Medford High School

Medford Comprehensive High School
Building Committee Meeting

06/01/2026



smma

LeftField

Agenda

- Roll Call
- Approval of Meeting Minutes
- Project Updates & Follow-ups
- Medford Update on Capital Projects and Preliminary Estimate of Project Costs Impact
- Review PSR Cost Estimate for C2.2A & C3.4A
- Project Timeline June 2026 – June 2027
- Updated Evaluation Criteria Matrix
- Life Cycle Cost Analysis (LCCA) Information
- Adjournment

Medford Update on Capital Projects and Preliminary Estimate of Project Costs Impact

THIS INFORMATION PROVIDED IN SEPARATE PRESENTATION

Review PSR Cost Estimates for C2.2A & C3.4A

Review of PSR Cost Alternates – Total Project Cost Projections

Alternative	A.1.1[3]	B.1.2	C.2.2A	C.3.4A	D.1.1	D.1.1NP
HS Only	NA	$724,212,930	$716,013,114	$720,203,471	$645,817,106	$645,817,106
HS + Current Existing PROG[1] (Pool = Reno in A,B +C, New in D)	$528,993,175	$782,964,083	$774,764,268	$778,954,624	$727,879,729	$704,622,258
HS + All PROG[2] Pool = Reno in B+C, New Pool in D)	NA	$821,449,418	$813,249,603	$817,439,960	$766,365,063	743,107,593

1) Existing PROG = These are the community programs that are existing in the high school today
2) All PROG = These are all the community programs that are proposed to be included in this project
3) Alternative A.1.1 does not support the Educational Plan

General Note:
Costs above do not include any of the Non-Program related alternates. Non-Program alternates are the other alternates that are not specifically related to program space. This includes the different pool options, access roads, mechanical systems, PV options and phasing.

Project Timeline

Project Timeline: June 2026 – June 2027

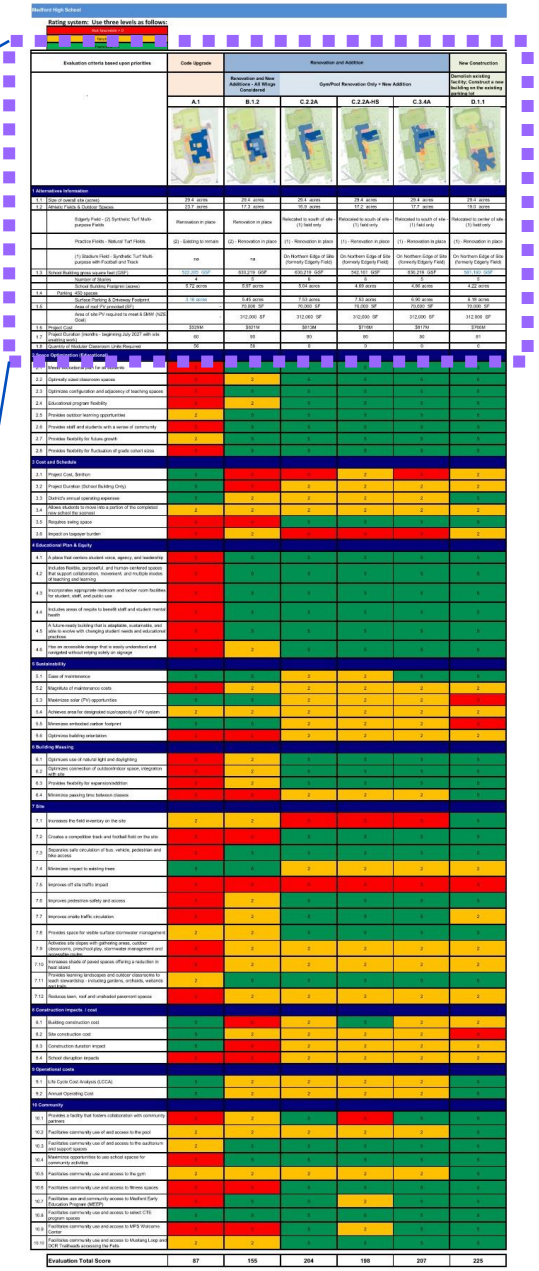
	PSR to MSBA 6/25	FAS Meeting 7/15 or 7/29	MSBA BOD Vote	SD to MSBA & DESE 2/24*	FAS Meeting (TBD)*	MSBA BOD Vote 4/29*	City Approvals
	2026				2027		
	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
FEASIBILITY (MODULE 3)													
SBC VOTE on Preferred Option	6/10												
SBC VOTE to Submit PSR	6/18												
Submit PSR	6/25												
MSBA Review													
MSBA FAS Meeting		7/15 7/29											
MSBA BOD Vote			8/26										
SCHEMATIC DESIGN (MODULE 4)													
TENTATIVE SBC Meetings		7/20	8/17	9/21	10/14	11/16	11/23 12/16	1/20	2/8 2/22	3/15	4/14		
Project Scope Finalized by City					10/14								
Cost information to Estimators								1/7					
Cost Estimates Reconciliation									2/3				
SBC Meeting to review costs									2/8				
OPM Submits cost to MSBA									2/10				
SBC VOTE to Submit SD									2/22				
Submit Schematic Design									2/24*				
MSBA Review										TBD*			
MSBA BOD Vote											4/29*		
FUNDING THE PROJECT (MOD 5)													
City Council Approval												TBD	
Citywide Vote													TBD
DETAILED DESIGN (MOD 6)													
Commence Design Development													6/1

