smma

Advisory Team - Sustainability & MEP Systems 5

Project Name:	Medford High School	Project Number:	25100
RE:	Advisory Team - Sustainability & MEP Systems	Meeting Date:	07/21/2026 **REV 08/07/26**
Prepared by:	Brenda Lam	Meeting Number:	05
Distribution:	Attendees		

Owner

- ☑ Libby Brown, *SBC Member, Architect at Goody Clancy*
- ☑ Suni Dillard, *Medford Resident, Sustainability Leader at HMFH Architects*
- ☑ Austin Ditz, *Medford Resident, Solar Project Manager*
- ☐ Audrey Feitor, *Medford High School Teacher*
- ☐ Jenny Graham, *Chair of SBC, Vice Chair of School Committee*
- ☐ Chris Hogan, *Medford Resident*
- ☐ Elisabeth Krautscheid, *Medford Resident, MassSave Decarbonization Program*
- ☑ Ken Lord, *MPS Chief Operating Officer*
- ☑ Sarah Michelman, *Medford Resident, Sustainable Design Consultant at The Green Engineer*
- ☐ Nicole Morell, *SBC Member*
- ☑ Jessica Parks, *Medford Resident, MIT Energy Efficiency Project Manager*
- ☑ Brenda Pike, *City of Medford Climate Policy Planner*
- ☑ Luke Preisner, *SBC Member*
- ☐ Chris Richard, *Medford Resident, Senior Project Superintendent at Turner*
- ☑ Paul Ruseau, *SBC & School Committee Member*
- ☐ Nathan Scott, *Medford Resident, Capital Construction at Tufts University*

SMMA & Consultants

- ☑ Martine Dion, *Director of Sustainable Design*
- ☑ Brenda Lam, *Sustainable Design Project Coordinator*
- ☑ Helen Fantini, *Project Manager*
- ☑ Matt Rice, *Principal-in-Charge, Architect*
- ☐ Abigail Ransmeier, *Head of Research*
- ☐ Soala Ajienka, *Architectural Designer*
- ☐ Jamay Li, *Architectural Designer*
- ☑ Emily Ehlers, *Mechanical Engineer*
- ☐ Andrew Barros, *Electrical Engineer*
- ☐ James Job, *Plumbing & Fire Protection Engineer*, AKAL Engineering
- ☐ Tommaso Bitossi, Transsolar

Leftfield

- ☐ Jen Carlson, *Project Director*
- ☑ Matt Gulino, *Project Manager*
- ☐ Adele Sands, *Educational Liaison*

Item No.	Action	Discussion
05.01	Record	**Meeting #5 Agenda** • Welcome & introductions • LEED Version Review and Confirmation • Preliminary Life Cycle Cost Analysis (LCCA) Information • Next Steps
05.02	SMMA	**LEED Version Review and Confirmation** • Motion voted and approved at the School Committee (7/20/2026), aligning with the discussions of the previous Advisory Team meetings, with a focus on the health and wellness and reduction of energy consumption and operational costs: ○ **Motion to recommend the Comprehensive Medford High School project shall achieve a minimum of LEED v4 Silver certification to meet MSBA requirements; however, the project shall prioritize building performance, occupant health, and lifecycle cost over point accumulation. To that end, the project shall:** **i. <u>Strive to achieve net-zero energy</u> (as technically feasible) through integrated passive design strategies, all-electric high-efficiency systems, and on-site renewable energy generation;** **ii. <u>Prioritize LEED healthy materials points to obtain the additional 1% MSBA reimbursement</u>. [NOTE: School Committee is updating this motion for action at the next meeting. Expect that prioritization of red list free materials, with the exception of MEP/FP, will be added]** **iii. <u>Prioritize water efficiency and stewardship</u> to reduce indoor potable water consumption by a minimum of 30%; while striving to eliminate potable water for irrigation use;** **iv. <u>Minimize the total cost of ownership</u>, designing operational systems, controls, and monitoring to substantially reduce energy, water, and maintenance costs over the life of the building.** **The long-term cost of operating and maintaining the building shall remain at the forefront of every design decision.**

