Lexington High School

Permanent Building Committee Meeting

02/27/2025

Building Floor Plan Review – confirm on 4/10

- ❑ Proposed Space Layouts
- ❑ Location & Access to Central Office
- ❑ Elevator Count, Usage Control & Roof Access
- ❑ Confirm Future expansion GSF

Programming – confirm today

- ❑ Confirm Blacher Seat Count
- ❑ Decide between 146M and 200M Track in Field House

Building Design – confirm today

- ❑ Add/Reno Field House – Scope & Constructability
- ❑ Mass Timber vs. Structural Steel

Plumbing Design – confirm today

- ❑ Confirm Battery vs. Hardwired Plumbing Fixtures

HVAC Design – confirm on 5/8

- ❑ Confirm Approach for Integrated Automation Systems

Renewable Energy – confirm on 5/8

- ❑ Location of Energy Storage Battery
- ❑ Final EV Charging Stations Quantity

smma

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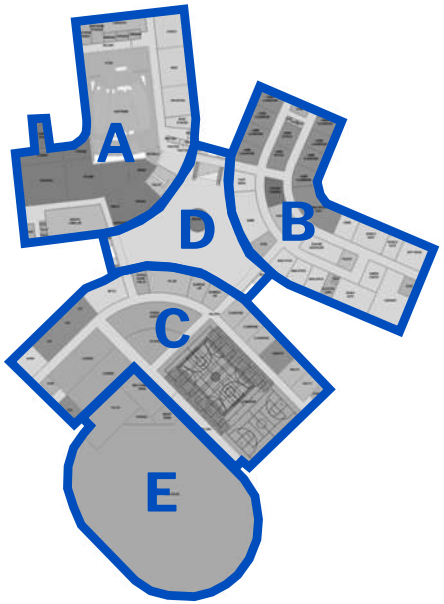
Building Floor Plan Review / Proposed space layouts and circulation

- Core Academic
- Science
- Teacher Planning & Small Group
- Admin, Guidance, ALPHA, METCO, Central Offices
- Auditorium / Drama
- Art & Music
- Media Center
- Vocation & Technology
- Physical Education
- Special Education
- Medical
- Kitchen, Restrooms, Custodial
- Commons
- Circulation
- Vertical Circulation
- Rooftop Open Space
- Other
- Expansion

LEVEL 1



KEY PLAN

Building Floor Plan Review / Proposed space layouts and circulation

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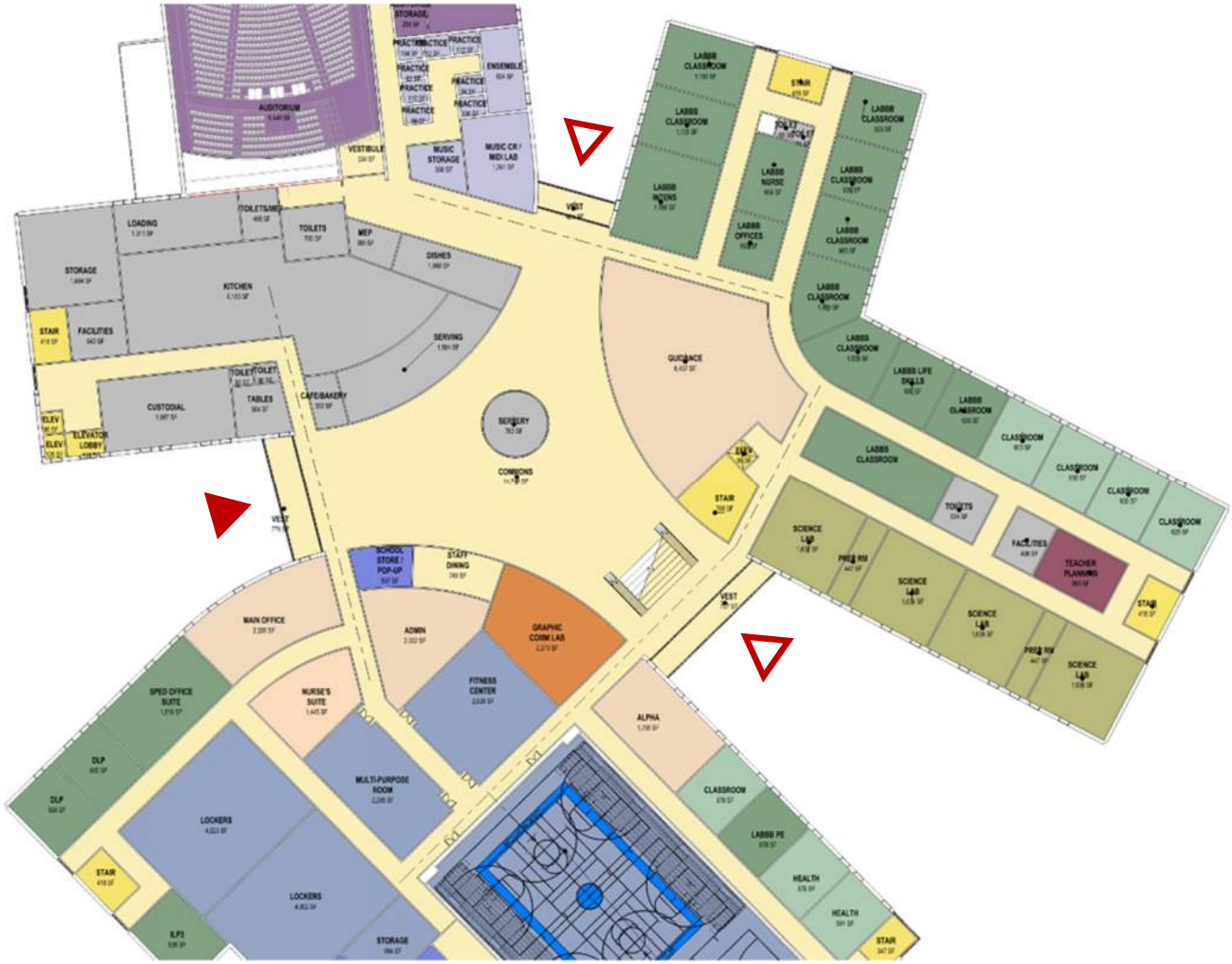

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LEVEL 2

Building Floor Plan Review / Proposed space layouts and circulation

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- Auditorium / Drama
- Art & Music
- Media Center
- Vocation & Technology
- Physical Education
- Special Education
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- Kitchen, Restrooms, Custodial
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- Circulation
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- Expansion

LEVEL 3

Building Floor Plan Review / Proposed space layouts and circulation

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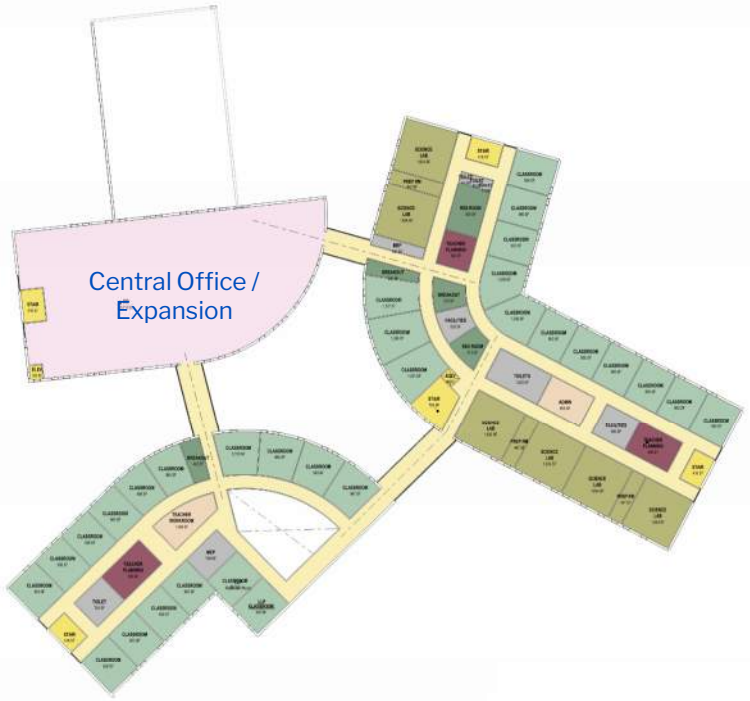


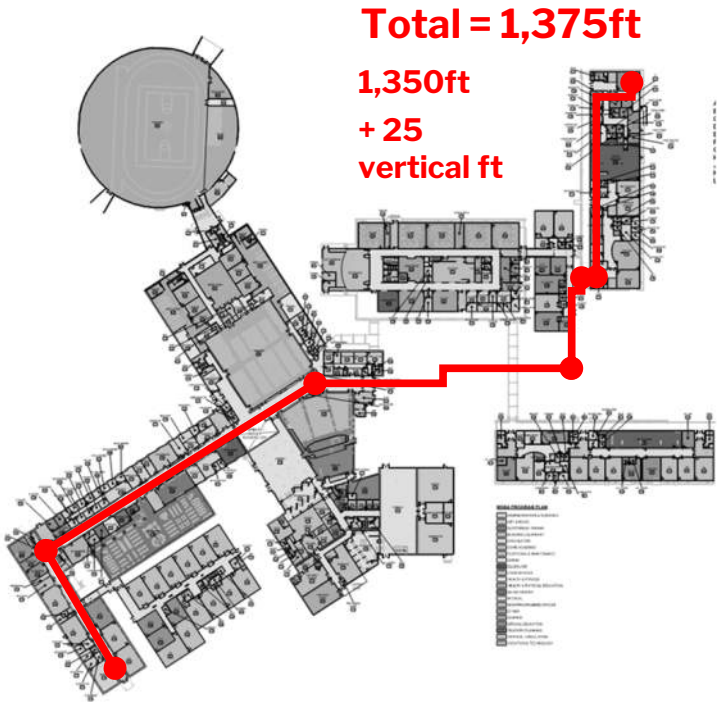
LEVEL 4

Building Floor Plan Review / Travel Times

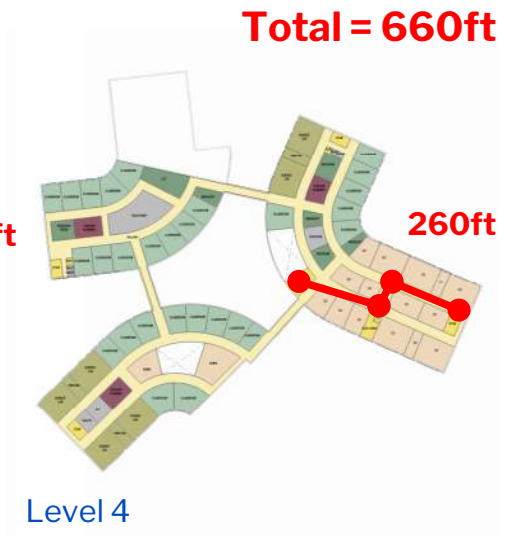
Existing Travel Time (Level 2 Building A to Level 2 Building J)

