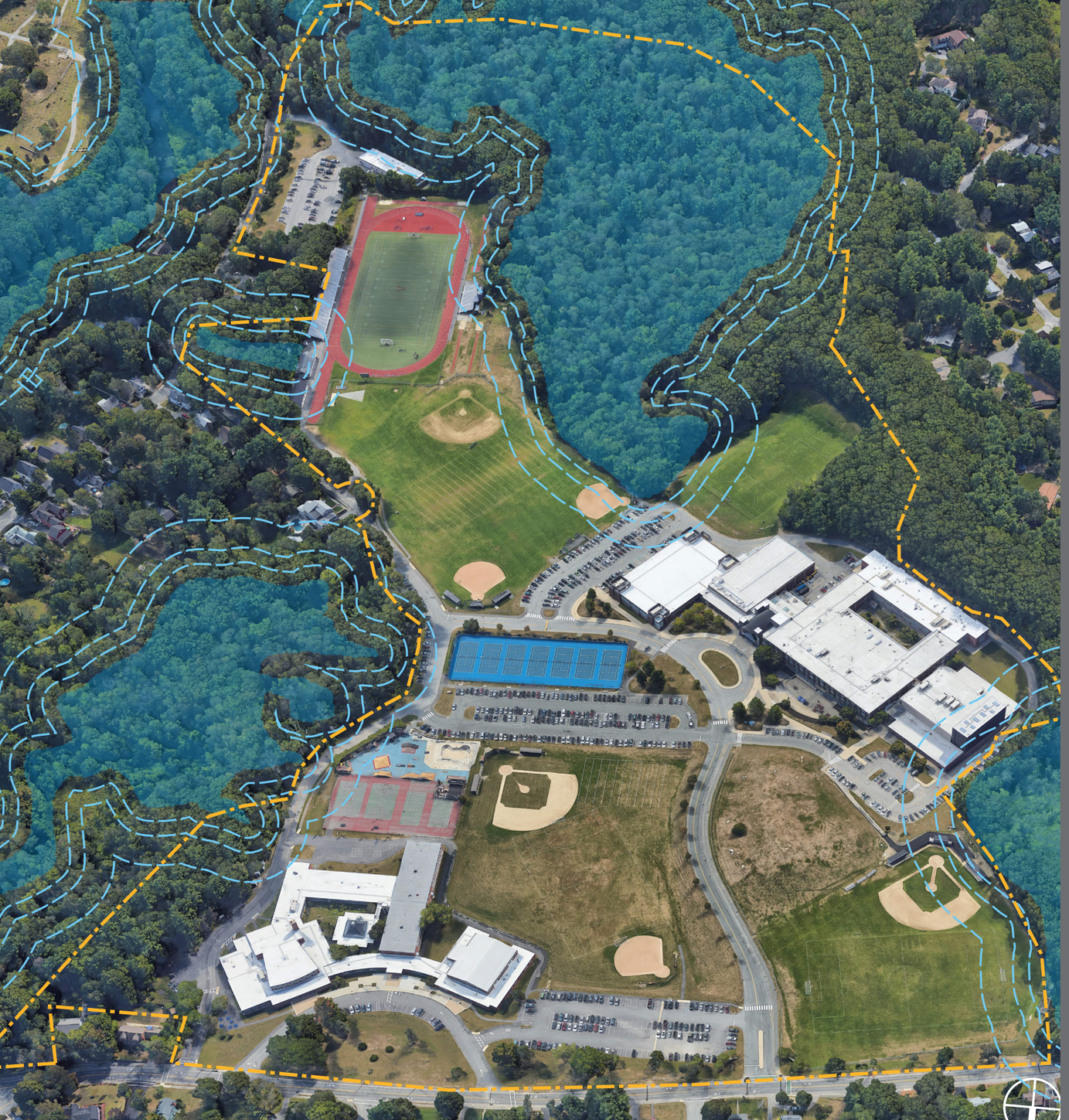


Andover High School Building Committee

September 28, 2023

HMFH ARCHITECTS

Budget summary

Dated: 09.28.2023

Total Project Budget	MSBA Cost Code	FS & SD Phase 1 Budget (Thru Sept. '23)	Billed to Date	% Complete (Phase 1)	SD Phase 2 Budget (Oct. '23 - March '24)	Total
Feasibility Study (FS) / Schematic Design (SD)						
OPM Feasibility Study / Schematic Design	0001-0000	$ 399,889	$ 359,505	89.9%	$ 125,111	$ 525,000
A&E Feasibility Study / Schematic Design	0002-0000	$ 2,012,500	$ 1,741,667	86.5%	$ 902,500	$ 2,915,000
Env. & Site	0003-0000	$ 243,195	$ 125,065	51.4%	$ 57,980	$ 301,175
Other	0004-0000	$ 18,511	$ 5,333	28.8%	$ 64,825	$ 83,336
Owner Contingency	0005-0000	$ 64,325	$ -	0.0%	$ 149,584	$ 213,909
TOTALS		**$ 2,738,420**	**$ 2,231,570**	**81.5%**	**$ 1,300,000**	**$ 4,038,420**

Matches Total Available Funds

Targeting Special Town Meeting in September 2023 for Approval of SD Phase 2 Funds

Andover High School

Space Utilization - Sep. 2023

In 2016, MGT consultants completed a space utilization report which identified that Andover High School had a space utilization rate of 117%. At that time, Andover High School had an enrollment of 1,782 students.

https://aps1.net/DocumentCenter/View/7840/2016-Comprehensive-Facility-Plan

MGT Space Utilization Report - 2016

Using the same methodology of the MGT consultants, a current space utilization analysis by AHS administration (Sep. 2023) identifies that Andover High School has a current space utilization rate of 108%. Andover High School now has an enrollment of 1,689 students, a 5% decrease since 2016. Since 2016 AHS has added additional special education and language programming, and has converted storage spaces to classrooms and offices.

Space Utilization Analysis- 2023

Summary of Spaces - Existing

Existing HS Net Square Feet

(49) General Classrooms
at an average size 790 net sf (undersized)

(16) Specialty Classrooms:
(7) Career/Tech. average 870 net sf (undersized)
(9) Art/Music average 1,200 net sf (varies)

(18) Science Classrooms
at an average size 1,000 net sf (undersized)

(19) Special Education spaces
at an average size 380 net sf (undersized)

Existing HS Gross Square Feet

Total GSF of building = 315,200 GSF

- less Field House at 30,340 GSF

- less Collins Center at 35,200 GSF

Sub-Total: SF of building = 249,660 GSF

MSBA Baseline for 1,700 Students

(8) additional classrooms
825 - 950 net sf

1,440 net sf recommended

1,200 net sf recommended

(12) additional spaces including prep rooms
1,440 net sf minimum

Double the existing space
50% of general classroom (412 net sf minimum)

