Located at the Prudential Center in Boston, Massachusetts, **888 Boylston Street** is a 17-story mixed-use building of approximately 425,000 square feet. The project consists of a three-story retail base, a 14-story office tower and two levels of subgrade parking. Focusing on “High Performance Design from the Inside Out,” 888 Boylston promotes health, productivity and a superior user experience.

**PROJECT HIGHLIGHTS**

- A dedicated outdoor air system (DOAS) uses 100% fresh air, instead of recirculated air, to over-ventilate spaces via active chilled beams without a prohibitive energy penalty.
- 100% LED fixtures provide optimal lighting while reducing energy costs.
- 13’-6” clear heights on the north façade create a “visual zone” that is 145% larger than a typical office building, thereby allowing more natural light into the interior space.
- Rainwater harvesting collects water from the roof for irrigation and cooling tower makeup, providing 20% of the total water consumed by the building.
- High and low roofs enhance solar panel positioning and production.
- Living walls and a green roof provide connections with nature and support a healthier urban ecosystem.

**A LIVING LABORATORY**

888 Boylston Street is not the largest or tallest building in Boston, but it is a giant in terms of sustainability. The project is certified LEED Platinum under the United States Green Building Council (USGBC) LEED for Core and Shell 2009 Edition. As long term owners invested in sustainable operations, BXP uses the building as a living laboratory and has hosted over 40 educational tours for students, universities, NGOs and the general public.

**MEASUREMENT AND VERIFICATION**

BXP has been measuring and verifying the building’s energy performance using an array of submeters to compare modeled performance to actual performance over time. Through 12 months of stabilized occupancy and the measurement and verification process, the 888 Boylston office space achieved a site energy use intensity of 39 kBtu/SF, which is 54% below the Boston regional Class A office average.

The high performance design and green power procurement strategies have reduced operational carbon intensity 92%; and, low flow fixtures combined with the rainwater harvesting system have cut water use 46% versus a regional average office.

**PROJECT TEAM**

Developer: Boston Properties  
Architect: FXCollaborative  
Contractor: Turner Construction  
MEP Engineer: BuroHappold Engineering  
Civil/Transportation Engineer: VHB  
Landscape Architect: Mikyoung Kim Design
Sustainability Considerations

The project has been certified LEED Gold and boasts a 35% savings of water usage and 34% energy savings over baseline. In addition, the Town of Holbrook took the step of voting a permanent protection of 7.6 acres of Town-owned land adjacent to the school site for habitat preservation and restoration.

The integration of building and site planning with community and ecological sustainability was the cornerstone of the design of the Holbrook K-12 school. This environmentally progressive program started with the selection of a central location with good public transportation access and connection to community amenities. From there the program developed significant elements that benefit both community and environment, such as a bike-friendly campus plan coordinated with a Massachusetts Safe Routes to School program partnership, and a significant commitment to the preservation of the local watershed and wetlands habitat.

As a part of the project, the town governing bodies took the step to voting a permanent protection of 7.6 acres of land adjacent to the school site for habitat preservation and restoration. The focus on the importance of water naturally extends to a storm-water quality design, treating runoff water from over 86% of suspended solids from 90% of average annual rainfall events. And within the building, fixture efficiency saves over 35% more water than the LEED baseline.

Energy efficient design is also a major sustainable attribute of the design, achieving predicted energy savings of over 34% better than ASHRAE 90.1 standard, while monitoring of outdoor air and commitment to low-VOC finishes ensures high indoor air quality for a healthy building.

Project Description

J.F.K. Elementary School and Holbrook Middle-High School together serve 1,095 students grades pre-kindergarten through 12 in a new building that is 217,353 gsf on two floors. This consolidates all three existing aged schools in the town into a single building with separate entries and spaces for the Elementary School and the Middle-High School. The combined school building was built in a single phase, thereby reducing disruption to students during construction, resolving the issue of three antiquated schools, and satisfying 21st century learning goals. Program elements include two cafeterias, a 320-seat auditorium, two larger gymnasiums, general classrooms, teacher development spaces, two media centers, and science labs that conform to 21st-century education standards. Also included are dedicated art, music, band, computer labs, special education spaces, and a STEAM commons to enhance the learning process by thinking creatively.