= **5.5 minutes** at an average adult walking speed

= **7 minutes** at a slower pace simulating an overcrowded condition between classes



Level 1



Level 4

The most remote travel distance is cut by more than half (52%) in the proposed design

Proposed Building Travel Time (Level 1 C Wing to Level 4 B Wing)

= **3.5 minutes** at an average adult walking speed

Building Floor Plan Review / Location & Access to Central Office

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- Admin, Guidance, ALPHA, METCO, Central Offices
- Auditorium / Drama
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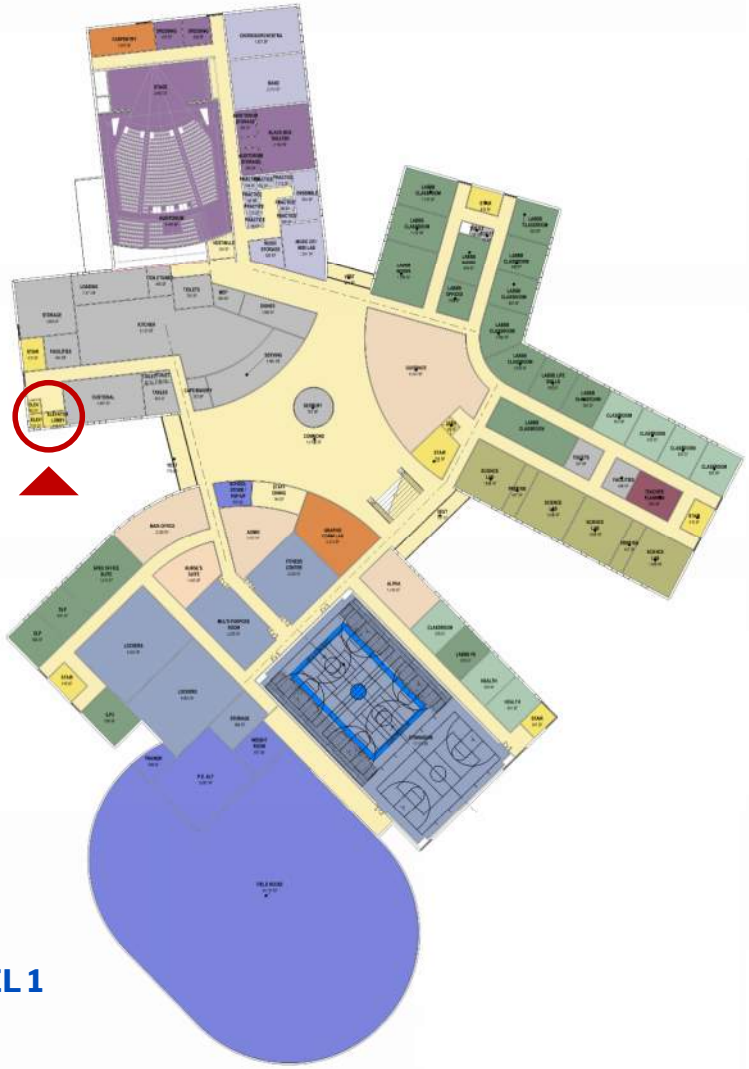
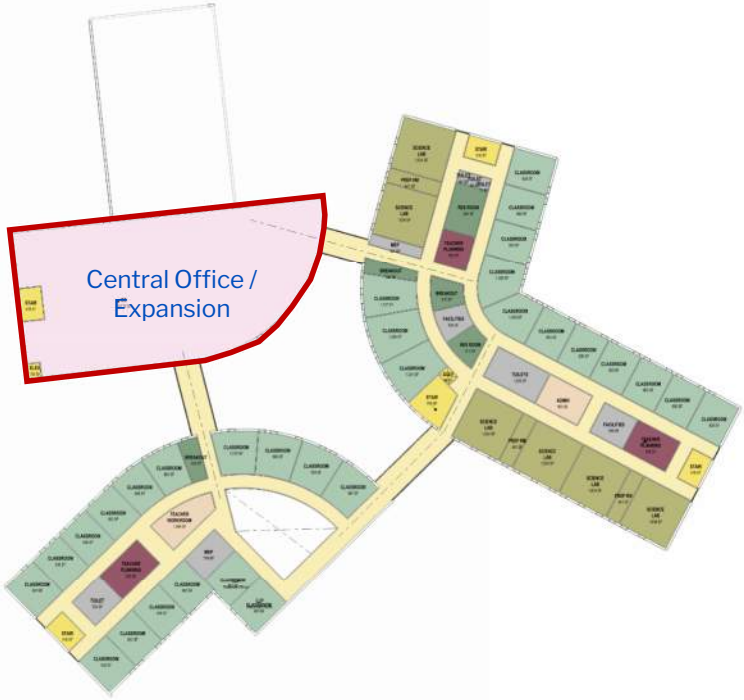


LEVEL 1

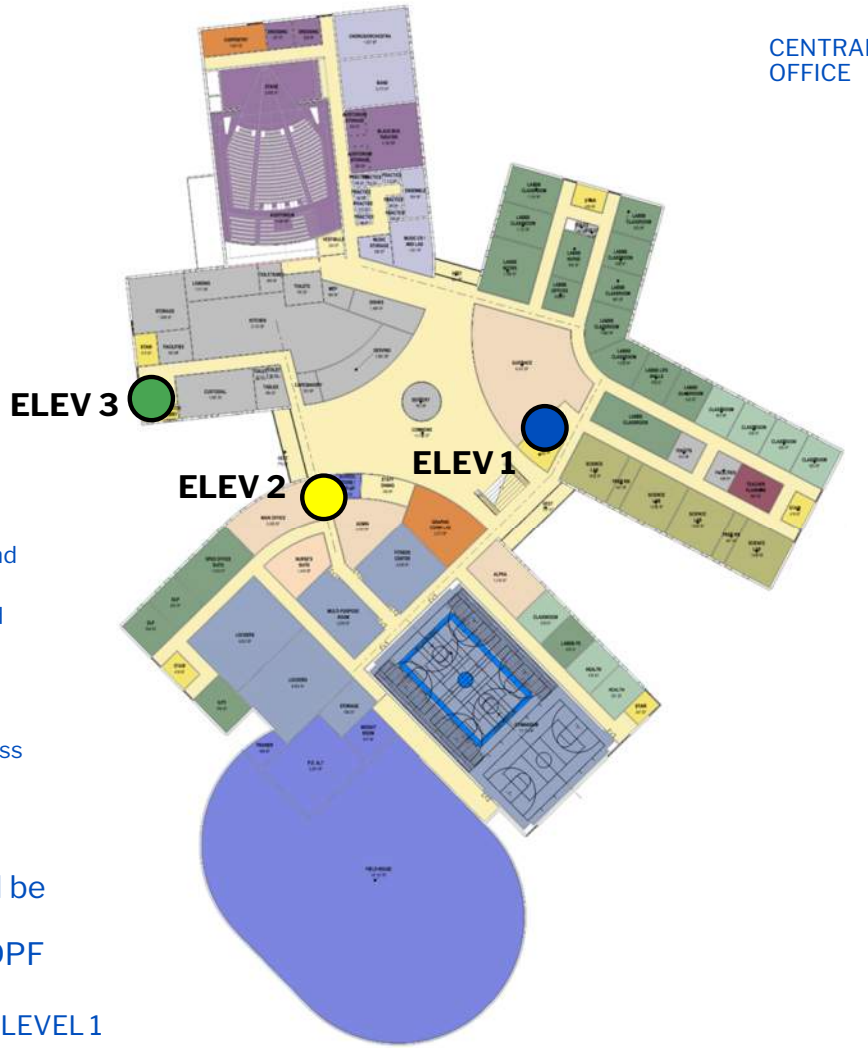


LEVEL 4

Building Floor Plan Review / Elevators – count, usage, control & roof access

Elevator Summary

- Traction elevator
- 5,000lb capacity
- 200fpm
- Requires a small control room
- Cab sized for a stretcher (+/- 5'-10"w x 8'-8"l)
- 3 total
  - 2 serving the school
    - ELEV 1 is adjacent to the central stair and would directly serve B wing
    - ELEV 2 is near the main entry and would serve A & C wings
  - 1 serving the Central Office
    - ELEV 3 would connect Levels 1 and 4 only but can be overridden by card access to stop at 2 & 3
- No roof access via elevator
- Current usage direction: Card access will be installed at all elevators. Overall access control TBD by School Department and DPF



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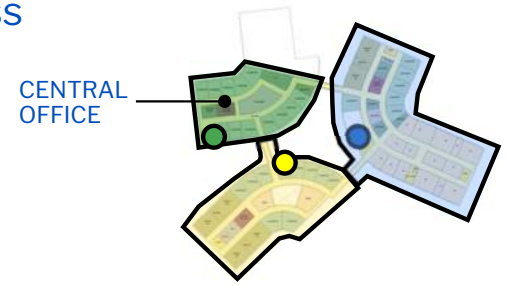
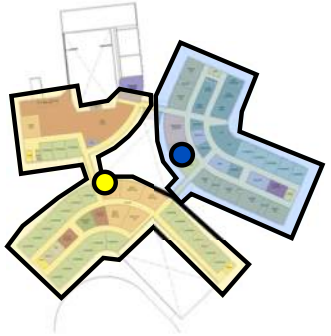


