



Meeting Notes

Project: Beal Early Childhood Center

Re: February 26, 2018 Sustainability Charrette

Date Issued: March 9, 2018

Prepared by: Chris Schaffner, TGE
Carrie Havey, TGE
Brad Newkirk, TGE

Location: Shrewsbury Beal Meeting, Inc.

Attendees: Chris Schaffner, The Green Engineer, Inc.
Carrie Havey, The Green Engineer, Inc. *
Brad Newkirk, The Green Engineer, Inc.*
Jared Gentilucci, Nitsch Engineering
Kevin Seaman, Seaman Engineers
Katie Crockett, Lamoureux Pagano
Sean Brennan, Lamoureux Pagano
Tom Lutynski, ART Engineering Corp.

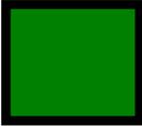
This meeting initiates the team's Integrative Design Process for the Beal Early Childhood Center project and will help inform the team's work going forward. We will use the goals and priorities discussed at this meeting to set specific metrics for the project during design, construction, and operation.

The Town of Shrewsbury has a strong commitment to energy-efficient, sustainable design. It is understood that the project has to show compliance with the MSBA's Green Schools program if the Town would like to receive the additional 2% reimbursement, in addition to showing compliance with the MA building code which is the Stretch Energy. Both of these require significant energy improvement above an ASHRAE 90.1-2013 code compliant building. The MA stretch energy code requires 10% energy performance improvement above the code baseline and MSBA Green Schools 2% reimbursement threshold requires 20% energy performance improvement above the code baseline.

SCHEDULE:

- Schematic Design: Spring 2018 through Fall 2018
- Design Development + Construction Documents: Winter 2018/19 through Fall 2019
- Construction Administration: 18 – 30 months

The project is currently in Programming and Conceptual Design.



VISIONING AND CAMPUS/PROJECT GOALS EXERCISE:

When asked what the Town hopes will be said about the Beal Early Childhood Center upon its opening, meeting participants answered with the following:

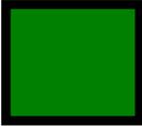
- Innovative
- Welcoming**
- Kitchen from Scratch, Demonstration Kitchen, Real Food
- Dishwasher for reusable plates *
- Connection between people and natural environment/ outdoor activities*
- Insulation to reduce heat loss/gain
- Great learning Environment
- Leverage Tech to reduce number of people needed to educate
- Refillable markers
- More buses to use 100% bus transport
- Effective use of space **
- Great town investment
- Tax payer cost/Financially sound *
- Children friendly
- Healthy environment for community use**
- Avoid Windmills
- Great IAQ/High Percentage Fresh Air/Low emitting materials**
- Visually Striking
- On time and budget
- Water Conservation
- Blends with Environment
- Recycled/local materials *
- Paradigm for others to follow
- Polished Concrete Floors
- Hydroponics
- Natural Light/ Efficient Lighting ***
- Passive Solar/ Solar/Renewable Energy/Geothermal**
- State of the art energy use for the next 50 years *
- Student learning
- Net Zero/ Energy Efficient building/Carbon neutral*****
- Ease of maintenance and advancement of the system/sensible design/ longevity*****
- The definition of smart

Note: * means that more than one person responded with this comment.

SUSTAINABILITY DISCUSSION:

Programming + General

- Project is not a typical k-12 school as it will have year-round use, including heavy Summer usage (full A/C)
- Designed for a capacity of 790 students
- 2-3 stories; 143,000 gsf



- Using analysis from comparable K-12 projects, CBECS and PNNL data, typical K-12 project Energy Use Intensities [EUI's] are in the range of 40 – 50 kBtu/sf/yr. The design EUI target for Beal should be in 25 – 30 kBtu/sf/yr range.