		• GBCI updated and extended the LEEDv4/v4.1 registration to June 30, 2027, providing an additional year for registration. This provides an opportunity for the new Medford High School project to be registered under LEEDv4 or LEEDv5. MSBA Green School Policy offers LEEDv4 or LEEDv5, with a required minimum Silver level certification in either version. MSBA Fully funds Fundamental and Enhanced Commissioning as par to their Green Schools Policy. MSBA provides for additional 3% reimbursement for projects that pursue the Specialized Opt-in Stretch Energy Code. Additionally, MSBA provides an additional 1% reimbursement for projects that achieve healthy materials and enhanced indoor air quality requirements (beyond their base requirements for specific LEED MR and IAQ credits). Note: A higher LEED certification level (Gold or Platinum) **does not** provide for additional MSBA reimbursement. • SMMA provided feedback from the recent LEEDv5 pilot projects. There are considerable challenges with the review process. Plan for a minimum of 10+ points being denied in LEEDv5 (versus 1-2 points under LEEDv4/4.1). • LEEDv5 is more stringent than LEEDv4, therefore LEEDv5 Gold and Platinum will be highly challenging. • MSBA reported that only one other project currently planned to pursue LEEDv5 and reconsidering back to v4. Medford HS, if pursuing LEEDv5, would be the only MSBA k-12 projects to pursue LEEDv5 at this time. • The Project cost currently includes: ○ A full ground source heating and cooling system (100% GSHP-geothermal) and structural steel frame. ○ Add alternates categories: ▪ Alternate for Solar PV/battery storage. The PSR project baseline for the Solar PV system is Solar PV-ready, allowing for Power Purchase Agreement (PPA) to provide for the Solar PV array on the available roof area only. The solar PV1 option priced in the PSR cost estimate is estimated to generate approximately 20-40% of the school energy use and does not include battery. The 3 Solar PV alternates are listed below. □ **PV1** - Provide Roof Mounted PV Panels overall available Roof Surface (assume City/District buys the panels) □ **PV2** - Provide Canopy Structures only for PV Panels over Parking, Drive Aisles and CTE Yards for NetZero (assume PPA for all PV Panels) □ **PV3** - Purchase Canopy Structures and all PV Panels (Roof and Canopy mounted) for NetZero (assume City/District buys the panels) ▪ Alternate HVAC systems (Hybrid 50%GSHP/50% AtWHP, 100% AtWHP) □ **HVAC1** - Change GSHP system to an air-source heat pump system (ASHP - Air to water type) □ **HVAC2** - Change GSHP system to a hybrid ground source heat pump and air source heat pump system. □ **HVAC3** - Change GSHP system to an air-source heat pump VRF system ▪ Alternate for 50% and 100% Mass Timber structure. The 2 mass timber alternates are listed below: □ **TIMB1** - Provide 50% of the new addition structural frame with mass timber members/systems □ **TIMB2** - Provide 100% of the new addition structural frame with mass timber members/systems
05.03	SMMA	**Preliminary LCCA (Life Cycle Cost Analysis)** • As part of the preliminary PSR LCCA, SMMA compared 2 mechanical systems (GSHP and ASHP) with 2 building design options: Option B1.2 (most robust add/reno) and Option D (full new construction), representing the 2 design option "extremes.", i.e. other design option fell in between relative to reno/add ratios. • Preliminary PSR LCCA Summary: ○ The Ground Source Heat Pump provides for generally lower EUIs (lower energy consumption) than ASHP. ○ The overall estimated annual energy costs range from $1.41-1.64, which represent lower costs/SF than the existing facility at approximately 40-50% energy costs reduction per square foot when compared to the existing high school despite the addition of 100% air conditioning (existing school does not have full AC). ○ The Ground Source Heat Pump system has higher upfront installation costs, mainly due to the bores/wells. This initial cost is challenging to recuperate. MSBA incentives and energy savings aren't enough to close the gap with a hybrid or ASHP system [as mentioned IRA federal incentives are subject to change and cannot be accounted for]. • A preliminary Solar PV Site Capacity assessment was provided for high-PV roof canopy and low-angle PV roof canopy based on the estimated roof Solar PV usable area, which in turn provided for the required ground-mounted area for 100% NZE. The schematic design phase will start the planning of the Solar PV systems, sizing and locations. • A preliminary Total Carbon (Operational + Embodied) analysis was provided representing a 60-year life cycle. ○ The analysis includes the reno/add and new construction building designs (Option B1.2 and D1.1). For the reno/add option, existing embodied carbon is represented as "carbon-saved" below the "0" level. ○ The preliminary results demonstrate that the existing embodied carbon does not make up for the higher operational carbon of the existing school. ○ The operational carbon savings that will result from the school project's high efficiency systems considerably contribute to reducing the total carbon (and mitigate the added embodied carbon) - refer to the presentation slide for more details. ○ Embodied carbon reduction is still a goal for the project and further embodied carbon analysis will be conducted during the Schematic Design phase with the intent to support integration of Mass Timber as part of the proposed school structure. • The LCCA process is used to assess and compare the HVAC building systems associated initial costs, replacement costs, maintenance costs and operating costs (energy utility costs) over the life cycle of the building ○ MassSave incentives are estimated and provided in the PSR LCCA analysis. ○ State incentives [DOER] are not yet included. The Schematic Design LCCA will include the potential Massachusetts State incentives programs for heat pump (and Solar PV), including the construction incentives program and the pos-construction incentives programs opportunities. ○ Potential federal incentives (IRA) are not included in PSR LCCA. The Schematic Design LCCA will list the potential IRA incentives (for geothermal), with the caveat that they are sensitive to major amendments throughout the

