



CLINTON MIDDLE SCHOOL

100 W Boylston St. Clinton MA 01510

Temp. Modulars

SUSTAINABILITY WORKSHOP - APRIL 24, 2023

CLINTON MIDDLE SCHOOL



TEAM INTRODUCTIONS

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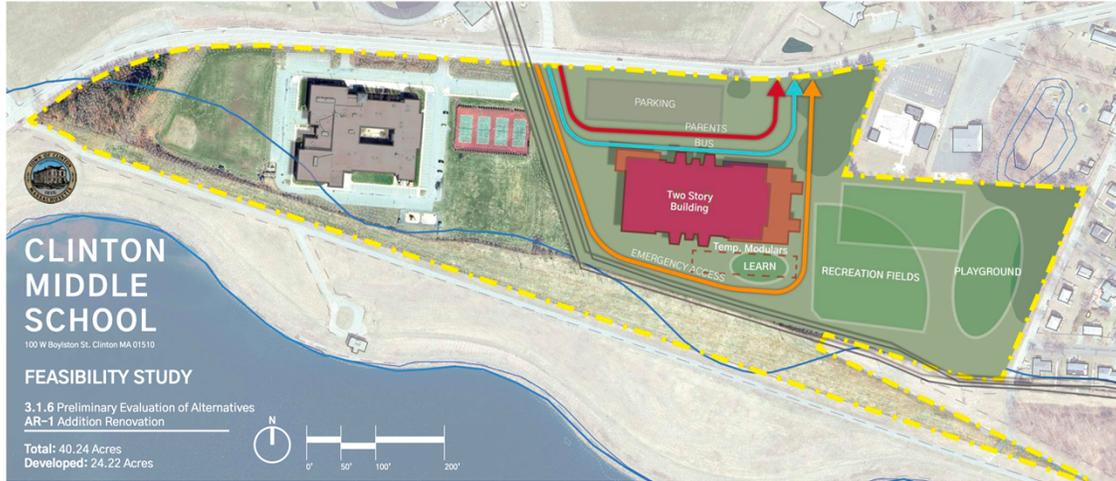
The Green Engineer
Sustainable Design Consulting



AGENDA

1. Welcome and Introductions
2. Project Overview and Schedule
3. Sustainability Commitments and Goals
4. Site/ Location
5. Energy
6. Water
7. Materials/ Health + Wellness
8. Indoor Air Quality
9. Wrap up and Next Steps

PROJECT OVERVIEW



AR-1



NC-1



AR-2



No Build Base Repair

SUSTAINABILITY GOALS

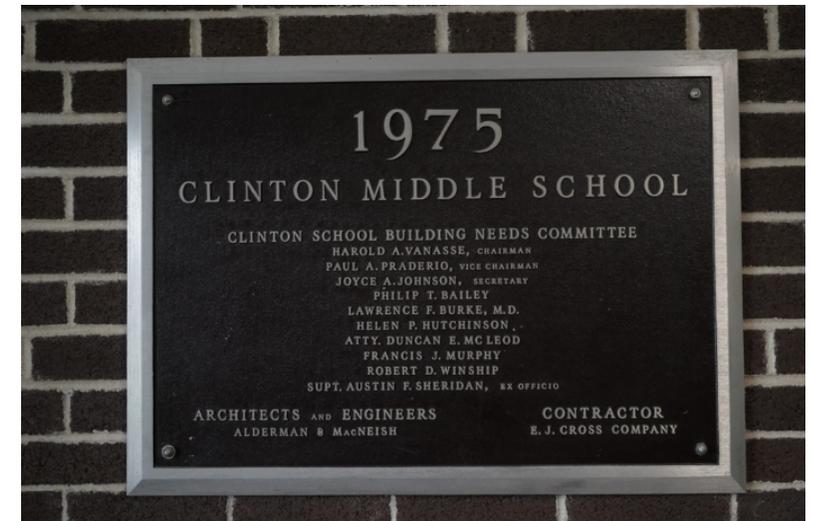
Project Goal Setting: Exercise 1

- What would you want the press to say about this project when the new Clinton Middle School is complete and occupied?
- After being opened for five years, what do you want people to still be saying about it?



Project Goal Setting: Exercise 2

- What is unique about this location and program that could contribute to the sustainable design features of project?
- What is unique about the project that could contribute to the sustainable development of the neighborhood?