LEVEL 4

LEVEL 3



LEVEL 2

Building Floor Plan Review / Future expansion GSF

Design Enrollment: **2,395 students**

Upper Limit of Future Expansion*: **3,000 students**

Total Future Expansion Need: **605 students**

Capacity of Central Office Conversion to Classrooms: **322 students (14 classrooms)**

Remaining Expansion GFA Needed: 283 students (~13 classrooms)

* Per SBC's PSR Preferred Concept Statement 11/12/2024

Building Floor Plan Review / Future expansion GSF

Option 1 – 53,760 GSF

- Adds (4) full Gen Ed Classroom bays per floor Total 16
- Adds (2) Science Labs and (1) Prep Room per floor Total 8/4
- Adds an egress stair at end of wing
- Allows space for exit from internal egress stair
- Includes internal zone for support space, toilets

- Additional Capacity: **552 students**
- Total Capacity at 85% Utilization: **3,269 students (target + 269 or +9%)**

13,440sf per floor

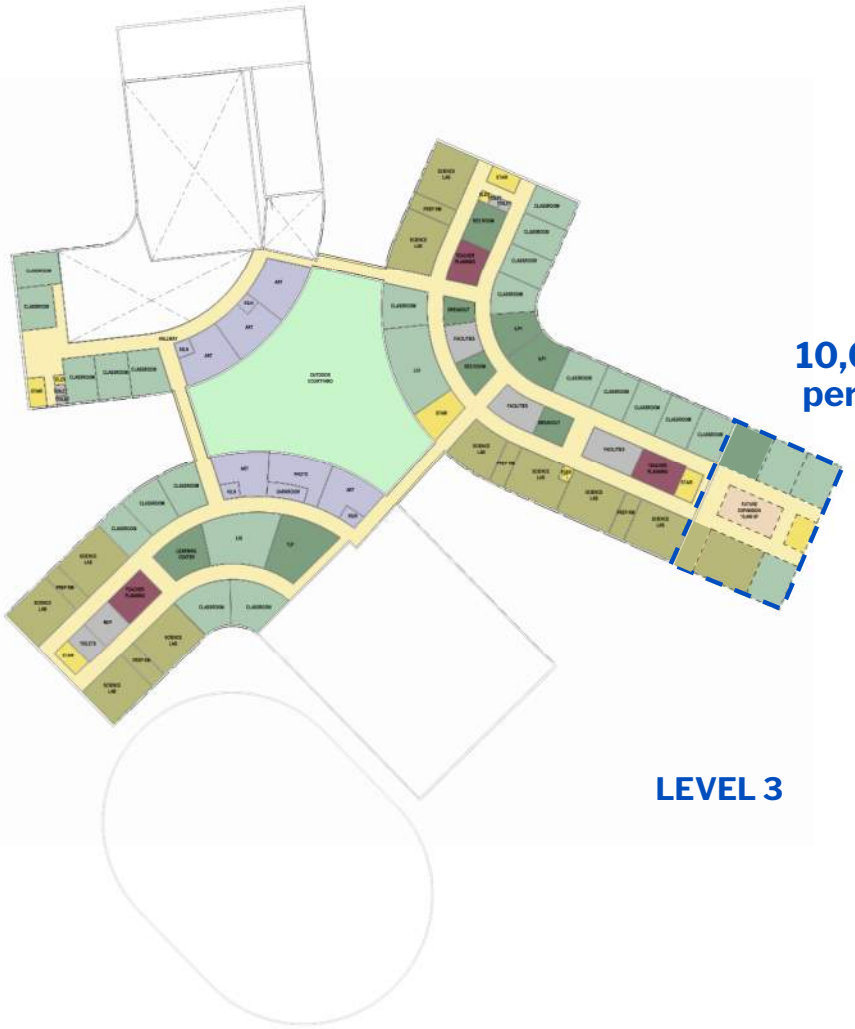
LEVEL 3

Building Floor Plan Review / Future expansion GSF

Option 2 – 40,320 GSF

- Adds (4) full Gen Ed Classroom bays per floor Total: 16
- Adds (1) Science Lab and (1) Prep Room per floor Total: 4/4
- Adds an egress stair at end of wing
- Allows space for exit from internal egress stair
- Includes internal zone for support space, toilets

- Additional Capacity: **552 students**
- Total Capacity at 85% Utilization: **3,177 students (target + 177 or +6%)**



10,080sf per floor

LEVEL 3

Building Floor Plan Review / Future expansion GSF

Potential Future Conversion to Dining for 200 Students (600/3 seatings)

Displaces 4 classroom bays or 92 students – may be offset in Wing B expansion options

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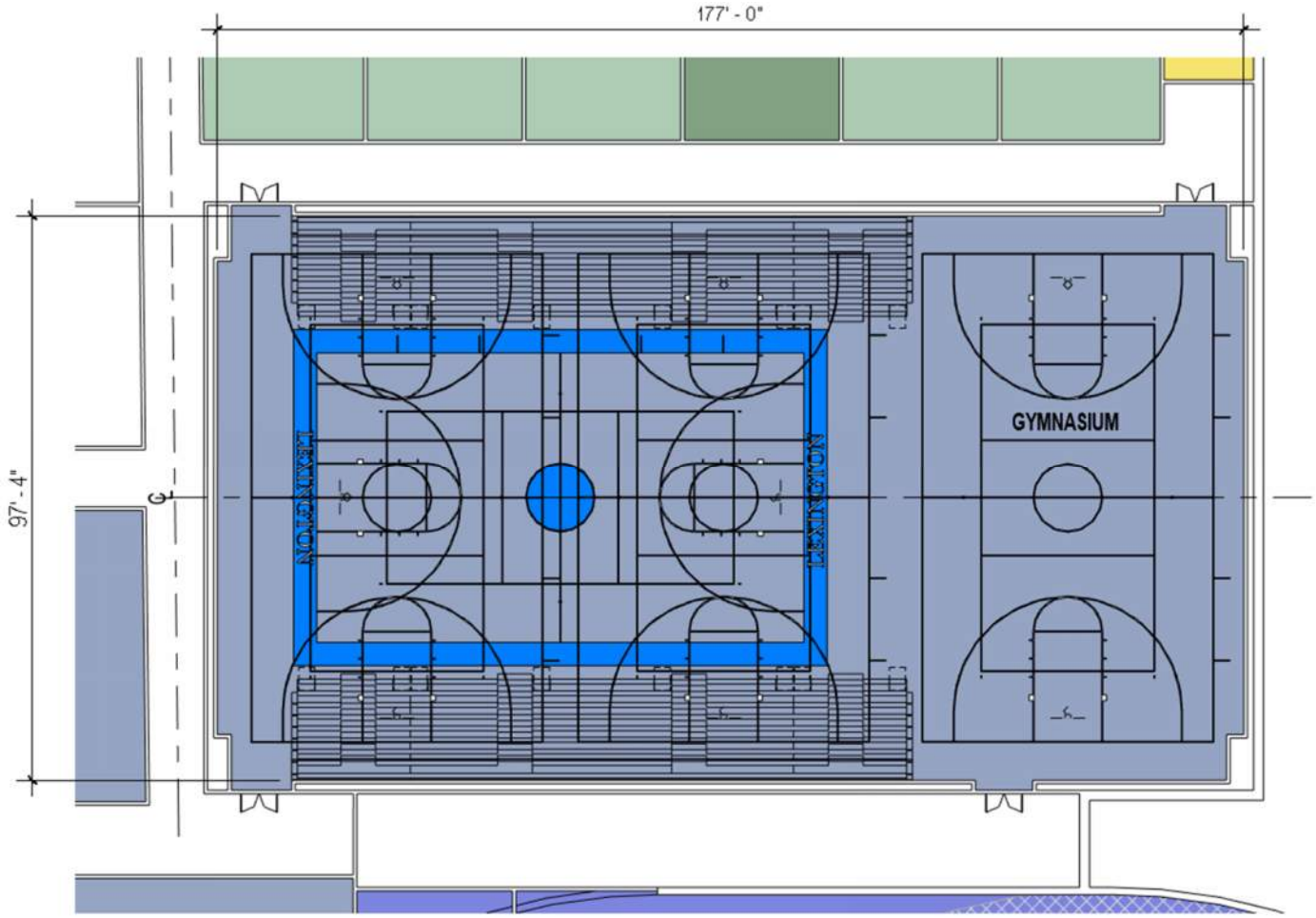
Confirm Bleacher Seat Count