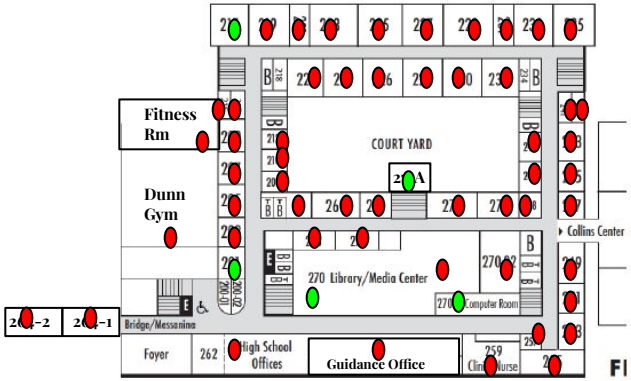
Room Usage by Period

1st Period - A Block

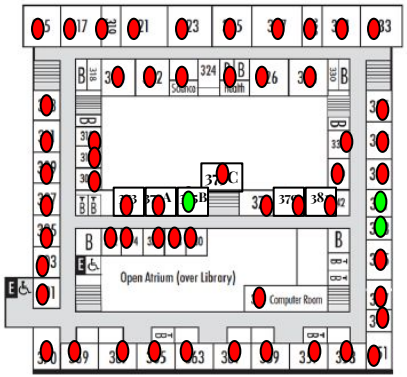
Andover High School

Building Map

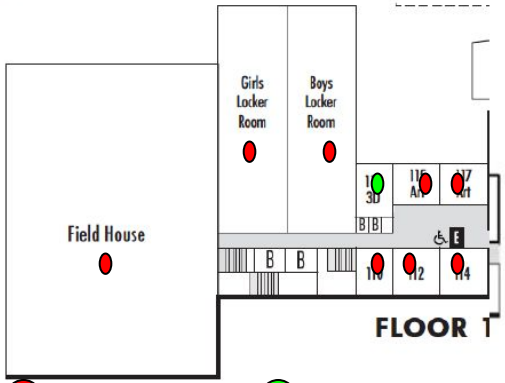
2nd Floor Map



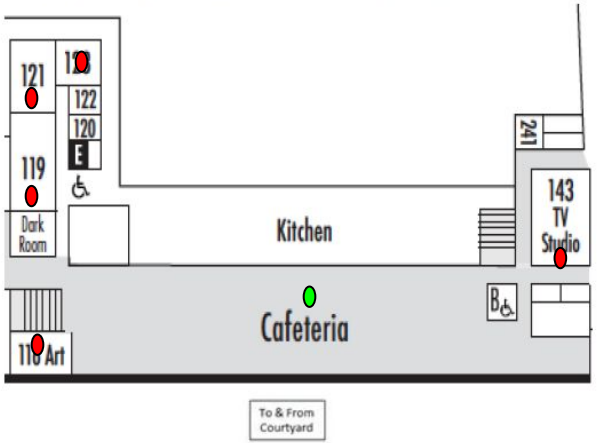
3rd Floor Map



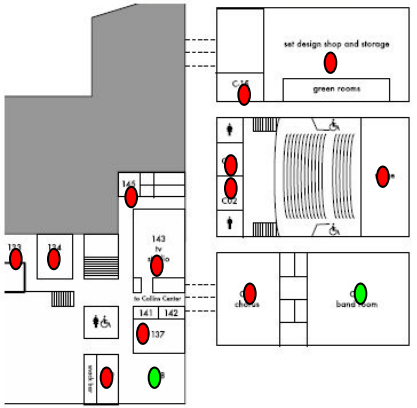
1st Floor - Fieldhouse



1st Floor - Cafeteria



1st Floor – Collins Ctr



Key: = In Use = Open

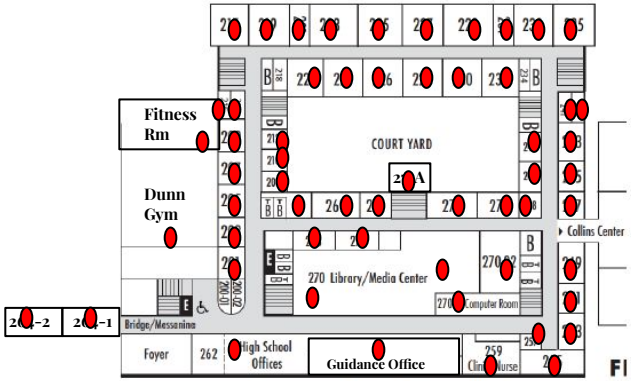
Room Usage by Period

2nd Period - B Block

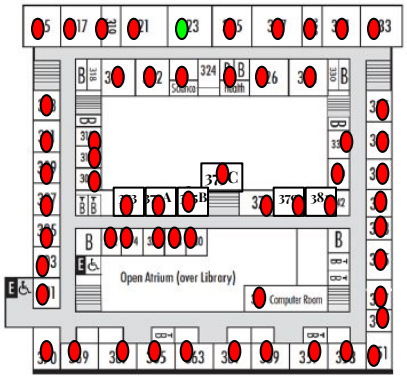
Andover High School

Building Map