*MSBA 2027 is not yet published - estimated date

Updated Evaluation Criteria Matrix

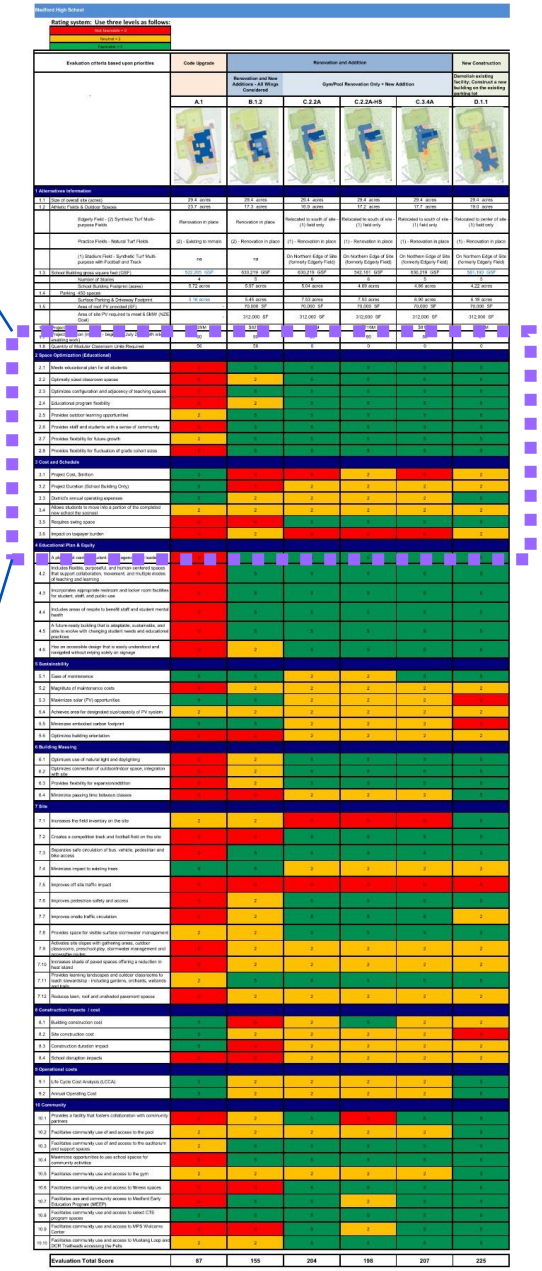
Updated Evaluation Criteria Matrix

	Evaluation criteria based upon priorities	Code Upgrade	Renovation and Addition				New Construction
			Renovation and New Additions - All Wings Considered	Gym/Pool Renovation Only + New Addition			Demolish existing facility; Construct a new building on the existing parking lot
		A.1	B.1.2	C.2.2A	C.2.2A-HS	C.3.4A	D.1.1
							
1 Alternatives Information							
1.1	Size of overall site (acres)	29.4 acres	29.4 acres	29.4 acres	29.4 acres	29.4 acres	29.4 acres
1.2	Athletic Fields & Outdoor Spaces	23.7 acres	17.3 acres	16.9 acres	17.2 acres	17.7 acres	19.0 acres
	Edgerly Field - (2) Synthetic Turf Multi-purpose Fields	Renovation in place	Renovation in place	Relocated to south of site - (1) field only	Relocated to south of site - (1) field only	Relocated to south of site - (1) field only	Relocated to center of site - (1) field only
	Practice Fields - Natural Turf Fields	(2) - Existing to remain	(2) - Renovation in place	(1) - Renovation in place	(1) - Renovation in place	(1) - Renovation in place	(1) - Renovation in place
	(1) Stadium Field - Synthetic Turf Multi-purpose with Football and Track	na	na	On Northern Edge of Site (formerly Edgerly Field)	On Northern Edge of Site (formerly Edgerly Field)	On Northern Edge of Site (formerly Edgerly Field)	On Northern Edge of Site (formerly Edgerly Field)
1.3	School Building gross square feet (GSF)	522,205 GSF	630,219 GSF	630,219 GSF	542,161 GSF	630,219 GSF	581,190 GSF
	Number of Stories	4	5	6	6	5	5
	School Building Footprint (acres)	5.72 acres	5.97 acres	5.04 acres	4.69 acres	4.86 acres	4.22 acres
1.4	Parking 450 spaces						
	Surface Parking & Driveway Footprint	3.16 acres	5.45 acres	7.53 acres	7.53 acres	6.90 acres	6.18 acres
1.5	Area of roof PV provided (SF)	-	70,000 SF	70,000 SF	70,000 SF	70,000 SF	70,000 SF
	Area of site PV required to meet 6.5MW (NZE Goal)	-	312,000 SF	312,000 SF	312,000 SF	312,000 SF	312,000 SF
1.6	Project Cost	$529M	$821M	$813M	$716M	$817M	$766M
1.7	Project Duration (months - beginning July 2027 with site enabling work)	60	90	80	80	80	81
1.8	Quantity of Modular Classroom Units Required	56	56	0	0	0	0



