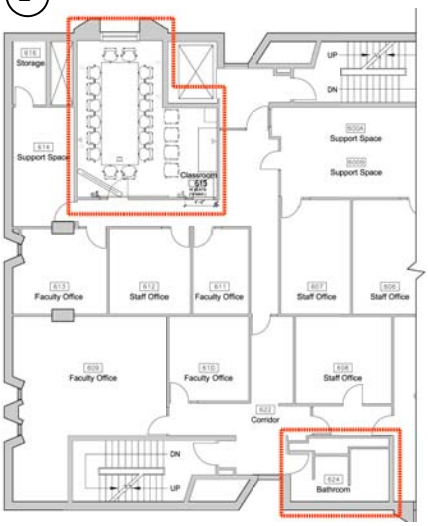


1 2nd Floor



2 4th Floor

3 5th Floor



4 6th Floor

Larsen Hall Room 212 Renovation
Photo: Harvard Office for Sustainability; 2007

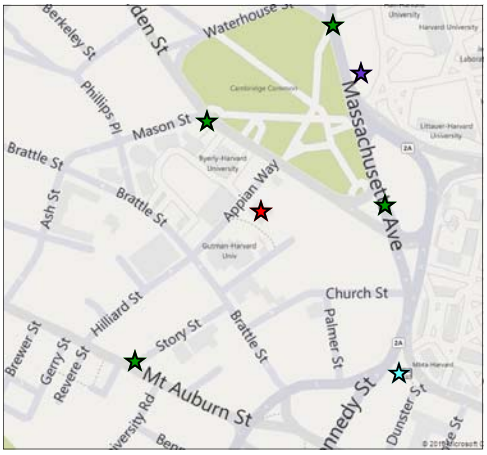
PROJECT TEAM

Owner	Harvard Graduate School of Education
Project Manager	Jason Carlson, Director of Operations
Architect	Baker Design Group, Inc.
Construction Manager	Shawmut Design and Construction
MEP Engineer	BLW Engineers, Inc.
Indoor Air Quality Testing	Environmental Health, Inc.
Sustainability Consultant	Harvard Office for Sustainability Green Building Services; Green Campus Initiative
Commissioning Agent	**Harvard Office for Sustainability**

SITE

Harvard University, Larsen Hall

- To encourage alternatives to driving, all occupants of Larsen Hall have access to Harvard's ***CommuterChoice Program***, which provides incentives, such as discounts, for all modes of alternative transportation as well as carpooling and fuel efficient vehicles. The Program is promoted through informational kiosks in building common areas and an extensive website. (www.commuterchoice.harvard.edu)
- The building is located within walking distance to the Harvard Square MBTA stop, several bus lines, and the Harvard University Shuttle. Also, there is access to a number of amenities, such as restaurants, banks, churches and retail stores.
- Larsen Hall provides storage for 74 bicycles directly outside of the Main Entrance. The nearby Hemenway Gymnasium, as well as Loeb Drama Center, provide occupants access to showers and locker rooms.



- Larsen Hall
- MBTA Subway Station
- Bus Stop Location
- Hemenway Gymnasium

Bicycle Storage
Photo: Harvard Office for Sustainability; 2007

WATER EFFICIENCY

As part of the renovation, restrooms on the second floor were retrofitted to improve water efficiency. These measures **reduce domestic water consumption by at least 40% over standard EPAct 1992 fixtures.**

Differences in the Flush & Flow Rates for EPAct 1992 Standard Fixtures and the fixtures utilized by the Larsen Hall Occupants

Fixture Type	Larsen Hall Flush & Flow Rates	EPAct 1992 Standard Flush & Flow Rates
Water Closet [GPF]	1.1 or 1.6 Dual Flush	1.6
Bathroom Sink [GPM]	0.5	2.5
Shower [GPM] - (Hemenway Gymnasium)	1.6	2.5

GPF - Gallons Per Flush GPM - Gallons Per Minute

SLOAN UPPERCUT®
Dual-Flush Flushometer
(Up 1.1 gpf and Down 1.6 gpf)

Delta Commercial®
T13H Series Showerhead
(1.6 gpm)

ENERGY EFFICIENCY

HGSE has committed, along with the larger Harvard University, to reduce greenhouse gas emissions 30% below 2006 levels by 2016, inclusive of growth. To this end, energy efficiency was an important sustainability goals in the renovation.

ELECTRICAL SYSTEMS

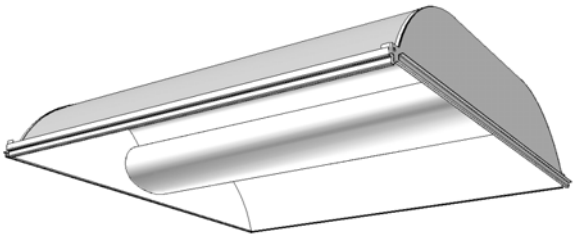
Designing lighting efficiently can have a significant impact on energy savings. **The lighting power density in Larsen Hall has been reduced to 40% below the ASHRAE 90.**1-2004 standard. In classrooms, ASHRAE allows a maximum of 1.4 watts per square foot. The reduction is achieved by using combination of efficient lighting and efficient fixtures.

- **Light Fixtures:** Energy efficient, low-mercury lamps were carefully chosen and strategically placed to reduce the projects electricity consumption. Larsen hall used Osram Sylvania T5 and TT5 lamps in indirect lighting fixtures.

- **Lighting Sensors & Controls:** To further reduce energy consumption, occupancy sensors are mounted in spaces to turn the lights off when not in use. These duel-technology sensors combine passive infrared and ultrasonic technology.