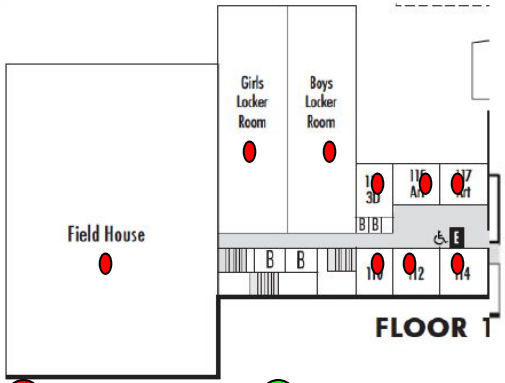
2nd Floor Map



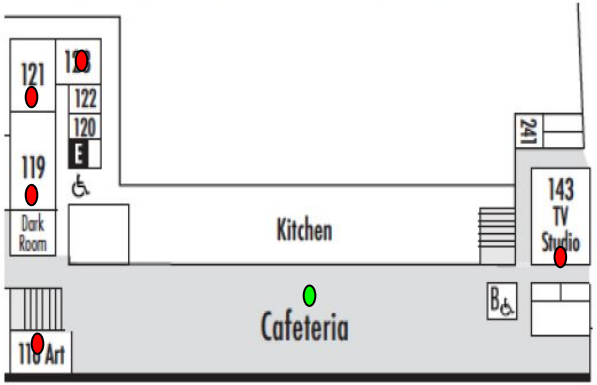
3rd Floor Map



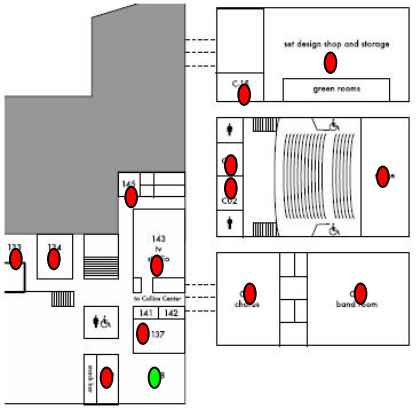
1st Floor - Fieldhouse



1st Floor - Cafeteria



1st Floor – Collins Ctr



Key: = In Use = Open

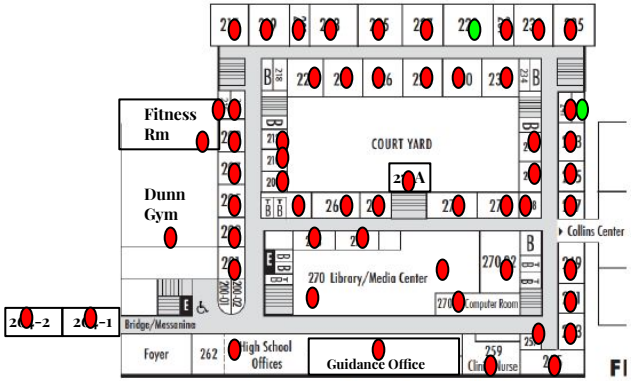
Room Usage by Period

3rd Period - C Block

Andover High School

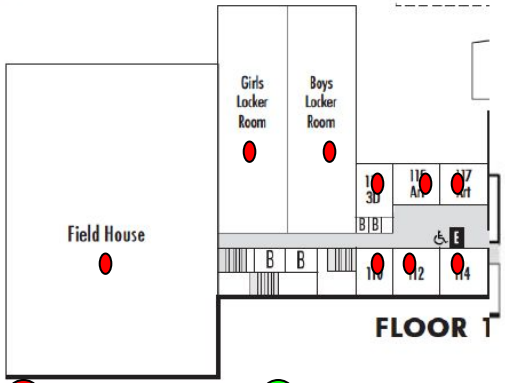
Building Map

2nd Floor Map

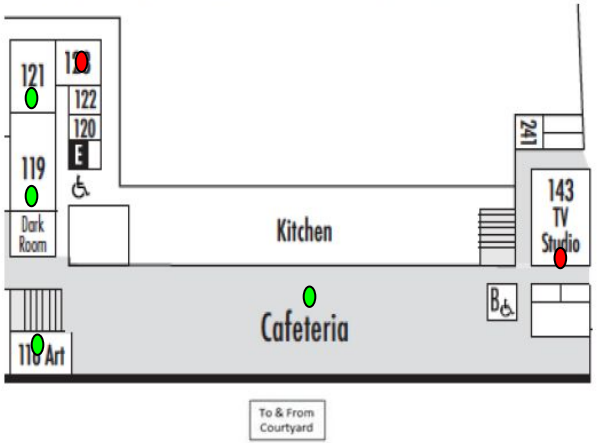


3rd Floor Map

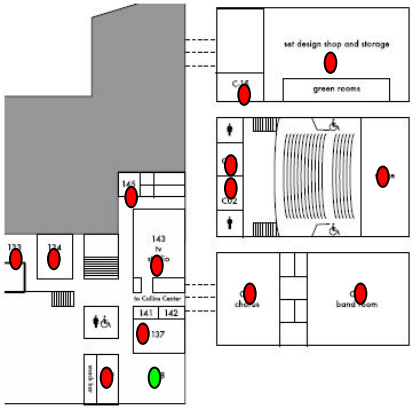
1st Floor - Fieldhouse



