Massachusetts School Building Authority
MA Schools Embrace a Sustainable Future

Hanlon-Deerfield Elementary School Building Project
“A SCHOOL IN THE WOODS”
Westwood, MA
12.02.2021
Collaborated with Community Stakeholders

Community Forums:
- Oct & Nov: Process, meet design team, approach, input on priorities
- Dec & Jan: Education Plan and Visioning Sessions
- March: Obtain input on short-listed options
- April: Redistricting
- June: Final design option

Other Outreach Meetings:
- (22) School Building Committee Meetings (open to public)
- (2) PTO meetings
- (3) Sustainability Sub-committee Meetings
- (1) Meeting with Police, Fire, Planning, Select board
• Importance of this project:
  
  **Schools are the largest energy consumers/emitters**

• Prioritize Carbon reductions

• Net Zero energy standards for new Town buildings

• Phase out fossil fuel use

• Discourage new natural gas hookups

• Install EV chargers

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*Courtesy of: The Green Engineer*
Iterative Investigation, Modeling and Analysis

Fig. 9. Radiant Benefit Study

Fig. 13. The selected three tiers

Fig. 14. EUI Comparison of the Three Tiers

Courtesy of: Thornton Tomasetti
Identified Goals and Direction

Energy Use Intensity (EUI): energy consumed per square ft / year

Path to High Performance Schools/ZNE

- **ENVELOPE**
  - Limited amount of glass
  - High Insulation levels
  - High performance windows
  - Envelope commissioning
  - Airtight building
  - Exterior shading

- **REDUCED LOADS**
  - LED Lighting
  - Smart outlets
  - Occupancy sensors

- **HVAC**
  - High Efficiency System
  - Decouple ventilation from conditioning
  - Energy recovery
  - Performance monitoring

- **OCCUPANT ENGAGEMENT**
  - Sub-metering and friendly competition
  - Wider set points
  - Shared equipment

Energy Use Intensity (EUI)

- **BASELINE BUILDING**
  - Typical school energy usage in MA
  - EUI: 55 kBTU/sq ft/yr

- **ON-SITE PVs**
  - EUI: 25 kBTU/sq ft/yr
Hanlon-Deerfield Elementary School
Westwood, MA

Existing Site

Hanlon School

Location for new school

Lowell Woods

Grimm Conservation

Mulvihill Conservation

Purgatory
Existing Site Inspiration
“a school in the woods”
Hanlon-Deerfield Elementary School
Westwood, MA

Existing Site Inspiration

"a school in the woods"
Existing Site Inspiration
“a school in the woods”
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Site Plan
113,141 sf building, 18.5 acres +/-
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Site Plan
113,141 sf building, 18.5 acres +/-
Daylighting Studies
Southern Classroom wing - integrated solar shading
Hanlon-Deerfield Elementary School
Westwood, MA
Southern Classroom wing - Outdoor Classroom
Hanlon-Deerfield Elementary School
Westwood, MA
Birdseye overall view of building, looking northwest

Hanlon-Deerfield Elementary School  Westwood, MA
View from Gay Street at northern entrance
Hanlon-Deerfield Elementary School
Westwood, MA
The proposed project plans to:

1. Minimize impact on the environment
2. Improve human health and well-being
3. Reduce economic impact over the life of the building
1. Minimize Impact on the Environment

- Low Energy and Zero Carbon use:
  - Super insulated and tight thermal envelope
  - Uses the ground for heating/cooling - without burning fossil fuels
  - Use controls for efficient use of HVAC, electricity (lights and outlets)

- Materials and Resources
  - Uses materials with low carbon footprint
  - Uses wood from sustainably harvested forests
  - Uses materials made from recycled materials and/or can be recycled

- Waste
  - Separates and recycles construction waste (96% avoid landfill)

- Water
  - Uses low-flow plumbing fixtures

- Ecology
  - Uses native, drought tolerant, low maintenance plants, trees and shrubs
  - Limits construction footprint to preserve existing trees
2. Improve Human Health and Well Being

- Indoor Air Quality and monitoring
- Materials made of non-toxic substances
- Daylighting and views
- Using the building and site as teaching tools: help children (and teachers) understand the impact of their decisions
3. Reduce Economic Impact - $$

1. Increased thermal envelope = less energy to heat/cool
2. Fossil fuel free, highly efficient HVAC, electrical systems and controls
3. Well-planned daylight use = reduced need for artificial lights/electricity
4. Use Renewable Energy = Photovoltaic (Solar) Panels
5. Careful management by End User so **actual** energy savings achieve **designed** energy savings
Summary of Sustainable Features

1. LEED v.4 Silver

2. Net Zero Energy Ready
   - Super insulated thermal envelope: Passive House standards for air infiltration
   - Geothermal wells for heating and cooling
   - Fossil fuel free (all electric)
   - Tracking predicted EUI of 22.6
   - Roof designed to support Photovoltaic Panels
   - Mass Save/Eversource Path 1 NZE schools
   - Solar shading integrated design

3. Highly efficient Electrical, HVAC, and Building Management System

4. Thoughtful management of water, sustainable materials and native landscaping