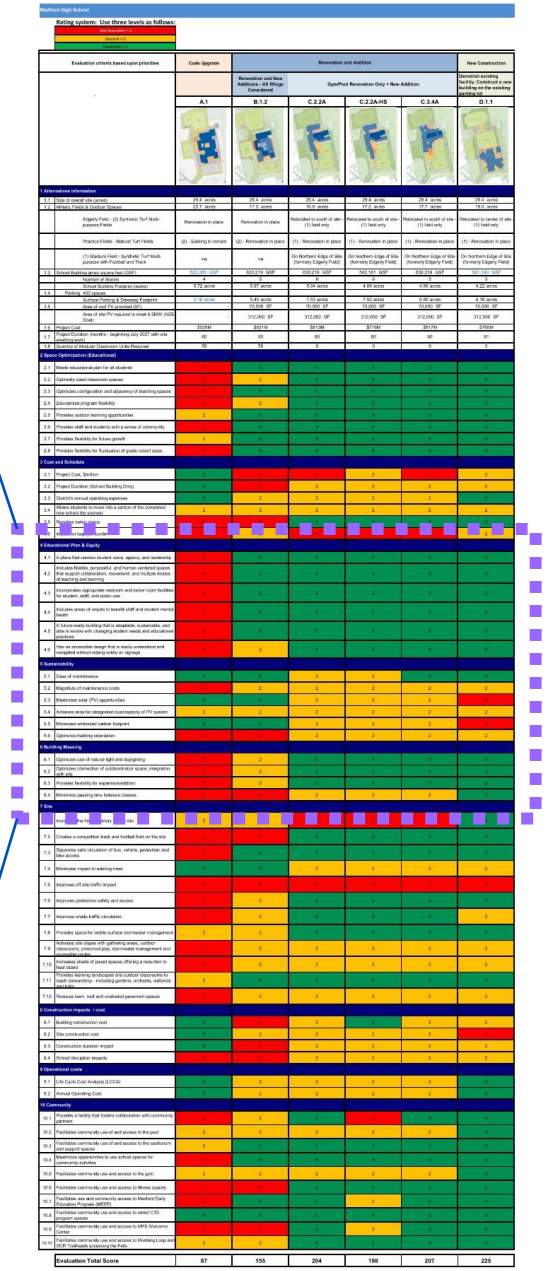
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		A.1	B.1.2	C.2.2A	C.2.2A-HS	C.3.4A	D.1.1
2 Space Optimization (Educational)							
2.1	Meets educational plan for all students	0	5	5	5	5	5
2.2	Optimally sized classroom spaces	0	2	5	5	5	5
2.3	Optimizes configuration and adjacency of teaching spaces	0	5	5	5	5	5
2.4	Educational program flexibility	0	2	5	5	5	5
2.5	Provides outdoor learning opportunities	2	5	5	5	5	5
2.6	Provides staff and students with a sense of community	0	5	5	5	5	5
2.7	Provides flexibility for future growth	2	5	5	5	5	5
2.8	Provides flexibility for fluctuation of grade cohort sizes	0	5	5	5	5	5
3 Cost and Schedule							
3.1	Project Cost, $million	5	0	0	2	0	2
3.2	Project Duration (School Building Only)	5	0	2	2	2	2
3.3	District's annual operating expenses	5	2	2	2	2	5
3.4	Allows students to move into a portion of the completed new school the soonest	2	2	2	2	2	2
3.5	Requires swing space	0	0	5	5	5	5
3.6	Impact on taxpayer burden	0	2	0	0	0	2



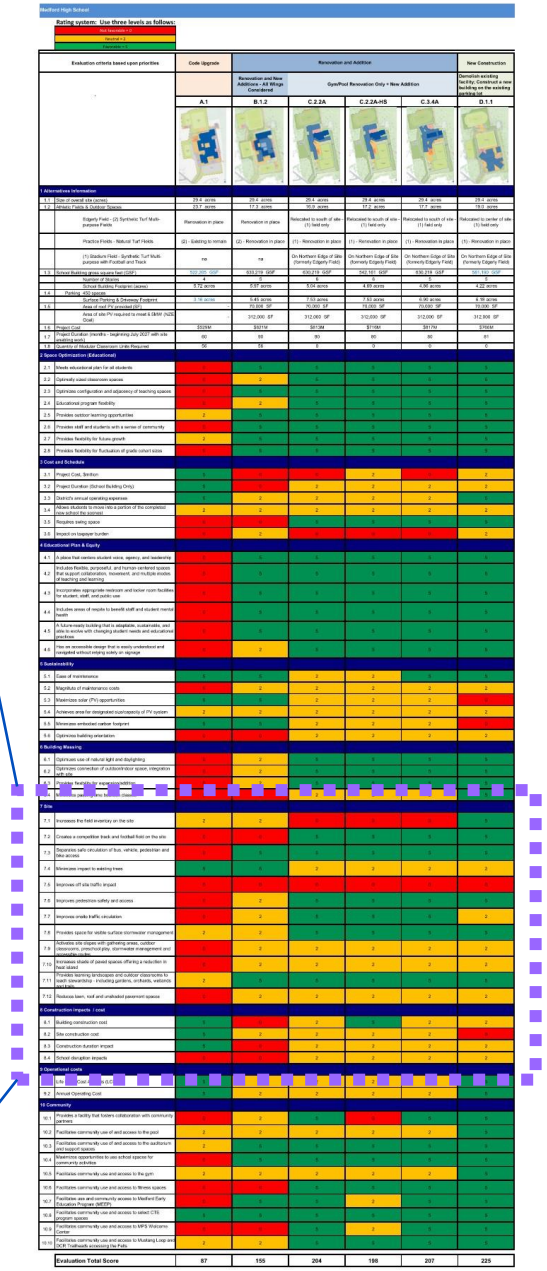
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		A.1	B.1.2	C.2.2A	C.2.2A-HS	C.3.4A	D.1.1
4 Educational Plan & Equity							
4.1	A place that centers student voice, agency, and leadership	0	5	5	5	5	5
4.2	Includes flexible, purposeful, and human-centered spaces that support collaboration, movement, and multiple modes of teaching and learning	0	5	5	5	5	5
4.3	Incorporates appropriate restroom and locker room facilities for student, staff, and public use	0	5	5	5	5	5
4.4	Includes areas of respite to benefit staff and student mental health	0	5	5	5	5	5
4.5	A future-ready building that is adaptable, sustainable, and able to evolve with changing student needs and educational practices	0	5	5	5	5	5
4.6	Has an accessible design that is easily understood and navigated without relying solely on signage	0	2	5	5	5	5
5 Sustainability							
5.1	Ease of maintenance	5	5	2	2	5	5
5.2	Magnitute of maintenance costs	0	2	2	2	2	2
5.3	Maximizes solar (PV) opportunities	5	5	2	2	2	0
5.4	Achieves area for designated size/capacity of PV system	2	2	2	2	2	2
5.5	Minimizes embodied carbon footprint	5	5	2	2	2	0
5.6	Optimizes building orientation	0	0	2	2	2	2
6 Building Massing							
6.1	Optimizes use of natural light and daylighting	0	2	5	5	5	5
6.2	Optimizes connection of outdoor/indoor space, integration with site	0	2	5	5	5	5
6.3	Provides flexibility for expansion/addition	0	2	5	5	5	5
6.4	Minimizes passing time between classes	0	0	2	2	2	5