1st Floor - Cafeteria



1st Floor – Collins Ctr



Key: = In Use = Open

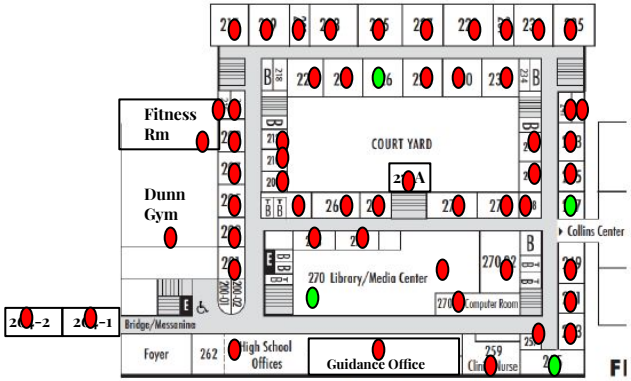
Room Usage by Period

4th Period - D Block

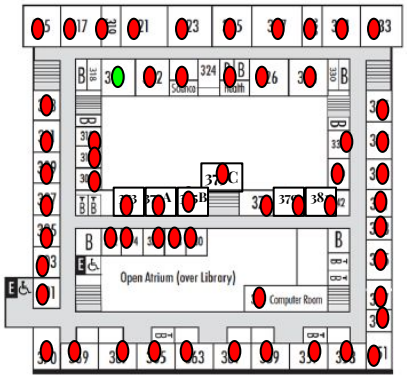
Andover High School

Building Map

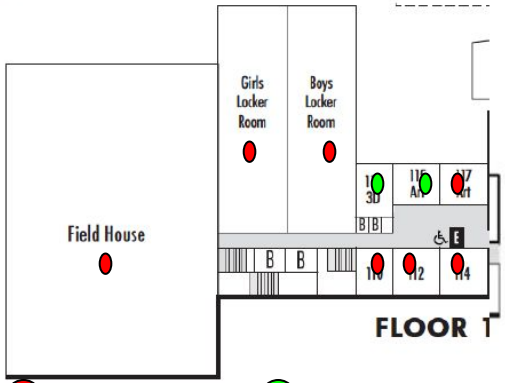
2nd Floor Map



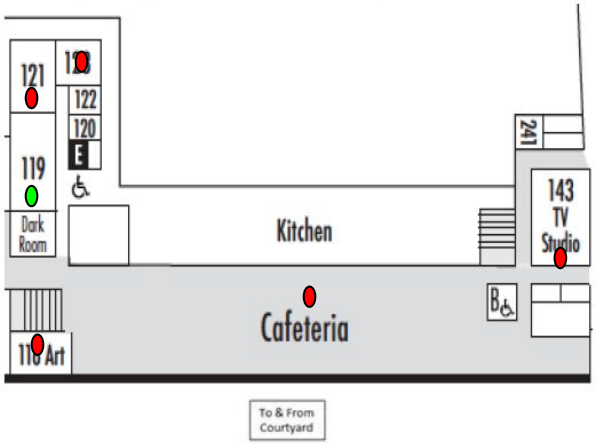
3rd Floor Map



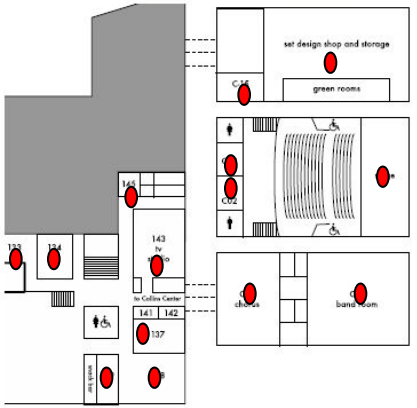
1st Floor - Fieldhouse



1st Floor - Cafeteria



1st Floor – Collins Ctr



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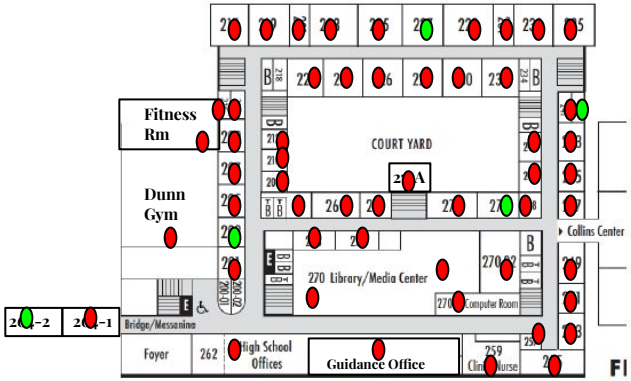
Room Usage by Period