Certified LEED Gold

Recognition (2018)
North American Copper in Architecture Award || Learning by Design Awards of Excellence Honorable Mention || American School & University Architectural Portfolio Citation
**Phillips Academy Andover, Snyder Center**

**Andover, Massachusetts**

**Completion Date:** 2018  
**Sustainability:** LEED Platinum®  
**Awards:** Citation, AIA New England, 2018

The Snyder Center is one of the most progressive buildings of its kind. By designing a series of unique spaces that reimagined the 21st century athletic center, the open and inclusive solution is comprised of a series of interlocking, transparent, and inviting student activity spaces. The result is a high-performance facility that acts not only as an athletic facility, but as a Student Center and hub for student activity. In fact, the Snyder Center is the first in the country to combine the array of program elements and be designed as a net-zero energy facility.

**Building Statistics**

- **Overall Square Footage:** 98,000 SF
- **Indoor Track:** 4-lane 200 Meter Oval  
  8-lane 60 Meter Straightaway  
- **Field Events:**  
  Infield: 4 convertible basketball / tennis courts  
- **Multi-Purpose Rooms:**  
  Studio 1 – 2,000 SF  
  Studio 2 – 1,400 SF
- **Squash Center:**  
  (11) international singles courts  
  (1) 3-glasswall Exhibition Court with seating

**Project Team**

- Perkins and Will  
- Rist-Frost-Shumway  
- Samiotes Consultants, Inc.  
- LeMessurier  
- Erland Construction, Inc.  
- Reed Hilderbrand  
- HLB Lighting  
- Omloop  
- Acentech

**Net-Zero Strategy**

1. **Waste Heat → 50% Energy Efficiency Improvement**
   Combine Field House project with replacement of refrigeration system at adjacent ice rink (a need identified during master plan) to allow for re-use of waste heat from ice making process to serve the new building.

2. **PV Array → Net Zero Energy**
   Optimize orientation of new Field House to maximize solar potential and daylighting, incorporate PV array on large roof of building to offset entire energy use and achieve Net-Zero energy for the project.

3. **Geo-Exchange → Net Positive Energy**
   Pair geo-exchange well field with future playing field construction to improve efficiency of refrigeration plant at rink, resulting in an overall Net-Positive project.

**Waste Heat Recovery**

**Sustainability Facts**

- 740 mW/h Solar PV Array  
- 103% Energy-use Reduction  
- -0.8 NET EUI  
- 35% Water-use Reduction  
- 2,410 board feet of beech salvaged on site
TD Bank Fenway
1333 Boylston Street
Boston, MA

FEATURES

NATURE-BASED BIOPHILIC PATTERNS

SUSTAINABLE FURNITURE

ENERGY-EFFICIENT LED LIGHTING

ECO-FRIENDLY CARPET

Paints, finishes and cleaning products have low environmental and indoor air quality impact.

Low-flow and low-flush fixtures have been installed to conserve water.

Water refill station saves plastic bottles and helps customers stay hydrated.

Retail Smart Controls help monitor real-time building performance.

Fenway is one of the first TD retail locations designed to meet the new LEED v4 standards.

LEED® Facts

LEED for Retail Pursuing LEED v4 certification 47*

Innovation 5 / 6
Water Efficiency 10 / 12
Location & Transportation 15 / 18
Energy and Atmosphere 12 / 38
Materials and Resources 3 / 14
Regional Priority 1 / 4
Indoor Environmental Quality 1 / 16

*Out of a possible 110 points

2019 Shop! Award Winner for Best Wall Treatment

The feature wall, made from locally salvaged wood, depicts Boston’s treasured Emerald Necklace.

TD is also part of the “Community Grown” program, a three-year partnership with the City of Boston to expand the reach of their community gardens and bring people closer to nature.
New Science Center
Amherst College | AIA COTE Top Ten Award

The Amherst College New Science Center is a high-intensity laboratory with one of the lowest energy footprints of its typology. The building employs several strategies contributing to energy efficiency including a high-performance envelope, abundant natural light, low-energy HVAC chilled beams, fan-coil distribution systems, optimized fume hood control strategies, demand control ventilation including laboratory spaces, high performance heat recovery with indirect evaporative cooling, and freezer heat recovery for domestic hot water. Indirect-direct evaporative cooling reduces the heating and cooling needed for the ventilation system to reduce peak loads in the laboratories. High performance triple-pane glazing, curtainwall and façade systems implement thermal breaks. Opaque, natural ventilation panels were used in the faculty offices to provide natural ventilation while maintaining thermal integrity of the triple-pane windows. The Commons’ roof monitors integrate architectural and mechanical elements that provide an overall comfort conditioning solution: chilled beams, radiant slabs, acoustic baffles and a photovoltaic array to generate onsite power.