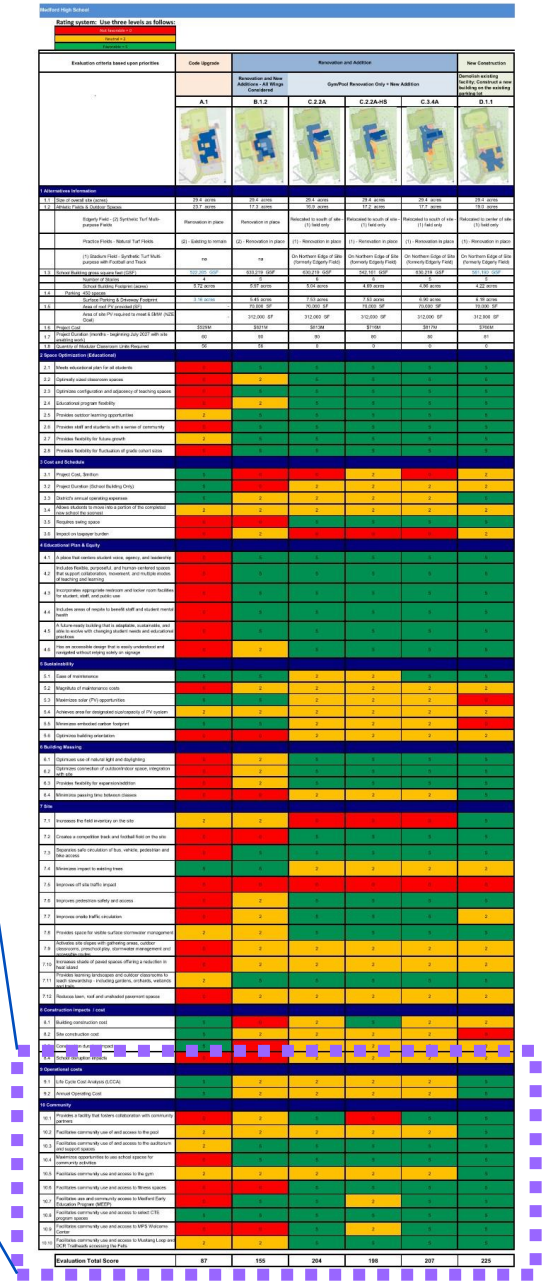
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		A.1	B.1.2	C.2.2A	C.2.2A-HS	C.3.4A	D.1.1
7 Site							
7.1	Increases the field inventory on the site	2	2	0	0	0	5
7.2	Creates a competition track and football field on the site	0	0	5	5	5	5
7.3	Separates safe circulation of bus, vehicle, pedestrian and bike access	0	5	5	5	5	5
7.4	Minimizes impact to existing trees	5	5	2	2	2	2
7.5	Improves off site traffic impact	0	0	0	0	0	0
7.6	Improves pedestrian safety and access	0	2	5	5	5	5
7.7	Improves onsite traffic circulation	0	2	5	5	5	2
7.8	Provides space for visible surface stormwater management	2	2	5	5	5	5
7.9	Activates site slopes with gathering areas, outdoor classrooms, preschool play, stormwater management and accessible routes	0	2	2	2	2	2
7.10	Increases shade of paved spaces offering a reduction in heat island	0	2	2	2	2	2
7.11	Provides learning landscapes and outdoor classrooms to teach stewardship - including gardens, orchards, wetlands and trails.	2	5	5	5	5	5
7.12	Reduces lawn, roof and unshaded pavement spaces	0	2	2	2	2	2
8 Construction impacts / cost							
8.1	Building construction cost	5	0	2	5	2	2
8.2	Site construction cost	5	2	2	2	2	0
8.3	Construction duration impact	5	0	2	2	2	2
8.4	School disruption impacts	0	0	2	2	2	2