5th Period - E Block

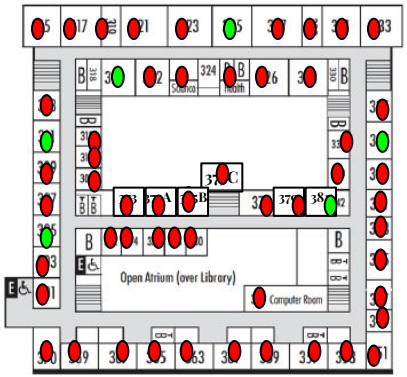
Andover High School

Building Map

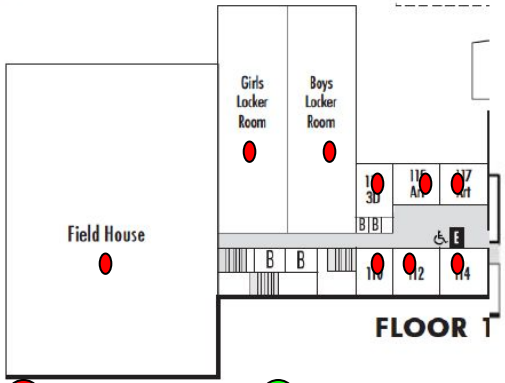
2nd Floor Map



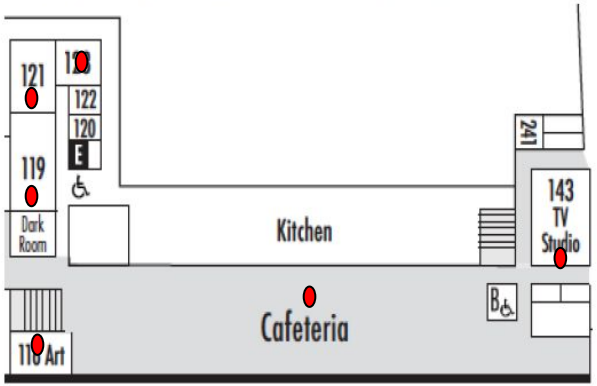
3rd Floor Map



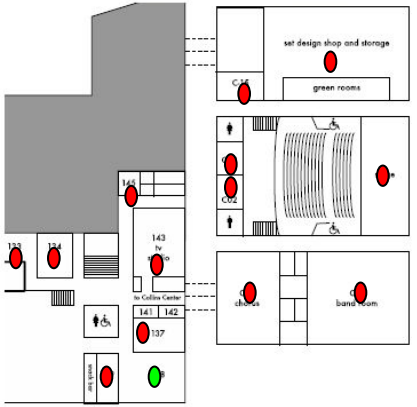
1st Floor - Fieldhouse



1st Floor - Cafeteria



1st Floor – Collins Ctr



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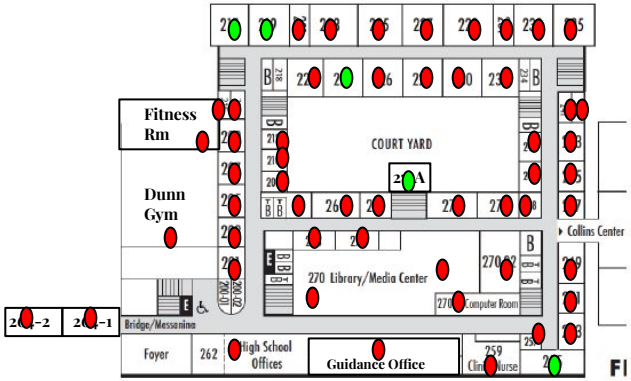
Room Usage by Period

