



## Meeting Minutes – Design Review Committee #6

**Project:** Central Middle School  
Greenwich, CT

**Issue Date:** April 14, 2023  
r. June 23, 2023

**Meeting Date:** April 12, 2023

**Project No.:** 22367.00

**Meeting Time:** 4:00 pm

**Present:** Design Team: Brian Hamel, Jim Hoagland, Kemp Morhardt, Amy Samuelson  
Owner's Project Manager: Chris Cykley, Jim Giuliano  
Building Committee: Tony Turner, Steph Cowie, Christina Poccia, Joe Rossetti, Dan Watson  
School Administration/BOE: Tom Healy, Dominic Franco  
Construction Manager: Valerie Donahue, Lynn Temple  
Public: Laura Erickson (BET), Harry Fisher (BET, EMAC), Peter Schweinfurth (EMAC)

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**Distribution:** Building Committee                      Project Google Drive  
GPS and CMS Administration

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1. Amy presented introductory slides, with focus on the importance of sustainable design, and strategies to meet net zero target.
  - a. Question on the baseline EUI, clarified as code minimum,
2. Kemp noted that the goal of the project is to design toward NZ, BC has opted to purchase that design service.
3. Brian reviewed his slide deck:
  - a. HVAC
    - i. Option 1 (all electric): VRF Heating and Cooling, Heat Pump DOAS & AHU's; Electric Heaters.
    - ii. Option 2 (mostly electric): VRF Heating and Cooling, Gas Fired Boilers, DX/HW DOAS & AHU's.
    - iii. Option 3 (highly sustainable): Full Geothermal System, Chilled Beams, CHW/HW DOAS & AHU's.
  - b. DOAS ventilation:
    - i. Dan: GPS has gone to a BiPolar Neddlepoint Ioniztion (BPNI). Brian: Can be adapted into a DOAS.
    - ii. DOAS will be the ventilation system for all of the three HVAC options.
    - iii. DOAS will also be the heating/cooling system at large spaces such as the gym and auditorium.
    - iv. Demand controlled ventilation through CO2 sensors within the space, not located at the AHU's.
  - c. VRF system:
    - i. Efficient; each room has its own units; low noise; low first cost.
    - ii. Considerations: distributed compressors, with many units to maintain - filter replacements once per year at the compressor and at the VRF in the room.

1. Dan W: BPNI have required filter replacements on a 3-month schedule.
- iii. Proprietary system to the manufacturer - would be married to the manufacturer for the life of the building.
- iv. Approximately one compressor unit per 7,500 SF.
- v. There were questions about the size of the units in general and the maximum size of units due to Propane limitations.
- vi. Corridor spaces will get minimal ventilation air, as is standard.
- vii. Size of the mechanical room requirements for VRF
- viii. Backup heat will be through electric resistance heating to supplement when temps go below 10° if using an air-to-air heat exchanger. This does increase the generator load.
- ix. If a condensing unit were down, you lose the function of that unit until replaced.
- x. VRF can be used for both Options 1 and 3
- xi. Heating load for a highly efficient envelope building can be reduced by up to 1/3<sup>rd</sup>, thus dropping the size of the equipment.
- d. Chilled Beams (as an alternate to a VRF system):
  - i. No moving parts, inducing ventilation air over the chilled beam.
  - ii. Benefits: Efficient, occupancy comfort, quiet, no moving parts, no filters, integrated air delivery
  - iii. Considerations: Need to monitor humidity control
  - iv. Dehumidification comes from the DOAS ventilation unit.
- e. Dan W: GPS does not want occupant controls in the room. Should be done through the BMS only – with a temp sensor in the classrooms/offices.
- f. Is there a desire for operable windows? Tom: Yes.
  - i. If utilizing chilled beams for heat/cooling delivery in the classrooms and offices, operable windows will require sensors to monitor when they are open and to shut down the chilled beams, to avoid the possibility of condensation.
  - ii. Dan W: The HS doesn't have operational windows.
  - iii. No operable windows is a culture change.
  - iv. Field trip to sample projects with chilled beams was requested.
- g. Boiler/ Chiller Plant:
  - i. Dom: Putting quite a few Tecogen chillers in. These run with natural gas powered 454 engines to drive the chillers. Recover the waste heat,
  - ii. Nice procurement incentive programs available.
  - iii. All connected via internet with an Ileos, heat pump.
  - iv. Operational costs? Will the electric bill be higher than the gas bill?
  - v. **Dan W mentioned that GPS would like to see Tecogen as an option and see some numbers**
- h. Air Source HP:
  - i. Once outside temp is around 10-degrees, they start to de-rate.
  - ii. Down to 20-degrees they operate well.
  - iii. Consider the location, climate zone.
- i. Geothermal:
  - i. Order of magnitude 150-160 wells, 500 feet deep, closed loop, for a building of approximately 130,000 SF.
  - ii. Dan W: Interior mechanical space is not reduced for this system. There will be a slightly larger mechanical room than a VRF system.
  - iii. True, but when units are inside the benefits include site aesthetics, more roof area available for PV options, longer life of mechanical equipment.
  - iv. Significant backup power for heating if remains all-electric (large generator)
  - v. Q: How confident in geothermal? CES/SLAM: Very confident.