Site, Location, and Transportation

- Glavin Center
 - More opportunities for passive design strategies
 - Already developed
 - No wetland issues
 - Potentially natural occurring arsenic in soils
 - Not very well drained soils
 - Adjacency to Route 9 could lead to traffic issues
 - No pedestrian access (sidewalks) along Lake Street
- Allen Farm
 - 3 potential vernal pools
 - Limited to no flexibility with building orientation
 - Undeveloped site could cause more disturbance to existing ecosystems and make stormwater compliance difficult
- There will be no irrigation for decorative lawns – only athletic fields
- Parking strategies will be the same or very similar on both sites
- 120 day-to-day spaces
- 350 total spaces for overflow + events
 - Opportunity to reduce heat island effect and stormwater
- Use light colored concrete pavement or pavers for heat island mitigation
- Shade pavement with building or trees where possible

Building Envelope

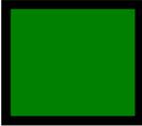
- Super-insulated, airtight envelope to reduce loads
- Glazing area should be no greater than 22% of the vertical envelope area
- Building envelope commissioning required by MSBA
- Shading devices will be installed for spaces where solar glare might be considered an issue

Building HVAC Systems

- Life-cycle cost analysis (LCCA) required by MSBA to compare cost benefits of HVAC system alternatives
- Hydronic heating/Dx cooling
- Energy recovery for AHUs
- Displacement ventilation for classrooms
- Demand controlled ventilation (DCV) for densely-occupied spaces
- Design team to weigh the benefits of simplicity vs. performance

Water Efficiency

- Low-flow fixtures:
 - Toilets
 - Standard for low-flow is 1.28 gpf
 - Lower-flush options are available in 1.1 gpf and 1.0 gpf models
 - These options would require a more aggressive pitch on pipes to assist flow and prevent potential blockage



- Urinals
 - Pint flush (0.125 gpf)
- No Showers in project scope due to program type and age of students
- Rainwater Collection and Reuse:
 - Not recommended for flushing
 - Would be required to be treated, filtered, pumped, and separated from main Domestic Water lines.
 - Money better spent in other places
 - Irrigation or process water is ideal use for collected rainwater
 - School Garden (if implemented) should utilize rain barrel for irrigation

Lighting Design

- 100% LEDs with occupancy and daylight controls
 - Will not flicker like fluorescents since LEDs do not have ballasts
- Tunable and networked lighting controls will be part of base-design
- Different color-rendering indexes (CRIs) will be used based on the space type they are being installed in
- Exterior lighting will have automated controls similar to interior
 - Town could decide to become a “Dark School” which entails all exterior lighting being switched off during unoccupied hours unless activity is sensed by motion sensors

Food Service

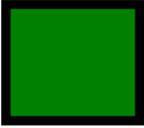
- Food stations are not a good fit for k-4 age levels due to the amount of time students would take picking out their food
- The Town has switched over to fully disposable lunch trays/utensils. This increases the project waste but minimizes process water usage from dishwashing and minimizes sanitary concerns
- Energy Star Certified equipment will increase energy use savings

Renewables

- Local municipality (SELCO) provides electricity at low rates to residents
 - Poses challenge for PV installation
- Sizable grants from being a Green Community could provide enough funding to make PV or GSHP installation economically feasible
- Because Shrewsbury has a local utility (Shrewsbury Electric & Cable Operations), other resources such as heat pump incentives are not available. SRECs are not available.
- Ground Source Heat Pump (GSHP)
 - Not a truly renewable system as electricity is needed to run the pumps and compressor
- Site Orientation Options:
 - Both sites offer opportunities for development of Photovoltaics arrays.

Operations

- Simplified building systems
- Building Management System will be used to help maintenance staff monitor, optimize, and troubleshoot building systems
- Operations manual will be developed
- Staff/faculty training will be required or highly encouraged



Innovative Strategies

- Green cleaning, integrated pest management and green building education are a good fit for a project of this type.

Materials

- The group ran out of time in the charrette to discuss sustainable approaches in this area. A future meeting will explore these items.