6th Period - F Block

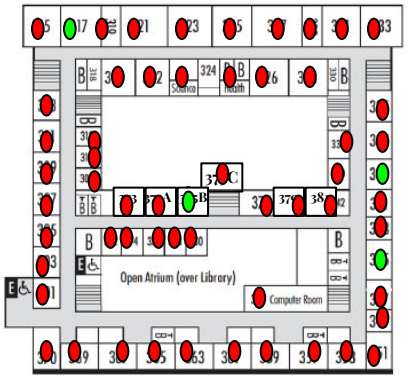
Andover High School

Building Map

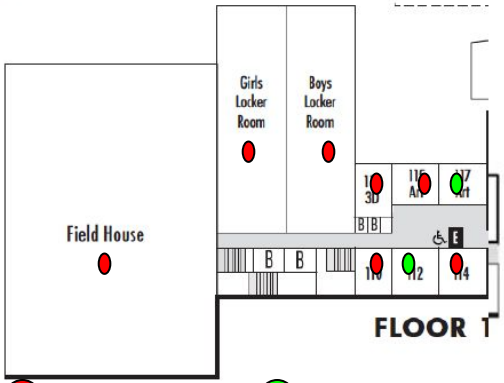
2nd Floor Map



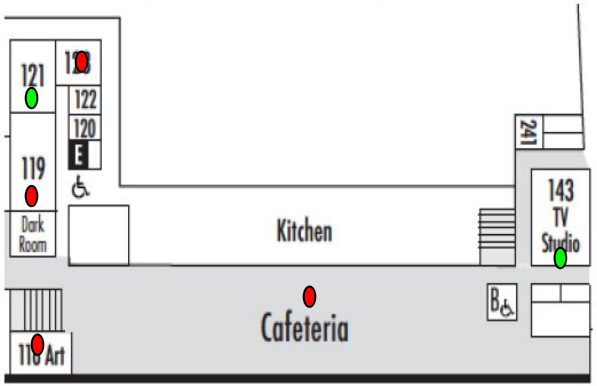
3rd Floor Map



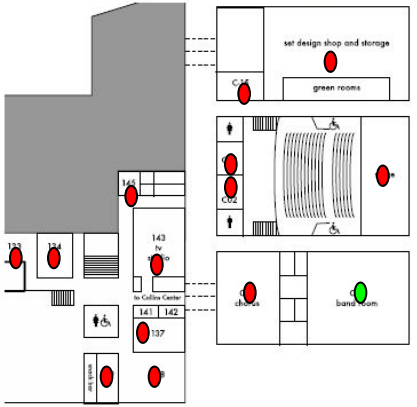
1st Floor - Fieldhouse



1st Floor - Cafeteria



1st Floor – Collins Ctr



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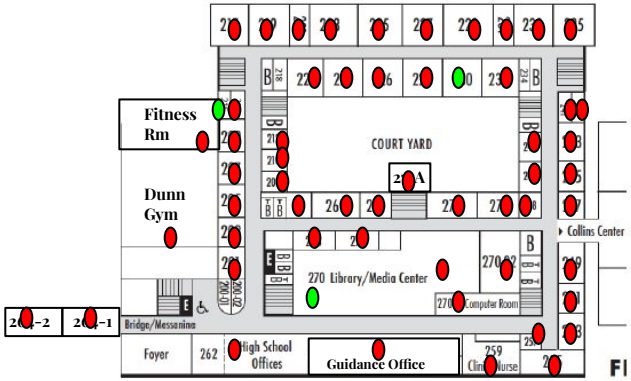
Room Usage by Period