Sustainability Goals & Commitments

- MSBA Requirements
 - LEED for Schools v4 Certified or NE-CHPS Verified
 - Total of 3 points (from 7 pnts available) from:
 - MR Building Product Disclosure and Optimization - Material Ingredients
 - IEQ - Low Emitting Materials
 - IEQ - Indoor Air Quality Assessment
 - (similar requirements for NE-CHPS)
 - Exceed the level of energy efficiency required in the current MA energy code by 20% using LEED-S EA “Optimize Energy Performance” credit or NE-CHPS “Energy Efficiency” credit



LEED and NE-CHPS Comparison



LEED

PRO – The LEED rating system is well established with a large database of resources, staff and certified schools

PRO – The “LEED Online” documentation and review process is robust and streamlined

PRO – LEED is continually improving its rating systems and documentation and review process through credit interpretations and addendum

CON – Projects in rural/suburban locations are unable to comply with a significant number of points as compared to urban sites

CON – More focused on the design and construction process and less on operations and maintenance



NE-CHPS

PRO – Adapted from regional stakeholders to account for climate, code, and regional education priorities

PRO – Many issues important to k-12 schools are emphasized—IAQ, energy efficiency and healthy materials

PRO – More focus on sustainable school operations and post-occupancy

CON – **Active involvement required by School Administration to supply required tracking, documentation and policies**

CON – NE-CHPS requires a “completeness review” before design and construction reviews

PROJECT SITE ANALYSIS

Site and Location

- Alternative transportation methods
 - Bicycle storage and bike network
 - Reduced parking and electric vehicles
- Siting of the building
- Access to open space
- Opportunities for health and wellness
- Exterior Lighting
- Landscape – native and drought tolerant plants
- Rainwater Management – low impact development

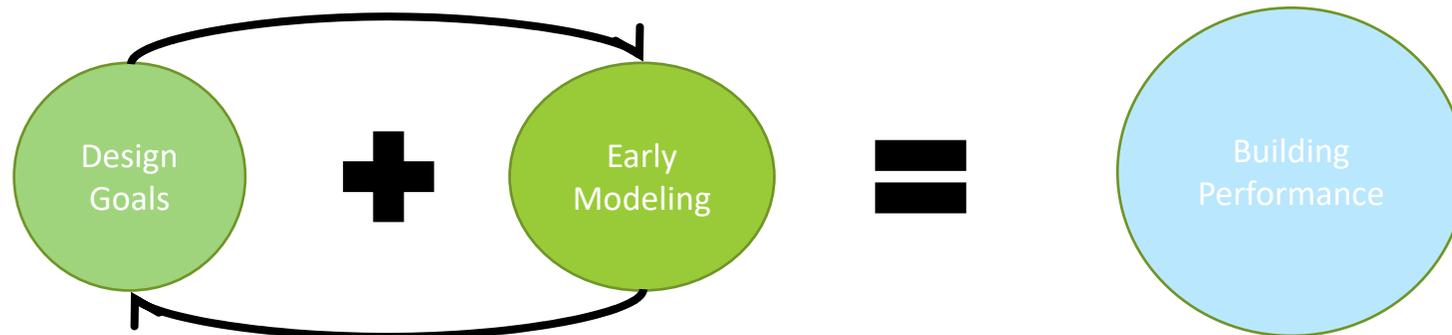




ENERGY
REQUIREMENTS
AND GOALS

Energy Performance Goals

- Energy Benchmarking and Target Setting
 - Net-zero energy/ carbon
 - Benchmarking EUI
- Energy Analysis
 - Integrative Design Approach – Analyze early and often



Proposed Stretch Code – Add'l Requirements

	Current Base & Stretch	Updated Stretch & Specialized
Envelope UA maximum	Mandatory – all commercial buildings	Improved for buildings with regular walls and accommodation for curtainwall buildings
Air infiltration	Air barrier required, No testing required.	Testing required. Maximum 0.35 CFM/sf wall area at 75 Pa (0.3 in w.g.)
Ventilation Energy Recovery	Many exceptions which allow no energy recovery, otherwise up to 50% effectiveness	Largely reduces exceptions, generally 75% effectiveness
Electrification of space heating	Optional	High ventilation buildings: Partial electrification mandatory, all other buildings: optional

Building Typology

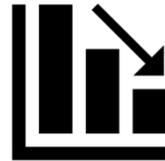
Offices, residential, schools over 20,000 sf. Includes types “adjacent” to residential use (post office, town hall, police station, similar)

High ventilation buildings (labs, hospitals) and multifamily (only until July 1, 2024). Optional for projects nor required to use TEDI. Typically Average ventilation at full occupancy greater than 0.5 cfm/sf.