Updated Evaluation Criteria Matrix

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		A.1	B.1.2	C.2.2A	C.2.2A-HS	C.3.4A	D.1.1
9 Operational costs							
9.1	Life Cycle Cost Analysis (LCCA)	5	2	2	2	2	5
9.2	Annual Operating Cost	5	2	2	2	2	5
10 Community							
10.1	Provides a facility that fosters collaboration with community partners	0	2	5	0	5	5
10.2	Facilitates community use of and access to the pool	2	2	2	2	2	5
10.3	Facilitates community use of and access to the auditorium and support spaces	2	5	5	5	5	5
10.4	Maximizes opportunities to use school spaces for community activities	0	5	5	5	5	5
10.5	Facilitates community use and access to the gym	2	2	2	2	2	5
10.6	Facilitates community use and access to fitness spaces	0	0	5	5	5	5
10.7	Facilitates use and community access to Medford Early Education Program (MEEP)	0	5	5	2	5	5
10.8	Facilitates community use and access to select CTE program spaces	5	5	5	5	5	5
10.9	Facilitates community use and access to MPS Welcome Center	0	0	5	2	5	5
10.10	Facilitates community use and access to Mustang Loop and DCR Trailheads accessing the Fells	2	2	5	5	5	5
	Evaluation Total Score	**87**	**155**	**204**	**198**	**207**	**225**



Note: The evaluations of the High School-Only C.2.2A-HS Alternative assume that first cost and operational costs will still be incurred by the District and City when the programs currently at the high school are relocated to other destinations within the City.

Life Cycle Cost Analysis (LCCA)

Sustainability and MEP Systems – 50-year Life Cycle Cost Analysis (LCCA)

Design Options Studied
Option B1.2-Add/Reno
Option D1.1 -New Construction

HVAC Systems Studied
GSHP (Ground Source Heat Pump - Geothermal)
AtWHP (Air-to-Water Heat Pump)

Life Cycle Cost Analysis (LCCA) is used to assess and compare the associated initial and operating costs of building systems (HVAC) over the life cycle of the building (50 years)

MHS Preliminary PSR LCCA includes:

- Initial costs
- Replacement Costs
- Maintenance Costs
- Energy savings from Utility Costs
- 50-yr. life cycle
- 3% cost escalation
- Incremental Costs, Payback and Incentives

Notes:

1. Options B.1.2 and D.1.1 were studied for the Preliminary LCCA as the two most dissimilar Options currently under consideration. The relative performance of the A and C Options can be roughly interpolated based on the B and D Options.

Design Option B.1.2



Renovation/Addition

[~640,000 SF]

Design Option D.1.1



New Construction

[~610,000 SF]

Predicted Energy Use Intensity (EUI) Goal

35

kBtu/SF/Yr. [Goal]

The 35 pEUI goal is informed by a reasonable impact of the CTE programs on overall building energy consumption vs. typical NZE school with no CTE programs [25-30 EUI]

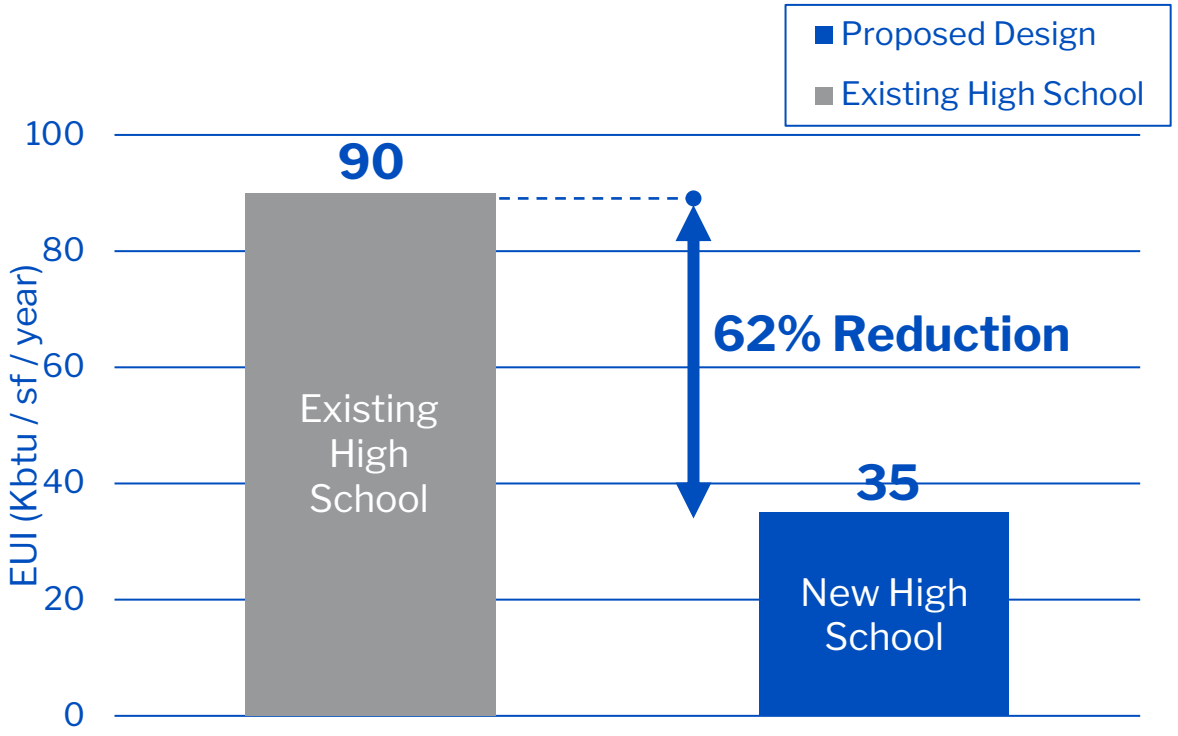


Passive Strategies | *Super-insulated Enclosure* | *Triple Glazing* | *All-Electric HVAC* | *Plug Load Management*