91 kBTU/SF
REDUCTION IN ENERGY USE compared to the 2030 baseline
76%
73%
58%
58%
41%

REDUCTION IN INDOOR WATER USE compared to the LEED baseline

76%
OF FLOOR AREA WITH direct views to the outdoors
58%
58%
PREDICTED REDUCTION IN SITE AREA supports vegetation
RAINWATER MANAGED from a two-year, 24-hour storm event
This project includes a system for natural ventilation made of louvers and operable windows.

The design of this music learning institute for the Tanglewood campus in Lenox, MA was guided by several overarching ideas:

1. **Natural Ventilation as Openness**
   Although the Linde Center for Music and Learning is fully air-conditioned, during a Tanglewood season there are many days when being open to the outdoors is desirable. In fact, we see this openness to be an essential Tanglewood characteristic. Thus, the Linde Center is designed to be naturally ventilated, with large 50’ wide operable walls, sliding doors, and actuator operated windows. This principle saves energy by maximizing the number of days that the air conditioning can be turned off.

2. **Sunshading for Energy Efficiency**
   Most glass in the building is facing either east or north, which are desirable solar orientations for energy efficiency. Large windows that face west are shaded by the large red oak, and southern windows in Studio E are shaded by horizontal metal sunshades on the exterior of the building.

3. **Recyclable, Renewable and Local Materials**
   Materials such as western red cedar, metal roofing, even structural steel and concrete, were evaluated for their recycled content, sustainable harvesting policies, and local content.

4. **Efficient Lighting and Mechanical Systems**
   The project uses low velocity ductwork (which has both acoustical and energy benefits by reducing static friction in the duct system), high efficiency HVAC systems including chillers and condensing boilers, and LED lighting - including performance lighting - which generates less heat and uses less energy.

5. **Photovoltaic System**
   A 62.4 kW photovoltaic array on the flat roof portions of the project provides a renewable energy source to the building and can provide excess power to the grid when not needed by the facility.

6. **Enhancement of the Tanglewood Tree Canopy**
   The project recognizes the impact across the Tanglewood campus of the mature tree canopy which provides shade to visitors and paving (reducing the heat island effect). The project includes a dramatic increase in tree canopy with new tree planting in and around the project but also to the south of Ozawa Hall.

7. **Preservation of a Cherished Red Oak**
   A centerpiece of the project, the Red Oak at the top of the ridge will be preserved. The Linde Center buildings are held back beyond the drip line of the tree – plus an added amount to ensure the Red Oak will provide shade for gatherings for many years to come.

**LEED GOLD CERTIFIED**
- Site: 11/26
- Water: 7/10
- Energy: 31/35
- Materials: 6/14
- Indoor Environmental Quality: 9/15
- Innovation in Design: 4/6
- TOTAL: 70 of 110

- 64.1% reduction in electricity use compared to the applicable ASHRAE 90.1 Appendix G baseline
- 39.8% reduction in indoor water use using efficient plumbing fixtures compared to EPAct baseline.
- 78% of construction waste diverted from landfill.
- 100% of irrigation water is supplied by a stormwater retention basin located just northeast of the site.

**DESIGN TEAM:**
- Architect: William Rawn Associates
- Sustainability: The Green Engineer
- Landscape: Reed Hilderbrand LLC
- MEP: R.G. Vanderweil Engineers
- Acoustics: Kirkegaard Associates
- Theater: NextStage Design
- Structural: LeMessurier Consultants
- Lighting: LAM Partners
- Civil: Foresight Land Services
- FF&E: Stefura Associates
- Signage: Roll Barresi & Associates
- Food Service: Lisa May Foodservice Design LLC
- Construction Manager: Consigli Construction Company
- Owner’s Project Manager: Skanska USA Building Inc.
This project sets a new standard for school design and high-performing buildings. Completed in August 2019, it is designed as the first Net Zero Emissions school in Massachusetts and was the pilot for the City of Cambridge’s Net Zero Action Plan. The 270,000 sf building includes an elementary school, middle school, school district administration, preschool, public library, public pool, and parking garage. The building massing recreates the civic amenity that was historically on the site and restores the green open spaces. The building was designed to push the envelope on net zero, occupant wellness, site impact, water, and resilience.

It is a new building type combining schools with a mix of diverse community programs into one complex whose integration allows the building to excel in all ten AIA Design Excellence measures. Of note are its positive impacts on local community, equity, and climate change vulnerabilities.