		design and construction phases. The IRA incentives are carried as a separate line item, with all challenges relative to tracking all manufacturing, labor, and training requirements. ○ The LCCA is only representative of the building, not including the pool. A separate pool LCCA analysis will be conducted during schematic design to compare a fossil fuel based system to an all-electric based pool water heating system. ○ The proposed school design includes full air-conditioning (100% of program spaces). *[note: the existing school is only partially air conditioned]* ○ The schematic design LCCA will include a whole building LCCA comparing to a Specialized Stretch Energy Code baseline, and include available utility and state incentives *[as mentioned above, IRA incentives will be separate, not bundled with MassSave.]* ○ 100% GSHP [geothermal] ○ GSHP [geothermal] / AtWHP (50% load each) ○ 100% Air to water HP ○ The Stretch Energy Code Baseline requires a fossil-fuel HVAC system. The baseline will also account for the Specialized Stretch Code requirements associated with the use of fossil fuel systems (Solar PV installation and electrification readiness requirements). • The proposed school has a goal for a Predicted Energy Use Intensity (pEUI) of 35 kBtu/sf/year. The pEUI represents the combine and total energy use of electricity, including lighting, mechanical systems, plug loads, refrigeration. While typical high school often pursue a 25-30 pEUI goal, high schools with CTE programs present a higher energy use per SF, due to the CTE program equipment (kitchens, automotive, carpentry, etc.)
05.04	SMMA	**Discussion** • Question about the projected PV system size and any assumption on battery system. SMMA advised a battery system is sized based on peak load demand response. SMMA advised early energy analysis resulted in an estimated 6.2 MW PV System (for 100% NZE). • Question on lack of conventional (natural gas) HVAC system. ○ SMMA advised that based on the Specialized Opt-in Stretch Code, all-electric systems would fall under the all-electric pathway and doesn't require installation of Solar PV. ○ An all-electric readiness infrastructure and Solar PV installation will need to be included if pursuing a natural gas system under the Stretch Code's fossil fuel pathway, which basically entails the project infrastructure, including utility infrastructure, is fully design for electrification. ○ SMMA advised the baseline energy system under the Stretch Energy Code requires the use of a natural gas heating system, which will provide comparison with the project's proposed all-electric systems. Baseline will include the costs provisions of the fossil fuel pathway (all-electric heating readiness and Solar PV installation to offset heating system). • Question about National Grid feedback for potential service upgrade and costs for added electrical load and would like to see costs breakdown for 6.2 MW Solar PV system. SMMA mentioned that the conversations with National Grid have started and a preliminary load letter has been sent to National Grid, with the expectation that National Grid will provide preliminary feedback and costs in approx. 6-8 months. MHS/SMMA do not have estimated costs of infrastructure upgrades as of yet, those will be provided by National Grid.. SMMA has also engaged with National Grid to review incentive pathways. MOU agreement in progress, pursuing Path 2, per National Grid [Note: National Grid stated that MHS does not qualify for the Path 1 NZE as MassSave doesn't provide exemption on the EUI 25 threshold for high school with CTE programs and higher EUI]. • An Advisory Team member recommended providing context (sustainability benefits ,cost benefits, PPA vs Ownership) to initial costs. The schematic design LCCA will address this criteria. • An Advisory Team member mentioned a potential/future pilot program for battery storage under MassSave incentives. • An Advisory Team member voiced concerned about the high costs of the 100% GSHP system option, especially with the potential DCR Deed -Article 97 restrictions. • An Advisory Team member recommended excluding the VRF/ASHP type system option, which would introduce refrigerants to the building and create a less healthy indoor environment. The new fire code requirements for interior refrigerant lines present additional costs as well. The GSHP and AtWP heat pump systems proposed rely on an interior hydronic hot water/chiller water and ventilation system. • Please note that ASHP (Ductless Mini Split type) are commonly used for small electrical/IT/mechanical closet spaces. • An Advisory Team member recommended providing comprehensive summary of City of Medford / MSBA / Code givens (provided in PDP and PSR presentations) in all future slide shows to bring the public up to speed.
05.05	SMMA	**Next Steps** • Sustainability Charrette: September 17th • Advisory Team meeting September 23rd: ○ MEP Systems Updates ○ Review/discuss recommendations to the SBC on October 6th on the following: ▪ Solar PV and Battery Storage Extent and Approach ▪ All-Electric Heating/Cooling System Options for SD LCCA ▪ Mass Timber Approach to Addition Structure • SBC Meeting October 6th