Note: *EUI refers to Energy Use Intensity, a metric which combines all building systems energy use per year per area, in order to compare with other schools'/code database.*

Sustainability and MEP systems / 50-yr. Life Cycle Cost Analysis

Estimated Annual Energy Use intensity (EUI)	
HVAC System	**Estimated EUI** (kBtu/SF/Yr.)
Add/Reno - Option B.1.2	
1-Ground Source HP (BOD)	34.7
2-Air-to-Water HP	36.1
New Construction – Option D.1.1	
1-Ground Source HP (BOD)	31.6
2-Air- to-Water HP	33.3
Existing Facility	90



All design options and HVAC systems options are in close range of the 35 EUI goal.

Sustainability and MEP Systems – 50-year Life Cycle Cost Analysis (LCCA)

Estimated Annual Energy Costs Comparison Relative to Existing Building	
HVAC System	**Estimated Annual Energy Costs** ($/SF)
Add/Reno - Option B.1.2	
1-Ground Source HP (BOD)	$1.55
2-Air-to-Water HP	$1.64
New Construction – Option D.1.1	
1-Ground Source HP (BOD)	$1.41
2-Air-to-Water HP	$1.43
Existing Facility	$2.79

Notes:
1. Energy costs based on total annual kWh savings, using the average 2-yr $0.22/kWh (utility bills).

Preliminary PSR LCCA Takeaways:

- 40%-50% Energy Costs Reduction Per Square Foot when compared to existing facility.
- School project includes fully air-conditioned school vs. existing school with limited air conditioning.
- Solar PV System and Battery Storage to further reduce energy costs:
  - Owned PV/Battery = peak load reduction/demand costs
  - PPA = electrical rate $/kWh reduction

Sustainability and MEP Systems – 50-year Life Cycle Cost Analysis (LCCA)

Estimated 50-year LCCA at Net Present Value (NPV)

HVAC System	Installation Cost	Replacement Cost	Maintenance Cost	Energy Cost	Total 50-year LCCA Costs	Total 50-year LCCA w/ Construction Incentives and Associated Costs
						MassSave
Add/Reno – Option B.1.2						
1-Ground Source HP	$79,530,000	$29,490,000	$5,403,000	$25,621,000	**$139,944,000**	$136,944,000
2-Air to Water HP	$50,770,000	$32,825,000	$5,275,000	$27,014,000	**$115,884,000**	$113,784,000
New Construction Option D.1.1						
1-Ground Source HP	$75,739,000	$29,490,000	$5,403,000	$22,190,000	**$132,822,000**	$129,822,000
2-Air to Water HP	$46,979,000	$32,825,000	$5,275,000	$24,082,000	**$109,161,000**	$107,061,000

Notes:

1. Installation costs are based on the PSR project cost estimates. Replacement costs are specific to each system, based on ASHRAE useful life data and using unit costs for equipment and labor, brought forward as Net Present Value (NPV) costs. Maintenance costs are estimated to include third-party service to systems, but not in-house routine maintenance.
2. Energy costs based on energy modeling analysis, using the 2-yr High School utility bills' average [blended] annual $0.22/kWh, with a 3% cost escalation rate. The energy costs do not include peak load reductions expected from a project's Solar PV/Battery Storage systems. Peak demand costs are approximately 30% of Medford High School's annual utility costs. The battery storage peak load reduction support utility energy costs benefits. The Total 50 yr. LCCA Cost is the sum of Installation, Replacement, Maintenance and Energy costs. Net Present Value modeled on a 50-year lifecycle cost, 3% cost depreciation.
3. Construction Incentives include MassSave Incentives. Post-occupancy annual incentives (revenues) are not included: Demand Response and peak load reduction utility incentive programs, and potential annual Renewable Energy Certificate (REC) for the GSHP or AtWHP.

Sustainability and MEP Systems – 50-year Life Cycle Cost Analysis (LCCA)

Estimated Incremental Cost GSHP vs. AtWHP Systems Costs				
HVAC System	**Installation Incremental Costs (Savings)**		***50-yr. Incremental Costs (savings)*[2]**	**Annual Energy Costs Savings[1]**
		Incl. MassSave[3]	**Incl. MassSave**	
Add/Reno – Option B.1.2				
1-Ground Source HP (BOD)	$28,760,000	$25,760,00	$23,160,000	($58,000)
2-Air-to-Water HP	$0	$0	$0	$0
New Construction Option D.1.1				
1-Ground Source HP (BOD)	$28,760,000	$26,660,000	$22,761,000	($74,000)
2-Air-to-Water HP	$0	$0	$0	$0

Notes:
1. Energy Savings: based on total annual kWh savings, using the average 2-yr $0.22/kWh (utility bills). Peak demand savings not included.
2. Incremental Costs are based on the PSR Cost Estimates and include materials and labors and are based on a per cost comparison to the analysis system baseline (ASHRAE 90.1-2019 App G).
3. MassSave Incentives assumes $3,000,000 cap for GSHP and $2,100,000 for AtWHP, based on National Grid 2026 Path 1 and Path 2 Programs.