King Open / Cambridge Street Upper Schools & Community Complex

**NET ZERO EMISSIONS / LEED V4 SCHOOLS PLATINUM** (Pending)

- 25 pEUI
- 72% energy reduction over 2030 baseline
- 190 geothermal wells
- 1,300 MWh PV
- Red List Free Materials
AUBURN COURT – NEW CONSTRUCTION
3 BROOKLINE PLACE | CAMBRIDGE, MASSACHUSETTS

PROJECT TEAM:

DEVELOPER/OWNER
AUBURN COURT LLC C/O HRI

ARCHITECT
DAVIS SQUARE ARCHITECTS, INC.

CONTRACTOR
NEI GENERAL CONTRACTING

MECHANICAL ENGINEER
BLW ENGINEERS, INC.

CIVIL ENGINEER
DEVELLIS ZREIN, INC.

LANDSCAPE ARCHITECT
KIMBERLY MERCURIO LANDSCAPE ARCHITECTURE

LEED CONSULTANT
NEW ECOLOGY, INC.

SOLAR/ THERMAL CONSULTANT
NEW ENGLAND SOLAR HOT WATER

BASIC FEATURES:

- All-electric utilities (no gas/oil)
- Highly insulated and tight building envelope with a continuous air barrier
- White roof to reduce heat-island effect

HIGH-EFFICIENCY HEATING & COOLING EQUIPMENT

- Solar hot water system
- Energy-efficient boilers
- Central energy recovery ventilation
- Mini-split air-source heat pumps

HEALTHY INDOOR ENVIRONMENT

- Maximized natural daylighting and cross ventilation
- ENERGY STAR®-certified light fixtures and appliances
- Low-flow shower heads and toilets, and aerators
- Resilient flooring (no carpet)
- Prioritized durable and sustainable materials
- No/low VOC levels for all paints, adhesives, and sealants
- Non-smoking building

LEED FOR HOMES MID-RISE PLATINUM-CERTIFIED
ENERGY STAR®-CERTIFIED
ACTIVE DESIGN CERTIFIED

TRANSIT & COMMUNITY RESOURCES

- Transit-oriented design, near several subway and bus stops
- Walkable community with nearby amenities
- Secure bike storage and bike infrastructure
- No new vehicular parking added
- Recaptured infill urban site

RESIDENT HEALTH & QUALITY OF LIFE

- Design incorporates Active Design Verified guidelines
- Non-elevated building, attractive staircase used to increase movement
- Variety of greenspaces featuring local and natural plantings, as well as sculptural installations
- Free farmers’ markets and wellness programming for Auburn Court residents

COMPLETED IN 2017
University of Massachusetts Boston Student Residence Hall and Dining Commons

Boston, Massachusetts

The first-ever student housing at UMass Boston achieves LEED Gold with a progressive array of healthy living strategies, including an active pedestrian walkway and live/learn spaces.

Architectural Features

Two buildings comprise the 263,000-sf facility that rises seven, nine, and 12 stories tall. Together they frame a pedestrian walkway and define an important entry portal from public transportation into the heart of the campus. The promenade invites people to make connections with each other and the natural world in the outdoor café seating and landscaped seatwalls.

The welcoming environment continues inside with a 500-seat dining hall and a variety of flexible study and collaboration spaces open to all students. On the residential floors, 1,077 beds are arranged across multiple unit types and living arrangements at price points accessible to students from diverse socio-economic backgrounds. Every floor features common spaces with unrivaled views of Boston Harbor and the city skyline. The design also incorporates several campus-wide initiatives including composting, clothing recycling, and building-based energy conservation measures.

Sustainability Features

SITE
• Convenient access to alternative transportation: MBTA, campus shuttles, BlueBikes, ZipCar
• A brownfield redevelopment
• Activates an important pedestrian gateway with gathering spaces inside and out
• Vegetated with drought-tolerant and native plantings
• 77% of hardscape is highly reflective to reduce heat-island effect

WATER
• No potable water used for irrigation
• 34% water savings with low flow showers, faucets, toilets, and urinals

ENERGY
• Two buildings average 23% energy cost savings through a high-performance envelope, energy recovery units, hot water efficiency, and 100% LED lighting.
• Enhanced commissioning used on project
• Refrigeration and HVAC systems selected to minimize or eliminate emissions of compounds that contribute to ozone depletion

MATERIALS
• Diverted 82% (1685 tons) of construction waste from landfill
• 30% of construction materials contain recycled content and were manufactured regionally
• 70% of wood products were sustainably harvested and FSC certified

HEALTH AND WELLNESS
• All interior finishes meet low emitting standards
• 100% of wood products do not contain added urea formaldehyde
• 95% of spaces have views to the outside, including student rooms overlooking Boston Harbor
• Design supports students’ wellbeing with equitable live/learn spaces open to all