Option 1

Bleachers off-center
from competition court

All doors at side walls

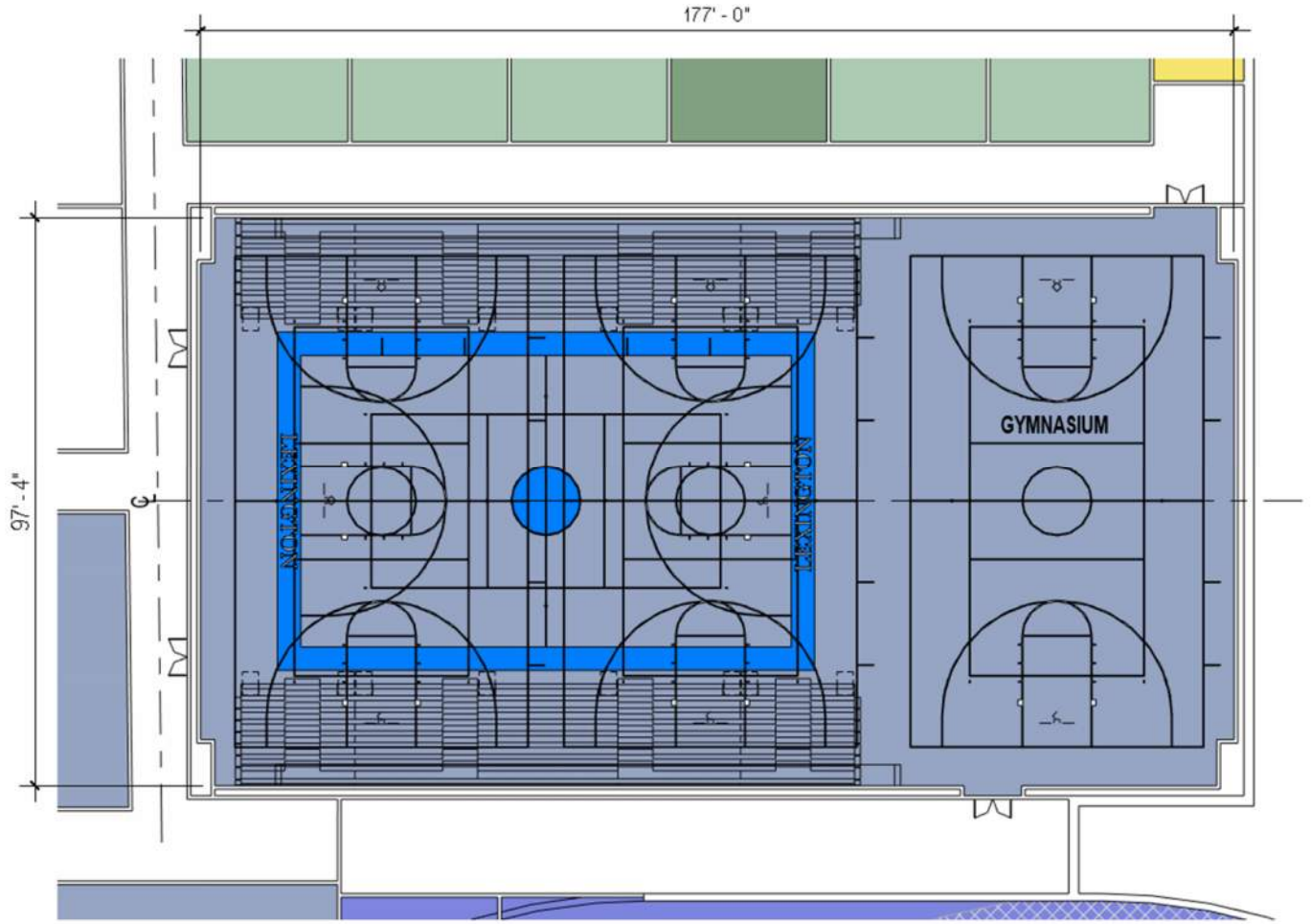


Confirm Bleacher Seat Count

Option 2

Bleachers centered on competition court

Main entry doors at end wall



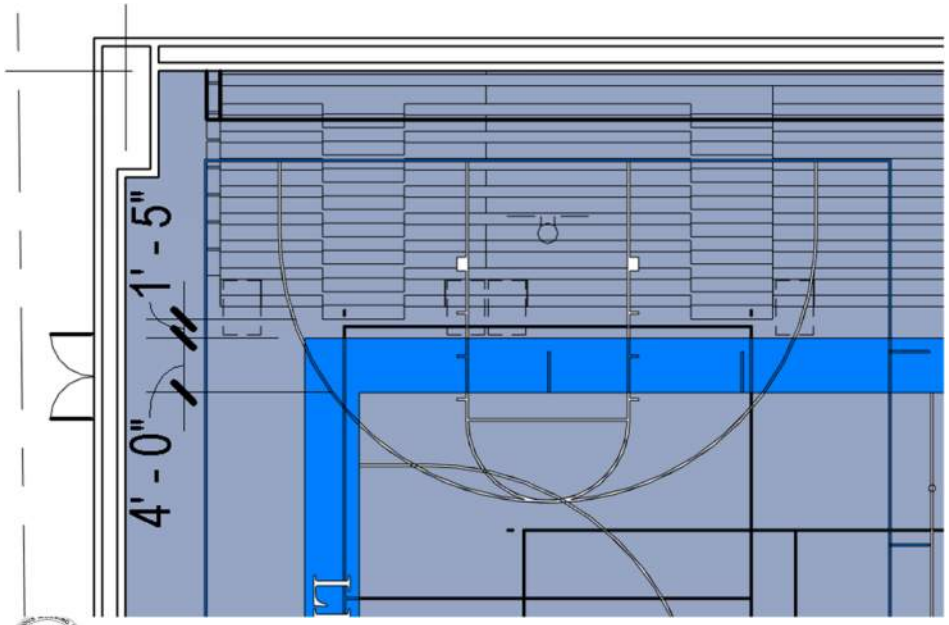
Confirm Bleacher Seat Count

CONFIRM

1,068 Seats on 9 tiers

1’-5” from outer edge of sideline to edge of bleacher steps

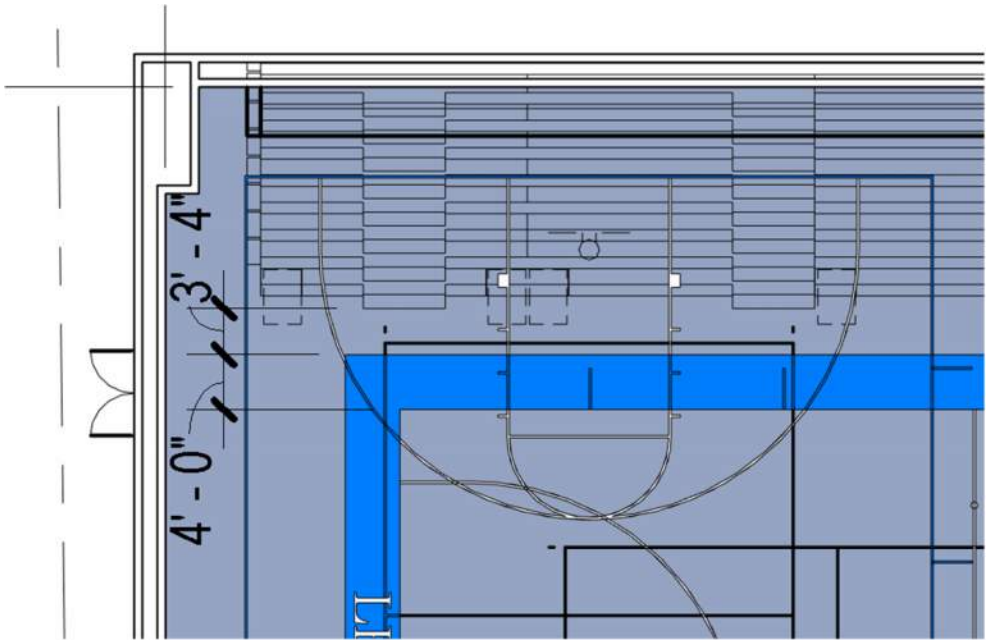
4’-0” sideline



1,016 Seats on 8 tiers

3’-4” from outer edge of sideline to edge of bleacher steps

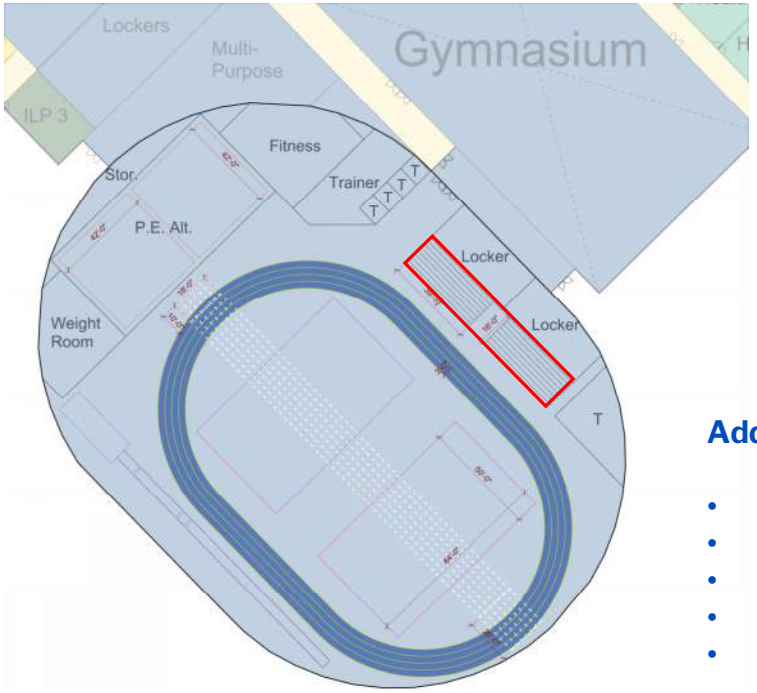
4’-0” sideline



Confirm Bleacher Seat Count

CONFIRM

	Option C/D.1
Const. Cost Option C Option D	$45,753,000/ $43,470,000
Footprint	48,000 GSF
Track Size	146m
Lane Count	4
Straightaway Length	55m
Multipurpose Courts	2-3
Bleacher Count	400
Weight Room	1,200 sf
PE Alternative	3,500 sf



Additional Program:

- Fitness Room – 1,600 sf
- Locker Rooms - (2) 900 sf
- Trainer's Room – 1,000 sf
- Toilets – 800 sf
- Storage – 700 sf

1. 3 courts possible if overlapping track
2. Increased PE Alt. size from 3,300 sf existing
3. Increased Weight room size from 679 sf existing
4. All new roof structure allows for goals, wrestling mats, batting cage, etc. to be hung from rafters