Preliminary PSR LCCA Takeaways

- **GSHP system:**
  - Overcoming the estimated $23,160,000 incremental cost vs. the AtWHP system over 50 yrs. is challenging, as the estimated GSHP incentives, replacement costs and energy savings totaling approximately $4,400,000 are not sufficient.
  - The initial GSHP $28,760,000 incremental costs [installation] only benefit a small reduction from the capped $3,000,000 MassSave Incentive and the $58,000-$74,000 annual energy savings.
  - Bores/wells will require 10-15 acres (pending well depth)
  - When comparing the B1.2 and D1.1 design options, the same relative cost challenges between the GSHP and AtWHP systems apply, i.e. the Design option selection is not highly impacted by the HVAC system selection.

- **Hybrid GSHP/AtWHP consideration:**
  - The potential for a hybrid GSHP/AtWHP to be assessed as part of the Schematic Design LCCA including comparison of 3 HVAC systems.
  - A 50% GSHP/50% Hybrid System would reduce bores/wells acreage to 5-8 acres.
  - Lower initial incremental costs.

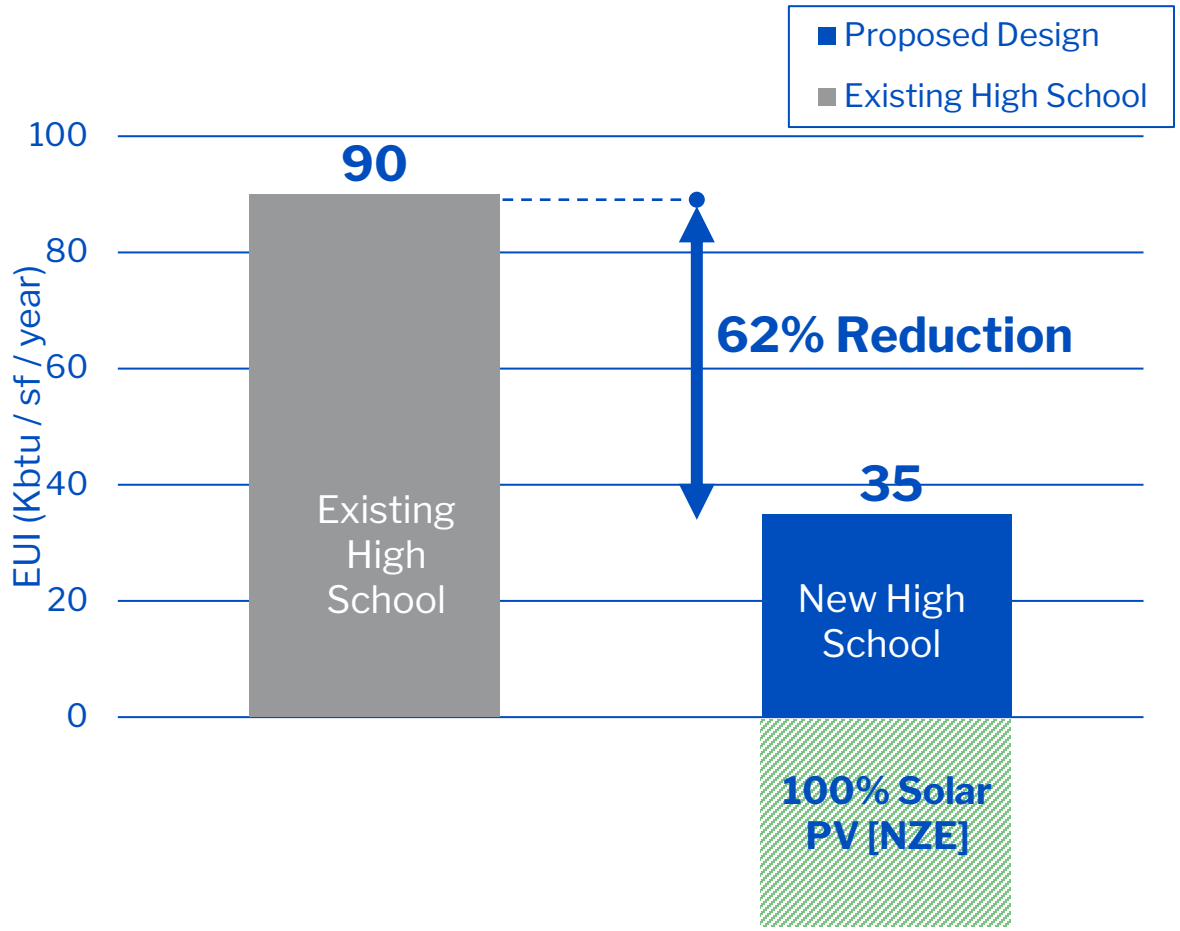
******Notes***:*

1. *SMMA is still assessing the feasibility of IRA's Federal Incentives. However, they are not likely sufficient to close the gap on the $28,060,000 incremental costs.*
2. *$4,400,000 based on ~$3,000,000 in replacement costs savings and estimated $1,393,000 energy savings [$58,000-$74,000 annual energy savings].*
3. *Bore/well test will inform GSHP soil conductivity which may slightly impact energy savings.*
4. *All design options and HVAC systems options are in close range of the 35 EUI goal.*

100% Net Zero Energy (NZE) Site Capacity Assessment

	Estimated Roof PV Area	Required Ground-Mounted Area for 100% NZE (SF)		
	%NZE	% NZE	Equivalent Area (SF)	
High-PV Roof Canopy	40-50%	50-60%	140,000-200,000 SF	• Available Parking area limited due to pending parking alternatives • Limited ground mounted canopy area (outdoor classrooms) • Consideration for BIPV [bldg. Integrated PV] at high façade areas – 50% less efficiency than PV canopies
Low-Angle Roof Canopy	20%	80%	Up to 300,000 SF	

Sustainability and MEP systems / 50-yr. Life Cycle Cost Analysis with 100% Solar PV



The building designed to a 35 pEUI goal combined with a solar PV system sized to produce equivalent energy annually would attain Net Zero Energy.