- **Plug Loads:** The Larsen Hall Classrooms were outfitted with all new AV equipment to bring them up to the HGSE campus standard. One Samsung plasma screens, two PCs, and two monitors all meet Energy Star® requirements. Computer equipment is set to turn off during periods of inactivity. The HGSE's IT department is dedicated to promoting and maintaining sustainability settings.

DT-300 Series Duel Technology Ceiling Sensors
Photo: www.wattstopper.com



HP90 Recessed Fluorescent (H9S2GLR214)
Photo: www.lightolier.com

Classroom with Energy Star® Plasma Screen
Photo: Harvard Office for Sustainability; 2007

- **Commissioning: The electrical system was fully commissioned by** Facilities Maintenance Operations (FMO), which ensures that all energy-related systems were installed as designed, and operating efficiently prior to occupancy.

- **Renewable Energy:** Renewable Energy Certificates were purchased from Sterling Planet (wind power) to offset 100% of the energy used in the two classrooms for two years.

  The project is offsetting 63,254 kWh, which avoids emitting 40,891 pounds of C02, and is equal to:

  - 9 passenger cars NOT driven for one year
  - 5 households' electricity use for one year, OR
  - 13 tons of waste recycled, not landfilled

INDOOR ENVIRONMENTAL QUALITY

HGSE is committed to providing a healthy indoor environment for all occupants. The project team was careful to maintain healthy indoor air quality during construction and to also ensure the space is designed to promote healthy indoor air quality during occupancy.

Indoor Air Quality During Construction: The building maintained occupancy throughout construction. Thus, a comprehensive indoor air quality management plan was implemented during construction to maintain healthy indoor air quality. HEPA (MERV 17) Filtration units were utilized to mitigate dust and maintain a negative pressure construction zone relative to finished spaces. In addition, all grills and vents were sealed to prevent dust and particles from the working area from entering adjacent occupied spaces.

Green Housekeeping: Larsen Hall participates in Harvard's Facilities and Maintenance Operations (FMO) Green Cleaning Program, which uses 100% recycled paper products and Green Seal certified cleaning solutions, among other green housekeeping practices.

No Smoking Policy: To protect the health of the occupants, Harvard Graduate School of Education does not permit smoking within 25 feet of any HGSE building.

Only Materials with **Low or No VOC Content** were used in Larsen Hall. Volatile Organic Compounds (VOCs) are chemical compounds and known carcinogens found in many construction materials that are considered detrimental to indoor air quality. Reducing the use of VOCs improves indoor air quality and consequently occupant health and productivity.

- **Composite Wood and Laminate Adhesives** used have no added Urea Formaldehyde.
- **Furniture and Seating:** Both the Herman Miller Equa 2 chairs and the KI Venue® tables are Greenguard certified products.
- **Carpet System** Shaw "Ducks in a Row" carpet has been awarded with Carpet and Rug Institute (CIR) Green Label Plus certification.
- **Adhesives and Sealants and Paints and Coatings** Examples of the products used:

Category	Product & Manufacturer	VOC Content (g/l)	VOC Limit (g/l)	Standard
Paints & Coatings	Benjamin Moore EcoSpec Primer & Flat	0	150.0	Green Seal GS-11
	Benjamin Moore Aura	49.7	150.0	Green Seal GS-11
Adhesives & Sealants	Shaw Contract Group Adhesive 1000	0	50.0	SCAQMD Rule 1168
	Johnsonite 960 Cove Base Adhesive	0	50.0	SCAQMD Rule 1168
	USG Sheetrock Joint Compound,	0	250.0	SCAQMD Rule 1168

Construction IAQ Measures Implemented During Construction

Photos: Harvard Office for Sustainability 2007

Pathway Interruption:
Isolated Work Area

Source Control:
VOC-free Joint Compound

Pathway interruption:
Forced air HEPA filtration unit filters exhaust & directs it out side

MATERIALS & WASTE

The Larsen Hall classroom renovations included demolition and removal of many existing finishes. The spaces were upgraded with new finishes such as flooring, ceilings and paint.

Selecting environmentally preferable materials and minimizing the amount of construction waste sent to landfills was important to the project. Rather than purchasing all new furniture, some pieces were salvaged from other areas of the building. Where new pieces were required, preference went to the selection of local materials and pieces with recycled content.

60% **of the interior, non-structural components were retained. This includes finished ceilings, flooring, interior wall partitions, doors.**

25% **of the total materials used in the project contain post-consumer and pre-consumer recycled content.**

80% **of construction waste was diverted from landfills, and instead recycled.**

Larsen Hall Furniture
Photo: Harvard Office of Sustainability 2007

Room 210: Salvaged Tablet Armchairs
Photo: Harvard Office of Sustainability 2007

ENVIRONMENTALLY PREFERABLE MATERIALS & FURNITURE

- Sheetrock Gypsum (USG)
  3% pre-consumer, 34% post-consumer
- Armstrong Cirrus Ceiling Tile (Armstrong)
  1% pre-consumer **69%** post-consumer
- Cirrus ceiling grid (Armstrong)
  25% pre-consumer
- "Ducks in a Row" Carpet Tiles (Shaw)
  38.2% pre-consumer
- "Borneo" Carpet Tiles (Shaw)
  36.7% pre-consumer
- Forbo: Marmoleum Teacher's Desk
  22% pre-consumer, 44% post-consumer
- Herman Miller Equa 2 Chairs
  17% pre-consumer, 19% post-consumer
- Versteel TIM Table
  17% pre-consumer, 19% post-consumer

ADDITIONAL RESOURCES

- Harvard Graduate School of Education: http://gseweb.harvard.edu/
- Harvard OFS - Green Building Services: http://green.harvard.edu/green-building-services
- Harvard OFS - Green Building Resource: http://green.harvard.edu/theresource