- vi. The ROI calc's presented today are based on today's capital costs and today's electric costs, but as electrical costs rise exponentially, the ROI calc's will be reduced.
  - vii. Peter: What about battery backup in lieu of a generator? CES: The quantity and cost of batteries to back up the school, even just for heat, will be significant and probably outside of the scope of this project.
  - j. Dan W: In the past have not gotten incentive programs since installed without pre-approved contractors. In the case of the CMS project, SLAM is working with Thornton Tomasetti who is an approved energy modeler for Eversource. They will work with Elizabeth at Eversource and Gregg at SLAM to maximize reimbursements.
  - k. Photovoltaic Arrays can be used to offset power use and to achieve net zero or "near" net zero, depending on how much PV can fit on the roof and/or on site.
    - i. Options include outright purchase and ownership of the panels, which carries maintenance and operations challenges.
    - ii. Power Purchase Agreements (PPA's) are an option that carries no first cost, but a 25-year agreement to purchase the power from the PPA company, which amortizes the first costs over the life of the contract.
  - l. Regardless of system selected, there will be full BMS control for the school. The State allows us to specify a sole source manufacturer if there is a typical vendor the district already uses.
    - i. Dan mentioned that CT Temp Controls are in 8-g buildings in Greenwich at this point.
  - m. Other systems that the State (OSCGR) will allow sole source specification: BMS, Fire Alarm, Security system (intrusion detection), keying system.
4. Decision Tree:
- a. Provide feedback and the building committee needs information to take a vote, then needs to be taken to the BoE for a decision.
  - b. Tony: Need a list of answers needed from the BC to make the conceptual estimate as accurate as possible.
  - c. Discussed the geothermal plant as an alternate to see the differential of cost between that and a traditional boiler plant.
5. Architectural Exterior:
- a. Jim reviewed the preference mapping results and the top 4 images.
  - b. Jim presented sample materials and discussed the interdependency of material selection and building performance, carbon footprint and sustainability reporting.
  - c. Lynn discussed the process of conceptual estimating relative to estimating with design/documents that are in early design stages.
  - d. Laura: Initial impression very dark & light.
  - e. Christina: a bit cold - the wood-look panel material is too light. Too much contrast.
  - f. Could you use actual wood? Yes, but there will be maintenance considerations.
  - g. Joe: Initial impression: CMS 2.0
  - h. Laura, Christina: flat roofs are a bit benign.
    - i. Entry point may be the location for some more pizzazz.
    - ii. Not "Greenwich Central Middle" it's "Central Middle School"
    - iii. KM/JH: Look at some sloped roof options at the entry point?
  - i. Steph: comments about the richness of the color (St. Tim's)
  - j. Tony noted that he is nervous about the relatively low number of the BC present. When do we need decisions on materials, color, etc.
    - a. BC needs a list of the decision points the design /estimating team needs

- k. Discussed the possibility of foregoing the DRC meetings since it seems that everything discussed at the DRC meetings will need to be reiterated and go to a full committee vote.
  - a. Is a NZE meeting with the BC required? If price 3-4 different systems
  - b. Need to determine VRF or Chilled Beam, then price the NZE vs non-NZE plants and the 3<sup>rd</sup> options in the TiCoGen
  - c. Go with Geothermal with options and deduct from that.
  - d. Would like to devote a portion of the next BC meeting to design.
  - e. Then discuss if the full BC is the DRC.
  
- 6. SLAM will generate a list of decisions broken down by needs for conceptual design and needs for SD completion.
  - a. SLAM to target generating the list by close of business Monday 4/17 after the SLAM/CSG/Turner meeting.
  - b. Concept: SF, massing, position of building on site, site plan, mechanical system and geothermal, price point of exterior wall, green roof.
  
- 7. Joe: Requested Turner for the template format for a conceptual vs. SD estimate.
  - a. Will be in Unifomat, which is system based.
  - b. Send a sample to Tony T.
  
- 8. The conceptual estimate will be used for the BoE to determine the need for additional funding and what magnitude.

Respectfully submitted,

Amy A. Samuelson, AIA, LEED AP  
Associate Principal