Total Carbon = Operational Carbon (Energy) + Embodied Carbon (Materials)

Operational Carbon is the greenhouse gas (GHG) emissions associated with the annual energy consumption of the building.

Embodied Carbon is the greenhouse gas emissions associated with the life cycle of the building materials, including manufacturing, transportation, installation, maintenance, and disposal.

Embodied Carbon Analysis Criteria Summary

Design Option B.1.2

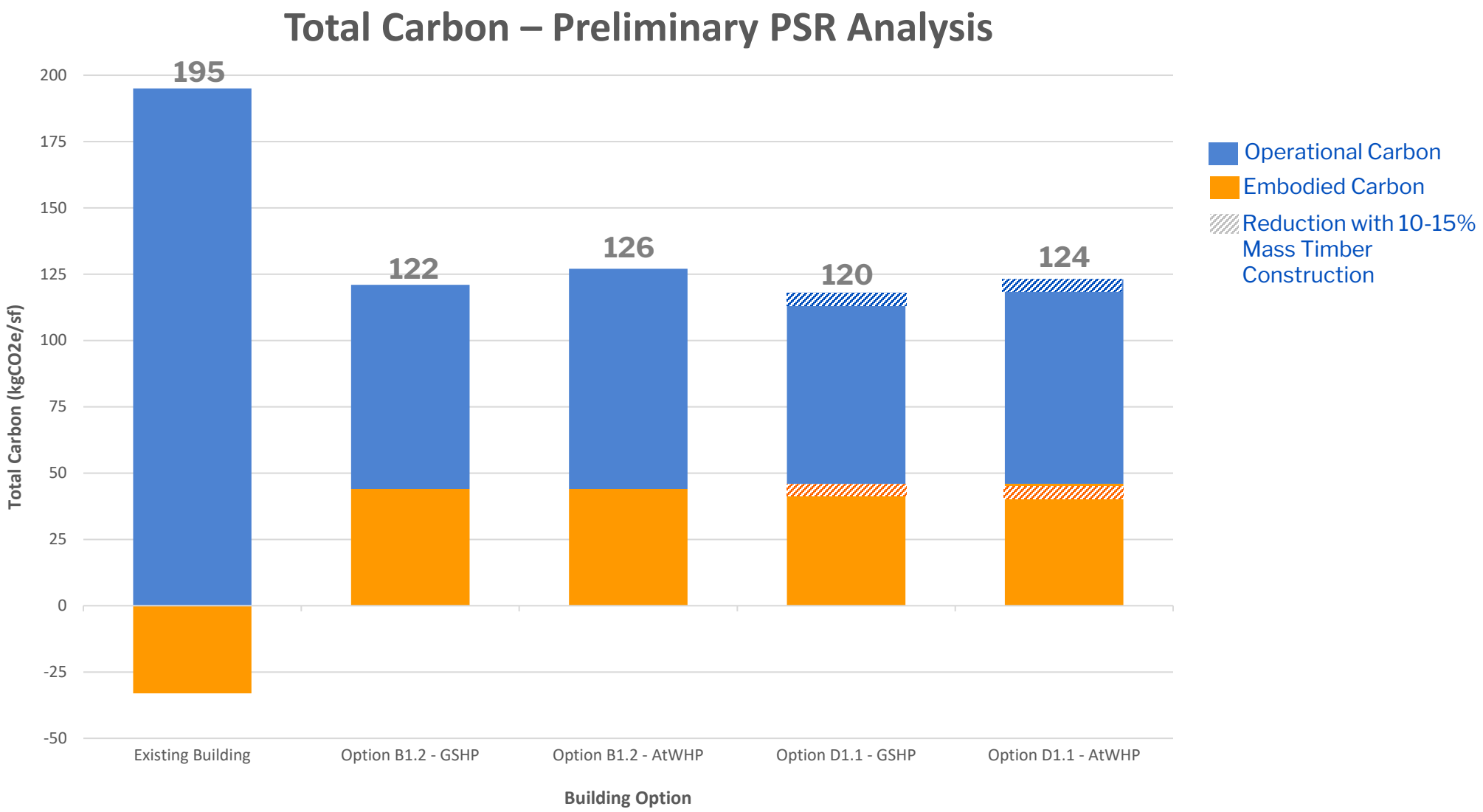


- Renovation/Addition [~640,000 SF]
- Full gut renovation
- Retaining existing structure
- New highly insulated enclosure
- New interior
- Modular Classrooms included

Design Option D.1.1



- New Construction [~610,000 SF]
- Low embodied carbon concrete, steel and insulation
- Assumes an option with 10-15% Mass Timber Structure



Total Carbon is the sum of the operational carbon (energy) and embodied carbon (materials).

Upcoming Meetings

- **6/03 Community Meeting 5** review of alternatives with cost information
- **6/10** (In Person) **MCHSBC** meeting to select a single option
- **6/15 School Committee Meeting**
- **6/18** (In Person) **MCHSBC** meeting to review and approve PSR submission

Thank you.

