



# Cunniff Elementary School

Watertown, Massachusetts

## General Information

**Location:** 246 Warren Street, Watertown, MA 02472

**Architect:** Ai3 Architects, LLC

**Engineers:** Structural: PARE Corporation.  
MEP: Griffith & Vary, Inc.

**Square Footage:** 82,355 square feet

**Construction Cost:** \$35,120,000.00

**Total Project Cost:** \$36,375,000

**Cost/ft<sup>2</sup>:** \$441.69

**Enrollment:** 425 total occupants (45 kindergartners, 340 first through fifth graders, 40 staff)

**Estimated Energy Cost Savings:** 100% savings (targeting ZNE-electric only), Estimated to generate 560,600 kWh, estimated to consume 558,280 kWh

**EUI (kBtu/ft<sup>2</sup>):** 23.13

**Design Standard:** LEED Gold

**Funding:** Town of Watertown

are included as a response to the information gathered from the studies. Light fixtures in the academic spaces are LED and equipped with sensors that allow automatic adjustment to provide the appropriate amount of light based on the function of the space. The lights also automatically turn off once a space is detected to be vacant, thereby reducing the electrical load.

## Project Overview

The new, all-electric Cunniff Elementary School is a high-tech, 21st century educational facility that includes many green design strategies such as energy efficient roof and walls, high-performance windows, high-efficiency mechanical and lighting systems, low-flow plumbing fixtures, numerous solar canopies, and many other features that help reduce negative impacts on the natural environment.

The building's organization and geometry was designed to take advantage of the natural topography of the site by placing program spaces that do not require natural daylight into the side of an existing hill, while simultaneously locating program spaces that benefit from daylight elsewhere. This strategy also allows for an efficient, compact building footprint, which makes it possible for the photovoltaic arrays to generate enough power to operate the entire site.

As part of the design process, the amount of natural daylight in each of the academic spaces was studied and analyzed to achieve optimal conditions. The orientation of the building and many of the building elements, such as the sunshade devices,



The design incorporates many strategic efficiency solutions into the site and surrounding landscape, such as occupancy sensors and native plants. All exterior light fixtures are LED and designed to minimize off-site light pollution. This is critical for Cunniff Elementary School as it is located within a residential neighborhood.



## High Performance/ Sustainable Design Elements

### Energy Efficiency

- Cunniff is targeting zero energy so by implementing LED light fixtures, occupancy sensors, high-efficiency mechanical systems, and WaterSense labeled appliances – coupled with a high-performance building envelope – the designed PV panels are expected to generate enough power needed to operate the site.
  - Behind the school's exterior, the building envelope has been designed with two layers of insulation – an R-10 continuous rigid insulation, which is adhered to the steel substructure, and an R-19 batt insulation, which is installed between each stud.
  - It was important for architects to remain aware of the window-to-wall ratio throughout each design stage. While conscious efforts were made to increase efficiency when specifying the insulated glazing units, windows inherently perform less efficiently than insulated walls. The overall building window-to-wall ratio is only 26 percent.

### Water Efficiency

- All the flush and flow fixtures are WaterSense labeled.
- All landscaping (including vegetables grown in student gardens) is native to Massachusetts, thereby making Cunniff an irrigation-free site.

### Policy and Operations

- Several sustainable policies and operational plans have been created and adopted by the Watertown facilities department, including:
  - Green Cleaning Policy
  - Ongoing Purchasing and Waste Policy
  - Facility Maintenance and Renovation Policy
  - Integrated Pest Management plan

## Community Involvement

- The community was involved in all phases of the project (pre-design, design, and construction) via public presentations and comment and question sessions.
- Students contributed gardens that include six planter beds and 130 square feet of cobble planters. All produce is harvested, washed, and served as meals or snacks during lunch and the before/after school programs. Gardens are organized and maintained by students, staff, and community volunteers.

## Daylighting

- Open and green space is particularly important in a school because, in addition to providing space to unwind or move around, it provides calming or stimulating experiences for students and staff. Not including small group/pull-out rooms, every academic space in Cunniff Elementary has either an exterior operable window or green space.

## Onsite Renewable Energy

- Ranging in orientation and size, Cunniff utilizes roof-, ground-, and canopy-mounted solar panels.
- Three electric vehicle parking spaces.

## Materials

- Materials were selected for their durability, maintainability, low toxicity, and recycled content.

## Site Selection

- The existing site accommodated new construction. By implementing a compact footprint, the new school was designed to provide more green space than the original school previously had, despite constructing a larger school facility.



This case study was prepared by NEEP with information provided by Ai3 Architects.

To learn more about this project, please contact: Mike Remondi RA, AIA, NCARB, Ai3 Architects, [remondi@ai3architects.com](mailto:remondi@ai3architects.com). For more information about High Performance Schools, please contact: John Balfe, Senior Buildings and Community Solutions Manager at [jbalf@neep.org](mailto:jbalf@neep.org). All photos credit to Ai3 Architects.