Bike Rack – A list of topics set aside for future discussion

- Operations manual
- Security on-site
- Food service protocols
- Traffic + site access
- Solar + renewables
- Gas vs. Elec Building
- EMF
- Passive green space
- Wastewater management
- Flexibility – other schools are a little too small. Ability to expand?

NE-CHPS vs. LEED v4 RATING SYSTEM REVIEW:

Executive Summary:

As required by the Massachusetts School Building Authority (MSBA), the Beal Early Childhood Center will need to register and certify under Northeast Collaborative for High Performance Schools (NE-CHPS) or LEED for Schools v4. An additional 2% reimbursement is available to the project for meeting more aggressive energy use reductions – 20% savings beyond current MA State Energy Code (ASHRAE 90.1-2013).

The proposed new Beal Early Childhood Center should be able to achieve either the NE-CHPS or LEED-S v4 certification if an aggressive commitment to sustainability is made by the school district and design team.

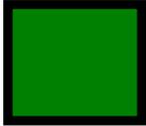
Analysis:

The selection of either rating system has advantages and disadvantages and implications for the Town of Shrewsbury. A summary is presented below:

NE-CHPS - PROs:

- Adapted with input from regional stakeholders to mirror the climate, building codes, and educational priorities of the Northeast.
- Emphasizes issues that are important to many school districts: indoor air quality, building operations, school security, resiliency, energy efficiency and low toxicity building materials

NE CHPS - CONS:



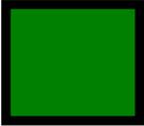
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- Mandatory requirement to satisfy all 28 prerequisites (LEED-S v4 has 14 prerequisites)
 - Project certification (and subsequent MSBA reimbursement) cannot occur until after the 10-month post-occupancy warranty review for commissioning is completed.
 - Labor-intensive NE-CHPS credit management and administration. NE-CHPS credits are subject to 3 reviews - the design review, construction review, and performance review – each containing additional documentation requirements.
 - Many of the NE-CHPS prerequisites and credits are policy driven and require COMMITMENTS from the school not just involvement in the certification process.
 - The NE-CHPS organizational budget and staff are smaller than that of the USGBC who administers LEED, which can lead to delays and inconsistencies in the management and certification process.

LEED v4 – PROs:

- The USGBC LEED rating system is well-established with a large database of resources, staff and certified schools.
- LEED is consensus based and is continually improving its rating systems and online documentation and review process.
- LEED-S is more performance-based than its earlier version, with an expanded focus on materials and their impact on human health and the environment, and a more comprehensive approach to water efficiency.
- The “LEED Online” documentation and review process invites all team members from engineers and architects to construction contractors and school officials to take part in the process and be part of the project online workspace so documentation is streamlined.

LEED v4 – CONS:

- Since the Beal Early Childhood Center project is located in a largely suburban location, the project is unable to capitalize on the significant amount of LEED points awarded to urban sites
- The market is still adapting to the changes in LEED v4, making the certification effort significantly greater than that of previous versions of LEED.
- While not a pro or con, one should be aware that LEED v4 awards points for EAc1 on energy cost savings over the ASHRAE 90.1 2010 baseline while NE-CHPS awards points based on energy use savings over the ASHRAE 90.1 2010 baseline (with source energy savings being the preferred metric).



NEXT STEPS:

- TGE to set up follow up meeting/call with the team to continue conversation on designing the school to be sustainable.
- Team to assess both NE-CHPS and LEED for Schools and share input with the Town
- TGE to provide Energy Use Intensity targets.
- Development of cost benefit analyses of alternative energy systems
- Team to discuss the Integrative Process credit in LEED and the Crime Prevention Workshop prerequisite in NE-CHPS. Both of these need to happen early in design.

ATTACHMENTS:

A. 02.26.18 PowerPoint Slides for Presentation

The forgoing discussions of this meeting are recorded as understood by the writer (marked by *), who should be notified of any omissions or corrections. Unless the writer is notified to the contrary, this report is presumed correct.