Small commercial buildings (under 20,000 sf, excludes multifamily)

Multifamily larger than covered by residential low rise code

Pathway Compliance



Pathway Summary

Specific TEDI limits by building type. The units are kBtu/sf-yr Focused on heating, cooling, and building envelope. Calculated by energy model. Impossible to achieve without Passive House parameters?

See modified PCI table by building type. See amendment 16 to C103.2 for documentation of airflows. Uses natural gas baseline. Challenging to achieve.

Meet IECC 2021 with MA Amendments

Modeling with RESNET software

Energy Conservation Measures

- HVAC systems
- All electric option
- Building Envelope
- Lighting design and target improvement beyond code
- Domestic hot water system and plumbing fixtures
- Process loads
- Passive strategies
- Renewables



MassSave Incentives

- Path 1: Zero New Energy
 - Site EUI 25 or negotiated Site EUI
 - ZNE, ZNE ready, or PH
 - Engage in concept design before 50% SD required
 - Available Incentives: \$1.25/sf construction, \$1.00/sf post-occ
- Path 2: Whole Building EUI Reduction
 - Minimum 10% EUI reduction from MassSave baseline
 - Incentives based on MassSave EUI reduction tiers
 - Engage by 100% DD, earlier ideally
 - Available Incentives: \$0.35/sf - \$1.25/sf



WATER USE

Water Use

- Outdoor potable water use reduction
- Rainwater capture/reuse
- Efficient water fixtures – WaterSense labeled
- Water metering prerequisite / data sharing and water sub-metering credit
- Bottle fillers
- Commercial Kitchen – process water reduction



MATERIALS

What is Embodied Carbon?



Embodied Carbon
Manufacture, transport and
installation of construction materials

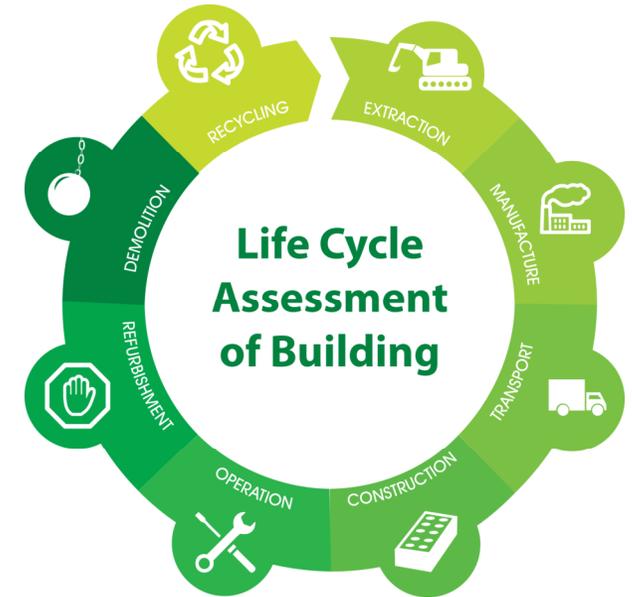
Operational Carbon
Building energy consumption

SKANSKA

Credit: Skanska Concoives Solution for Calculating Embodied Carbon in Construction Materials, Announces Transition to Open-Source Tool

Renovation vs New Construction

- In most cases, the greenest building is the one that already exists.
- If new construction is pursued - opportunities for material reuse and recycling of existing materials.
- Whole building Life Cycle Assessment
 - Fly ash/slag in concrete
 - Cross-laminated timber floors instead of metal deck
 - Glulam columns/beams instead of steel



Materials

- Interior finish products – low emitting materials
- Durable materials
- Red list free – banned chemicals of concern such as PFAS, flame retardants





INDOOR
ENVIRONMENTAL
QUALITY

Indoor Environmental Quality

- Air Quality
 - Ventilation
 - Filtration
 - Monitoring (CO2/ Air Quality Sensors)
 - Low VOC Interior Finishes
- Visual Comfort
 - Natural Light
 - Lighting Controls
- Thermal Comfort
 - Operable windows
 - Adjustable thermostats
- Acoustic Comfort
- Green Cleaning





NEXT STEPS