LEED Facts

For LEED v3 2009 Certification awarded January 2019

GOLD 64
SUSTAINABLE SITES 21/26
WATER EFFICIENCY 6/10
ENERGY AND ATMOSPHERE 11/35
MATERIALS AND RESOURCES 7/14
INDOOR ENVIRONMENTAL QUALITY 13/15
INNOVATION IN DESIGN 5/6
REGIONAL PROXY CREDITS 3/3

Project Team

ARCHITECT
ELKUS MANFREDI ARCHITECTS

CLIENT(S)
UNIVERSITY OF MA BUILDING AUTHORITY AND UNIVERSITY OF MASSACHUSETTS BOSTON

DEVELOPER
CAPSTONE DEVELOPMENT PARTNERS

LANDSCAPE ARCHITECT
CORLEY WOLFF DESIGN GROUP

SECTIONS ENGINEER
HALEY & ALDRICH

SPECIALTY ENGINEERING
NITSCH ENGINEERING

SPECIALTY DESIGN IN CHARGE
PROVIDENT COMMONWEALTH EDUCATION RESOURCES GROUP

SPECIFICATIONS WRITER
KALIN ASSOCIATES

LIGHTING (DINING COMMONS)
HDLC

#9
The Institute for Global Citizenship at Macalester College in St. Paul, Minnesota was built to synergize its commitment to internationalism, multiculturalism, and service to society. The building houses administrative and faculty offices as well as community meeting space. It features an interior courtyard knitting the building together and providing an inspiring place for students, faculty, and community to contemplate and discuss their place in the new global society.

The stone exterior of the building echoes the universal and global traditions of load-bearing buildings, peeling away at the corner to create a welcoming entrance for everyone passing through the campus.

**SUSTAINABLE BUILDING FEATURES**

- Building envelope: R70 roof and R40 walls
- Structure: massing concrete core acts as “thermal flywheel” to mitigate internal thermal loads
- HVAC: hydronic system of radiant ceiling panels, chilled sails, and heat recovery
- Extensive use of recycled, non-toxic and low-VOC materials
- Operable windows configured to optimize daylight
- Site: indigenous plants, extensive storm water management
Harvard University’s ArtLab, a cross-curriculum space for the arts, is located on the school’s Allston campus in Boston. Its location along North Harvard Street links the University’s historic and new campuses; its entrance faces Cambridge, and its one-story pinwheel configuration create outdoor public spaces that respond to the surrounding urban context. The building consists of a series of studios, workshops, and media spaces that surround a common hub space, which is able to accommodate performances and exhibitions, thus framing interactivity at its center. The surrounding units will provide recording studios, sound-editing stations, and spaces for rehearsal, improvisation, and informal performance.

The building relies entirely on electricity; no fossil fuels are supplied to the building, unique for Boston’s climate zone of 5A. The anticipated energy use intensity (EUI) of the ArtLab is 34 kBtu/ft²/yr, one third the amount of energy as a typical arts education building. Energy conservation measures include: lighting power density of 0.5 W/sf, a high performing envelope, point of use water heaters, an air-source VRF heat pump system for heating and cooling, and high efficiency energy recovery ventilators that operate on a zone-by-zone demand basis. Energy is produced on site through a roof mounted solar array with the goal of achieving Zero Net Energy, and the project predicts a 20% or greater reduction in potable water use.

Harvard ArtLab
Allston, Massachusetts
Significant Project Features
– LEED Platinum certified
– 45 foot rack storage warehouse
– 10,000 square feet training/conference center
– Data center with N+1 design
– Chilled beam HVAC systems
– 135 KVA PV array system generates clean energy for 16% of building’s annual energy usage
– 2,000 KVA generator for standby power
– Chemical free water treatment system in HVAC system
– High volume circulation fans to circulate air within warehouse space
– Eco-friendly xeriscape landscaping saves water by using drought tolerant plants

All 86 LEED credits were achieved

Whole building energy simulation was utilized to show a total energy cost saving of 41%

Subaru of New England Headquarters
Norwood, Massachusetts, USA

HVAC system measures 40% above code
Water savings measures 30% above code

Architect
Gorman Richardson Lewis Architects

Structural Engineer
RRC Engineering

MEP/FP Engineer
WSP USA Buildings Inc.

LEED Administrator
Columbia Construction Company

Civil Engineer
United Consultants Inc.

Energy Modeling & Consulting
WSP USA Buildings Inc.

Solar Designer
Columbia Construction Company