Decide Between 146M or 200M Track in Field House

CONFIRM

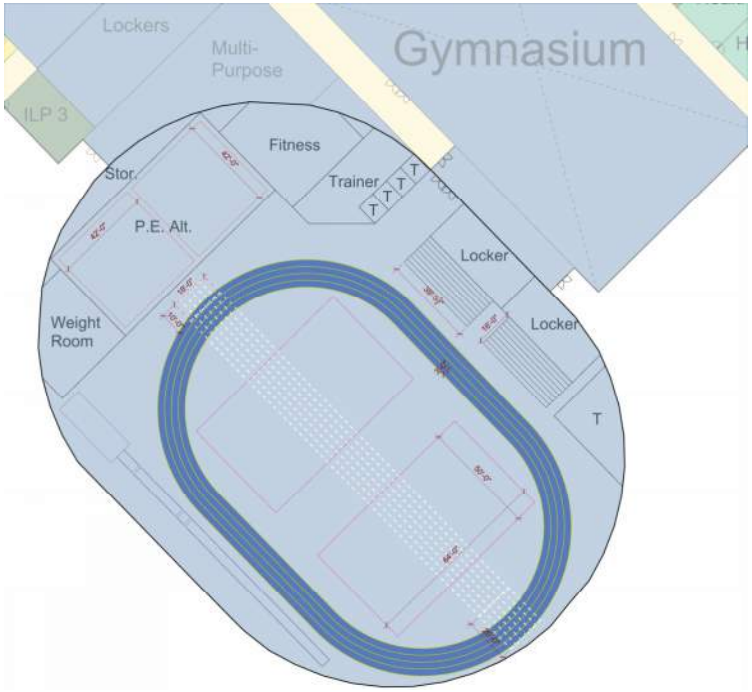
Field House Programming Meeting Takeaways:

1. Safety is a major concern and should be considered as part of every decision
2. Providing space for programs that don't have sufficient space in the existing field house (i.e. trainers, weight room, cheer, etc.) is a priority
3. Flexibility of space to accommodate the number of different groups utilizing the field house is a priority
4. Strong preference for 146-meter track from athletics coaches and trainers. Track coaches still preferred a 200m track.
5. Unanimous preference for 146-meter track among athletic director, principal, PE coordinator, and recreation dept.
6. Track coach requested consideration of a banked track if 146-meter track is pursued.
7. A few individuals expressed a preference for Option B (trainers and AD) as it would compartmentalize uses in a way that would enhance safety, scheduling and monitoring.

Decide Between 146M or 200m Track in Field House

CONFIRM

146m Track



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Additional Program w/ 146m Track Option:

- Fitness Room – 1,600 sf
- Locker Rooms - (2) 900 sf
- Trainer's Room – 1,000 sf
- Toilets – 800 sf
- Storage – 700 sf

200m Track

1. PE Alt. located within track footprint shows overlay of (2) regulation 42'x42' wrestling mats
2. All new roof structure allows for goals, wrestling mats, batting cage, etc. to be hung from rafters

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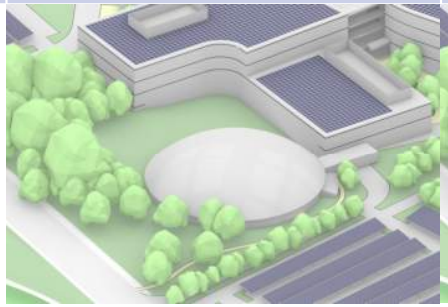
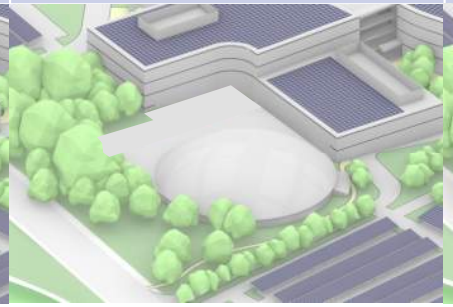
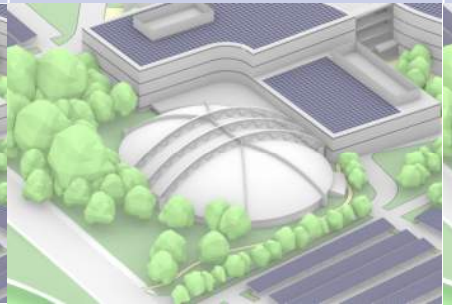
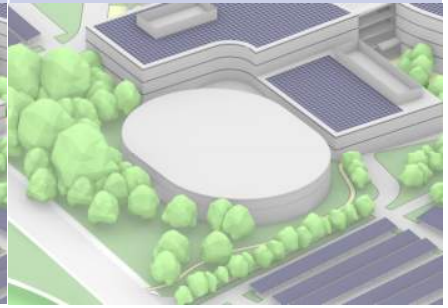
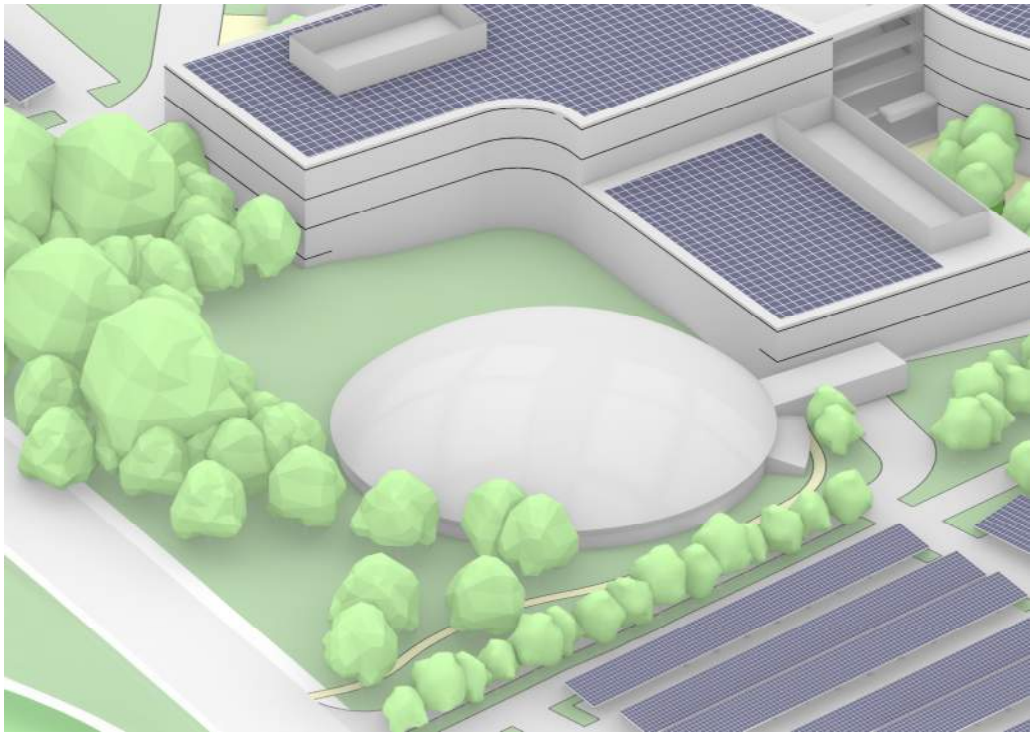
CONFIRM

	Option A	Option B	Option C	Option D
Project Cost	$26,625,000	$42,625,000	$57,191,000	$54,338,000
Footprint	34,400 GSF	48,000 GSF	48,000 GSF	48,000 GSF
Approach	Renovation	Reno + Addition	Reno + Addition	Reno + Addition
				

Field House Scope & Constructability

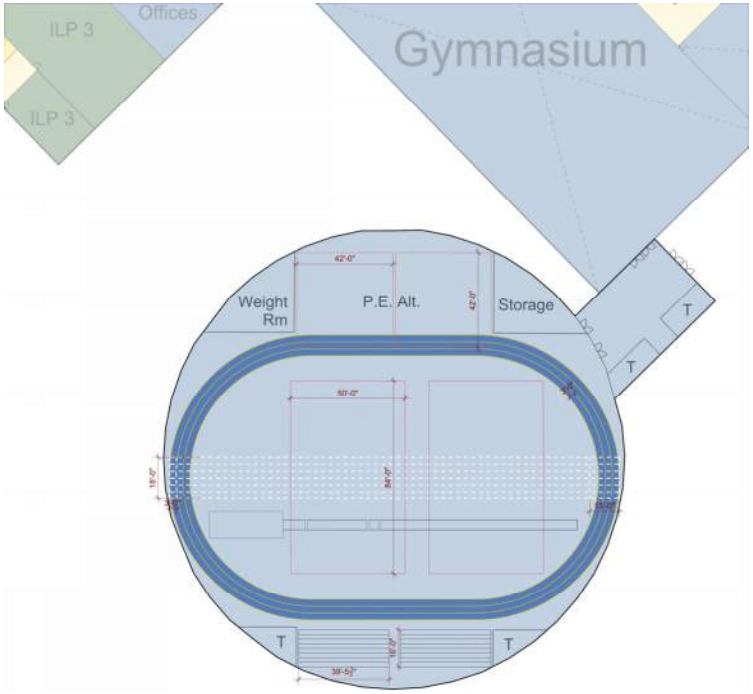
- **Option A: Renovation Only** (34,400 GFA)



- New slab on grade
- New exterior enclosure:
  - Brick veneer cavity wall
  - 8” Mineral Wool Insulation
  - AVB on existing concrete walls
  - Triple-pane clerestory glazing
  - New HM doors
  - Membrane roofing on 10” insulation
- New MEP systems
- New lighting and PA systems
- (2) new scoreboards
- Retractable bleachers for 400 seats
- Interior finishes: Resilient athletic flooring, rubber flooring at PE Alt and Weight Room, wall paint and wall pads

Option A/ Renovation Only

	Option A
Project Cost	$26,625,000
Footprint	34,400 GSF
Track Size	146m
Lane Count	3
Straightaway Length	55m*
Multipurpose Courts	2-3
Bleacher Count	400 shown
Weight Room	679 sf
PE Alternative	3,300 sf



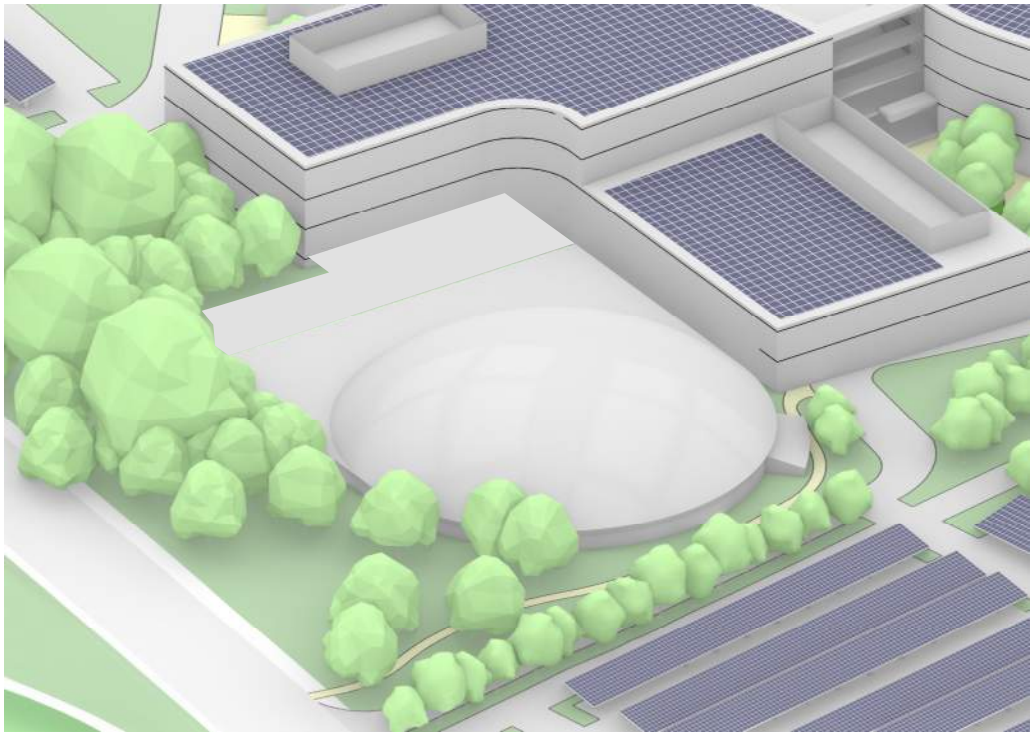
Additional Program:

- Toilets
- Storage

1. Minimum safe run-out length to be determined. Drawing shows only 13' with 55m straight track*
2. 4 lanes possible if using less than regulation radius.
3. 3 courts possible if overlapping track and portable long jump pit
4. PE Alt room does not accommodate (2) regulation 42'x42' wrestling mats
5. Existing roof structure does not allow for goals, wrestling mats, batting cage, etc. to be hung from rafters
6. Slight increase of storage and toilet space possible

Field House Scope & Constructability

- **Option B: Renovation + Addition** (48,000 GFA)
  - Renovate existing 34,400 GFA Field House
  - Add 13,600 GFA New Construction Addition on Grade with Flat Roof



- New slab on grade
- New exterior enclosure on existing Field House same as Option A.
- Addition to be steel framing with same exterior enclosure on 6” metal studs and sheathing.
- Expansion joint between Field House and School
- New MEP systems
- New lighting and PA systems
- (2) new scoreboards
- Retractable bleachers for 400 seats
- Interior finishes: Resilient athletic flooring, rubber flooring at PE Alt and Weight Room, wall paint and wall pads

Option B / Renovation + Addition

- Renovate existing 34,400 GFA Field House
- Add 13,600 GFA New Construction Addition on Grade with Flat Roof

	Option B
Project Cost	$42,625,000
Footprint	48,000 GSF
Track Size	146m
Lane Count	3
Straightaway Length	55m
Multipurpose Courts	2-3
Bleacher Count	400
Weight Room	1,600 sf
PE Alternative	3,500 sf

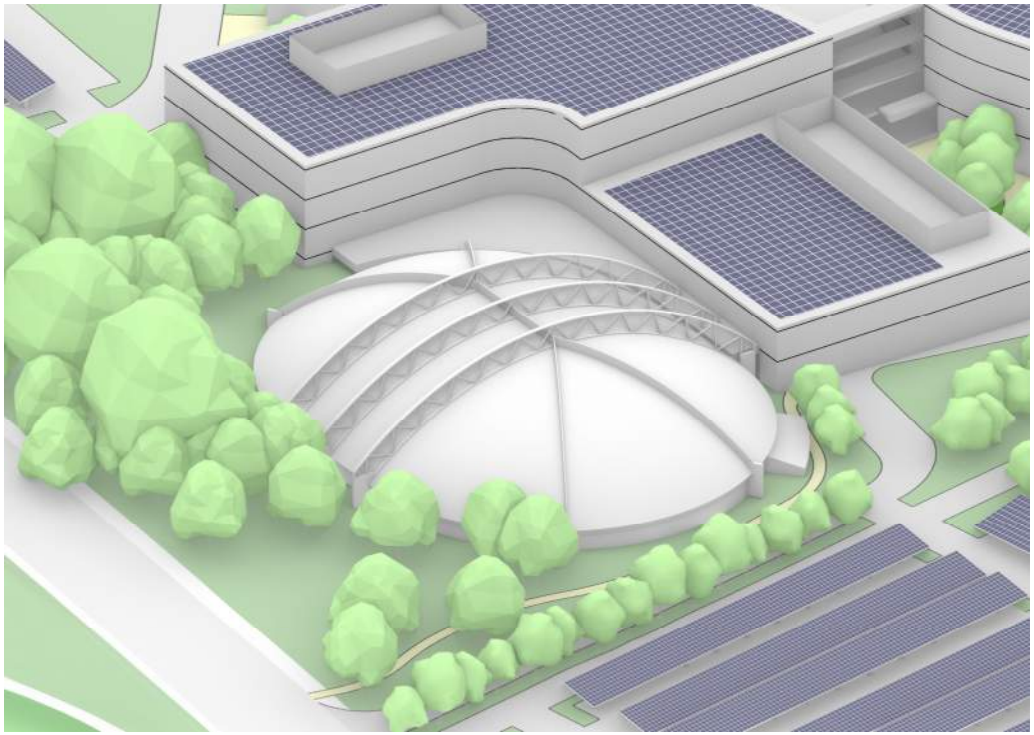
Additional Program:

- Fitness Room – 1,600 sf
- Locker Rooms - (2) 1,500 sf
- Trainer's Room – 1,900 sf
- Toilets – 1,000 sf
- Storage – 1,700 sf

1. Minimum safe run-out length to be determined. Drawing shows only 13' with 55m straight track*
2. 3 courts possible if overlapping track and portable long jump pit
3. Increased PE Alt. size from 3,300 sf existing
4. Increased Weight room size from 679 sf existing
5. Existing roof structure does not allow for goals, wrestling mats, batting cage, etc. to be hung from rafters

Field House Scope & Constructability

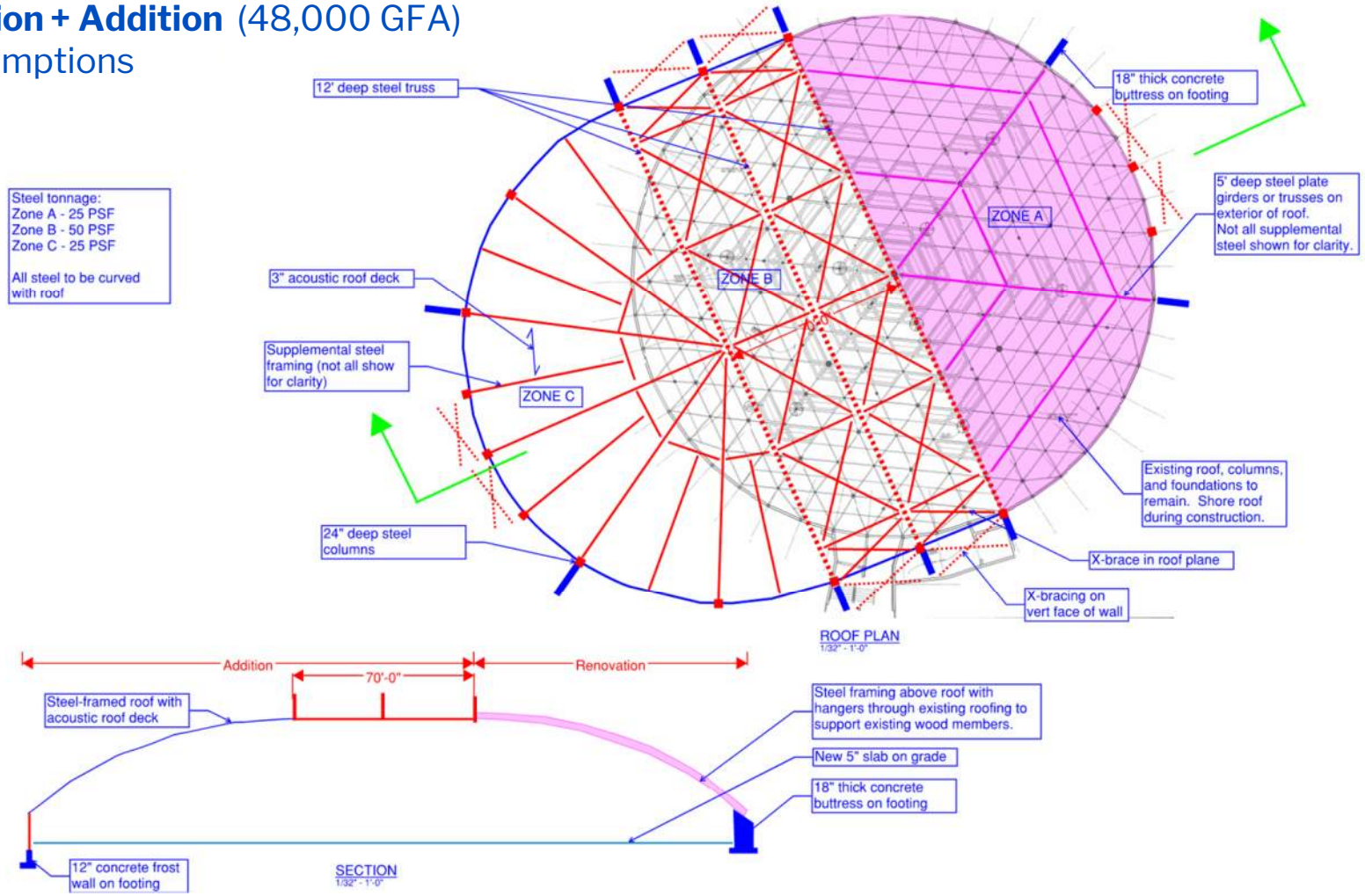
- **Option C: Renovation + Addition** (48,000 GFA)
  - Renovate half of existing 34,400 GFA Field House
  - Add 30,800 GFA New Construction Addition to Extend Domed Roof



- New slab on grade
- New exterior enclosure on existing Field House similar to Option A. Backup wall at expanded areas to be 8" CMU.
- New roof structure
- Existing dome structure requires temporary shoring
- Expansion joint between Field House and School
- See following slide for Structural assumptions

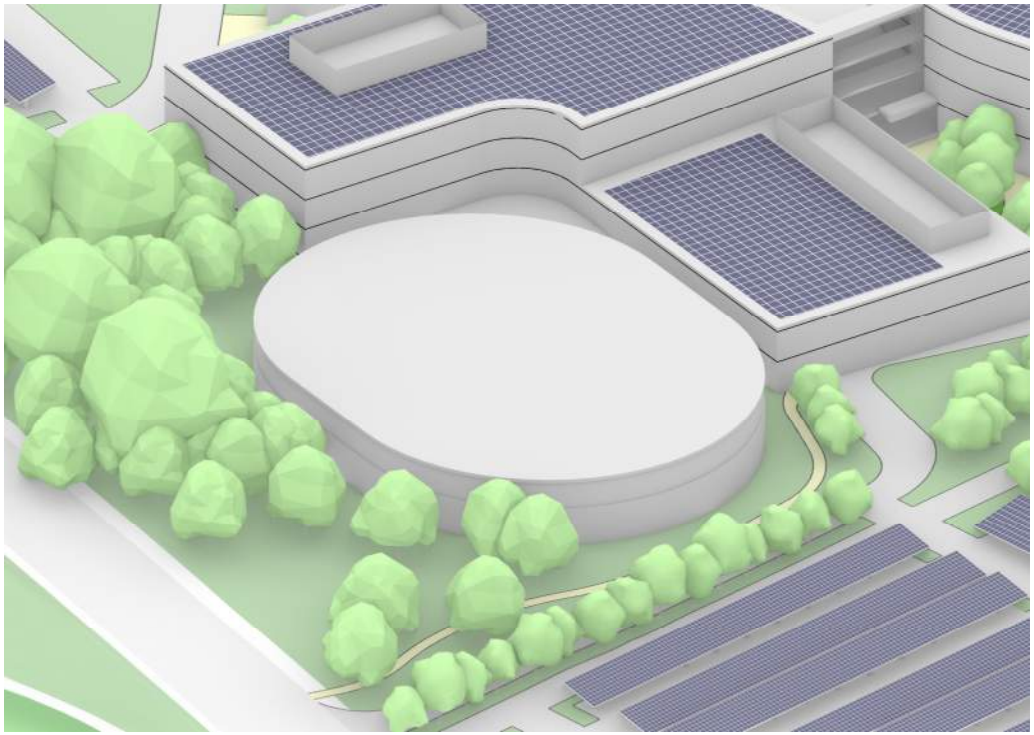
Field House Scope & Constructability

- **Option C: Renovation + Addition** (48,000 GFA)
  - Structural Assumptions



Field House Scope & Constructability

- **Option D: Renovation + Addition** (48,000 GFA)
  - Retain half of existing Field House foundations
  - Extend Building to enclose 48,000 GFA, similar to Option C, but with Flat Roof

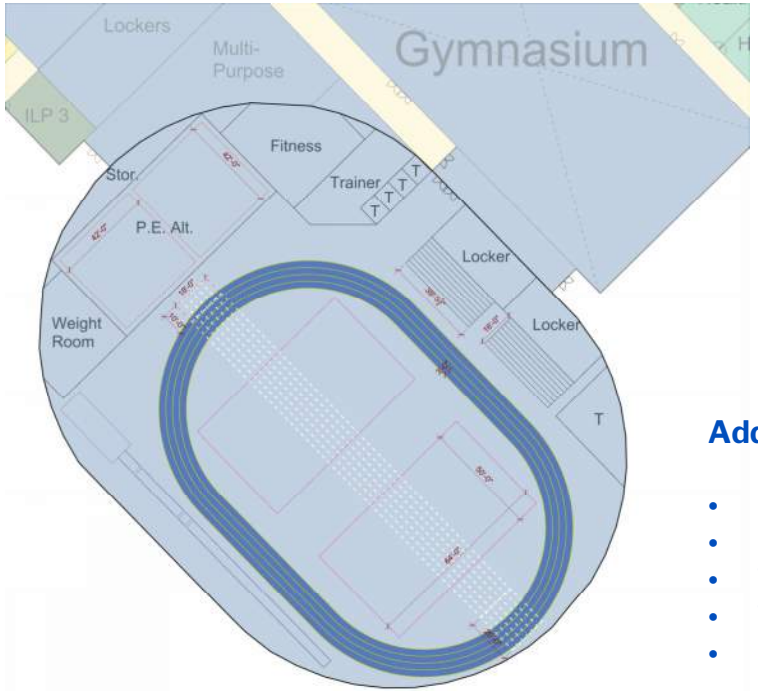


- New slab on grade
- New exterior enclosure same as Option A, with 8” CMU backup at new walls
- New roof structure with 10’ deep steel trusses spaced at 12’ o.c.
- Existing dome structure requires temporary shoring
- Expansion joint between Field House and School
- See following slide for Structural assumptions

Option C.1 & D.1 / Renovation + Addition

- Retain half of existing Field House foundations
- Extend Building to enclose 48,000 GFA, Option D similar to Option C, but with Flat Roof

	Option C/D.1
Project Cost Option C Option D	$57,191,000/ $54,338,000
Footprint	48,000 GSF
Track Size	146m
Lane Count	4
Straightaway Length	55m
Multipurpose Courts	2-3
Bleacher Count	400
Weight Room	1,200 sf
PE Alternative	3,500 sf



Additional Program:

- Fitness Room – 1,600 sf
- Locker Rooms - (2) 900 sf
- Trainer's Room – 1,000 sf
- Toilets – 800 sf
- Storage – 700 sf

1. 3 courts possible if overlapping track
2. Increased PE Alt. size from 3,300 sf existing
3. Increased Weight room size from 679 sf existing
4. All new roof structure allows for goals, wrestling mats, batting cage, etc. to be hung from rafters

Option C.2 & D.2 / Renovation + Addition

- Retain half of existing Field House foundations
- Extend Building to enclose 48,000 GFA, Option D similar to Option C, but with Flat Roof

	Option C.2/D.2
Project Cost Option C Option D	$57,191,000/ $54,338,000
Footprint	48,000 GSF
Track Size	200m
Lane Count	4
Straightaway Length	55m
Multipurpose Courts	3-4
Bleacher Count	400
Weight Room	None
PE Alternative	Area within track

1. PE Alt. located within track footprint shows overlay of (2) regulation 42'x42' wrestling mats
2. All new roof structure allows for goals, wrestling mats, batting cage, etc. to be hung from rafters

Mass Timber / Town Questions

Q1: Acoustics seem to be a big issue (i.e. noise transfer between spaces)

A: Mass timber floor assemblies: typically lower Noise Reduction Coefficient (NRC) rating vs. standard concrete floor on metal deck:

- Gypcrete topping with an acoustical underlayment included at to match the NRC of a concrete on deck floor.
- Gypcrete and underlayment already accounted for in the estimated project costs for mass timber.

Q2: Do the costs account for the amount of the newly exposed infrastructure and what that may mean in terms of needed mitigation (i.e. fireproofing, aesthetics). Are there savings or adds there?

A: Costs and visuals:

- The added costs for mass timber account for the fireproofing reduction savings.
- Exposed MEP infrastructure: assuming program spaces may still have a finish ceiling, while feature spaces and possibly hallways expose the mass timber structure.
- Strategic use of ceiling clouds or finished enclosures for mechanical equipment to be considered, pending cost impacts

Q3: Can embodied carbon be presented in a measurable, easy to understand unit. Compared to 1 year of current school emissions for example?

A: A comparative impact may be provided.

- Embodied carbon is measured in carbon dioxide equivalent (kgCO2eq) over a 30-year life cycle.
- Operational carbon (school emissions) are annual. They may be accumulated over 30 years for the purpose of the comparison.

Mass Timber / Town Questions

Q4: What are the warranties, life cycle costs, and maintenance requirements?

A:

- Warranties vary by manufacturer but generally covers the structural integrity of the projects.
- Life cycle costs: recent studies concluded that wood buildings are fully capable of having long lifespans. However, it is found that there is no relationship between structural material and average service life.
- The durability and maintenance of mass timber will vary based on exposure. There are options for coatings that can be used for greater durability and longevity.

Q5: Are there any savings if finishes are not needed where mass timber would remain exposed?

A: See response to question #2 on the previous slide for exposed ceiling design approach

- Exposed mass timber assumes a $15/sf savings, not including potential costs such as acoustic clouds or fabric panels.

Q6: What is the base cost of steel/concrete versus mass timber?

A:

- Steel and concrete structure: $24,636,380, plus the $2,186,389 spray and intumescent fireproofing totals to $26,822,769.
- Mass timber structure incremental costs:
  - Option A – all mass timber: $24,000,000 incremental costs.
  - Option B – Hybrid (steel columns): $19,000,000
  - Option C – Gym/Dining/Media only: $2,000,000

Mass Timber / Town Questions

Q: Where does the mass timber come from? What country? (i.e. tariffs)?

A: Mass Timber is mostly sourced in the U.S. and Canada. Both Eastern and Western forests of each country provide for mass timber.

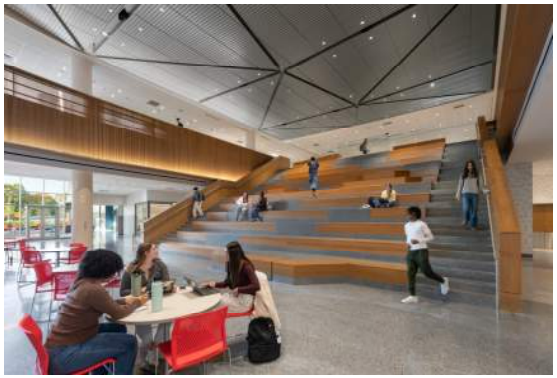
- When considering embodied carbon, it would be best to source from the Eastern Forests, as the Western Forests Timber imposes higher transportation carbon emissions.
- The potential tariffs on the Canadian wood, in addition to the already existing tariffs, will have costs impact.
- Conversely, the higher demand on the sourced U.S. timber may trigger higher costs on US sourced timber.
- Steel and aluminum will also be subject to tariffs. Similar to wood, U.S. steel/aluminum production demand will increase, with the likeliness of costs potentially increase across the board due to limited production capacity.

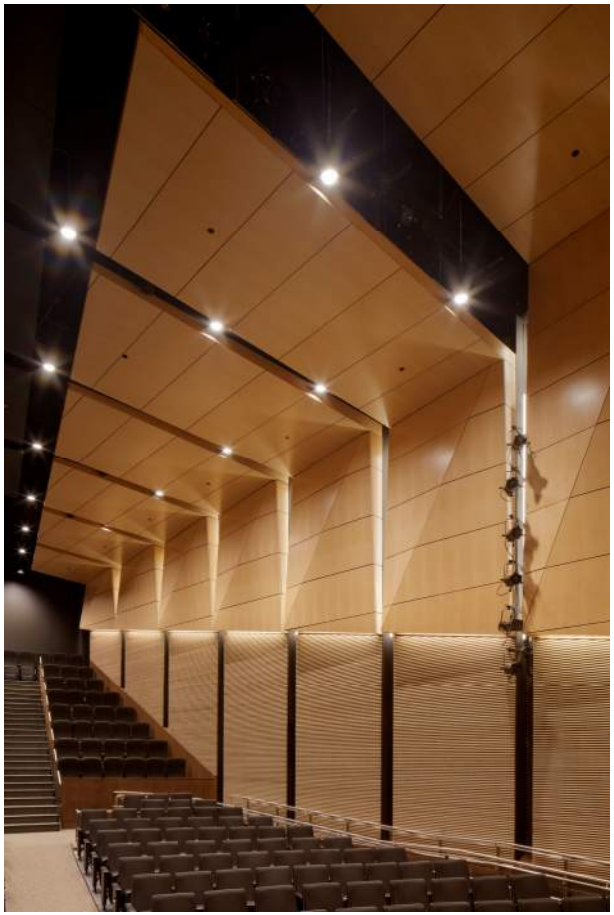
Q: Provide a cost per SF for mass timber to help potentially deciding on where it could be used in specific spaces.

A:

- The cost for a full building mass timber structure is roughly $54/sf.
- The cost for more limited usage of mass timber beams over steel columns and bracing is roughly $45/sf.

Other Wood or Wood-Look Finishes in Lieu of Mass Timber





Mass Timber vs. Structural Steel

CONFIRM

PSR Cost Estimate Considerations

Option A (Mass timber used for the entire structure)

Est. Total Project Cost = $24,000,000

Level 1

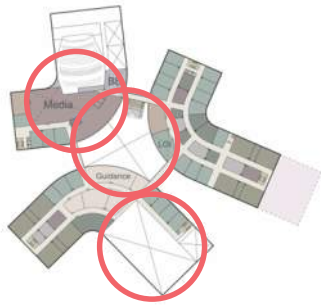
Option B (Hybrid system – all mass timber except steel used for columns)

Est. Total Project Cost = $19,000,000

Level 1

Option C (Mass timber used at the Gymnasium, Dining Commons and Media Center only)

Est. Total Project Cost = $2,000,000



Level 2

Building Floor Plan Review – confirm on 4/10

- ❑ Proposed Space Layouts
- ❑ Location & Access to Central Office
- ❑ Elevator Count, Usage Control & Roof Access
- ❑ Confirm Future expansion GSF

Programming – confirm today

- ❑ Confirm Blacher Seat Count
- ❑ Decide between 146M and 200M Track in Field House

Building Design – confirm today

- ❑ Add/Reno Field House – Scope & Constructability
- ❑ Mass Timber vs. Structural Steel

Plumbing Design – confirm today

- ❑ Confirm Battery vs. Hardwired Plumbing Fixtures

HVAC Design – confirm on 5/8

- ❑ Confirm Approach for Integrated Automation Systems

Renewable Energy – confirm on 5/8

- ❑ Location of Energy Storage Battery
- ❑ Final EV Charging Stations Quantity

smma

Confirm Battery vs. Hard Wired Plumbing Fixtures

CONFIRM

Sensor Operated Fixtures

- Hard-wired
- Battery powered

Building Floor Plan Review – confirm on 4/10

- ❑ Proposed Space Layouts
- ❑ Location & Access to Central Office
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Integrated Automation Systems

Automation Systems

- Building Management System (BMS)
- Renewable Energy Systems
- Lighting Control
- Security
- Fire Alarm
- Metering
- Smart Sensors (Halo)

Integration Approach

- BACnet/IP
- Division 25

Building Floor Plan Review – confirm on 4/10

- ❑ Proposed Space Layouts
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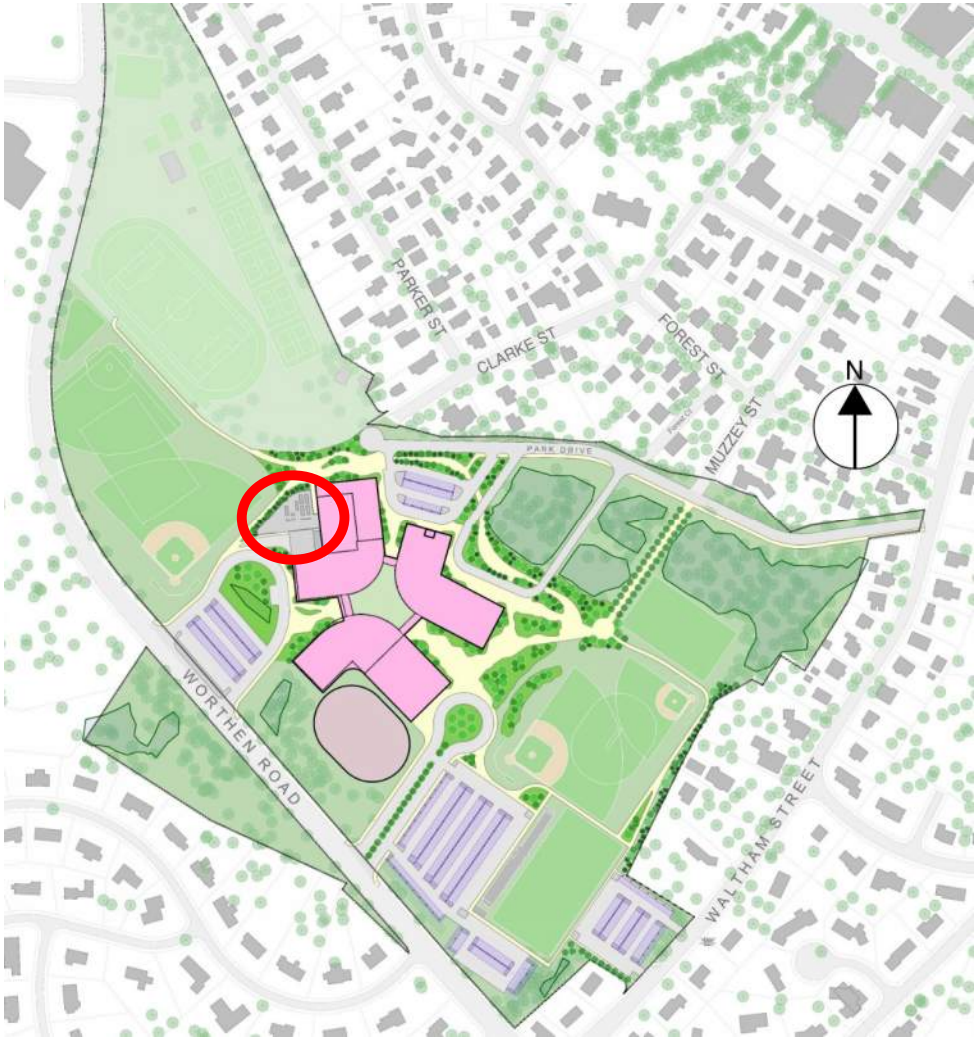
Location of Energy Storage Battery

List of Equipment

- Utility Interconnection Switchgear
- Microgrid Switchboard
- Diesel Generator(s)
- Power Transformer(s)
- Battery Energy Storage System(s)



Final Electric Vehicle (EV) Charging Station Quantity – Evaluating Requirements and Net Zero Impact

EV Charging Vehicles

- Lexington Policy: 4% Installed, 50% Ready
- LEED / MA Building Code: 2% Installed, 10% Ready
- Total Parking Spots [5]: 500 Parking (New Program) / 469 Parking (Existing Program)

Scaling [1]	EV Parking Spaces	EV Chargers	Annual Energy Usage [2]	Increase to Building Energy Usage	Additional Solar Required [3]	EV + PV Cost Increase [4]
4%	20	10	**26,730 kWh**	--	--	
10%	50	25	**66,825 kWh**	+ 2%	+ 3%	$ 629,571.43
20%	100	50	**133,650 kWh**	+ 4%	+ 6%	$ 1,259,142.86
30%	150	75	**200,475 kWh**	+ 6%	+ 9%	$ 1,888,714.29
40%	200	100	**267,300 kWh**	+ 8%	+ 12%	$ 2,518,285.71
50%	250	125	**334,125 kWh**	+ 10%	+ 15%	$ 3,147,857.14

Note:

1. **The baseline 4% installation is already accounted for in the project budget and energy modeling assumptions.**
2. **Values are based on MA DOER data, assuming typical milage per day, EV charging behavior and diversity factors.**
3. **The additional PV is based on a Net Zero Site goal. Increased solar generation will be reflected into parking canopy arrays.**
4. **Cost estimates are scaled based on last round of pricing data.**
5. **Clarification needed on bylaw intent regarding "newly constructed parking spaces."**

Thank You!