7th Period - G Block

Andover High School

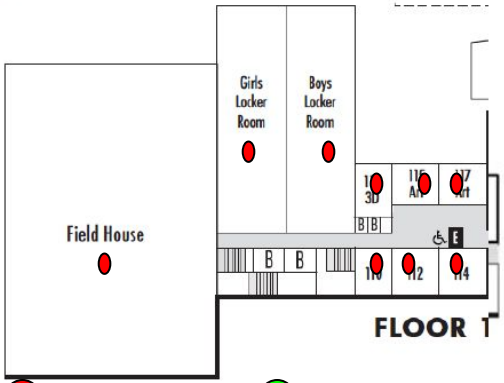
Building Map

2nd Floor Map

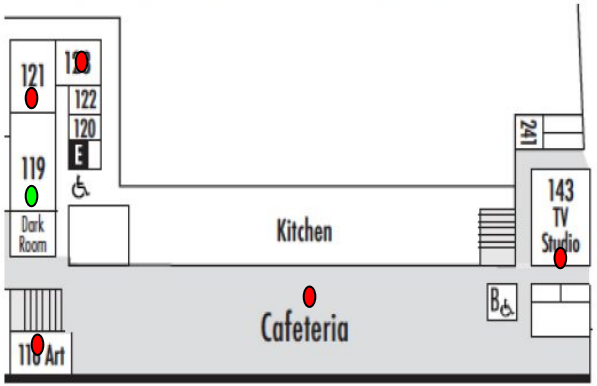


3rd Floor Map

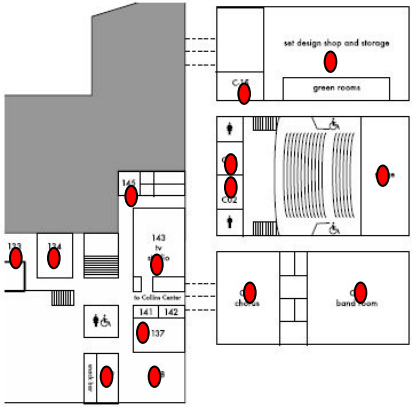
1st Floor - Fieldhouse



1st Floor - Cafeteria



1st Floor – Collins Ctr



Key: 🔴 = In Use 🟢 = Open

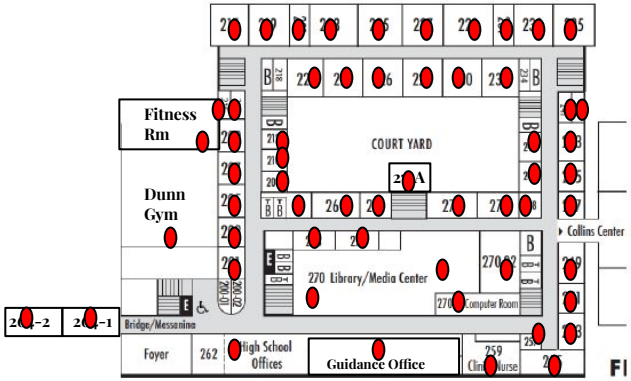
Room Usage by Period

8th Period - H Block

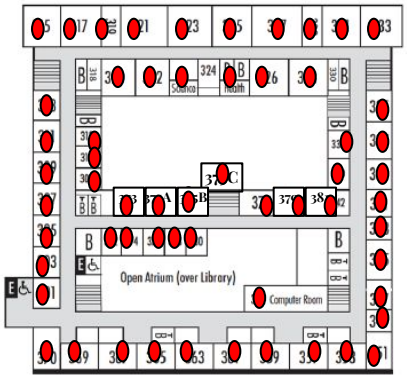
Andover High School

Building Map

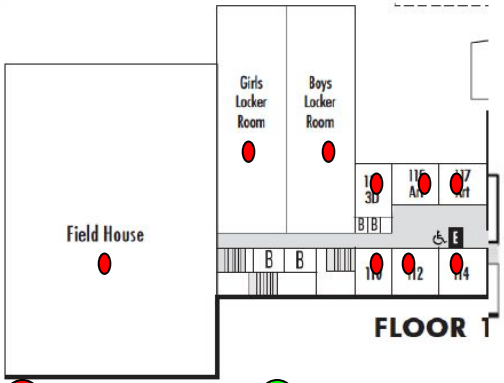
2nd Floor Map



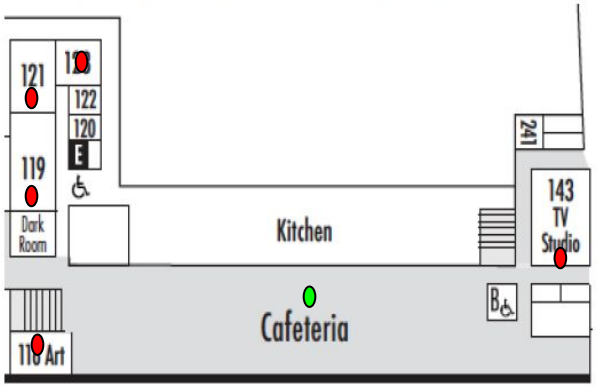
3rd Floor Map



1st Floor - Fieldhouse



1st Floor - Cafeteria



1st Floor – Collins Ctr

Key: ● = In Use ● = Open

Converted Spaces

Storage / Office to

Special Education Program

(375C)

Converted Spaces

Subdivision of Classroom to create two special education classrooms

(375B)

Converted Spaces

Subdivision of Larger Classroom to create two special education classrooms

(379)

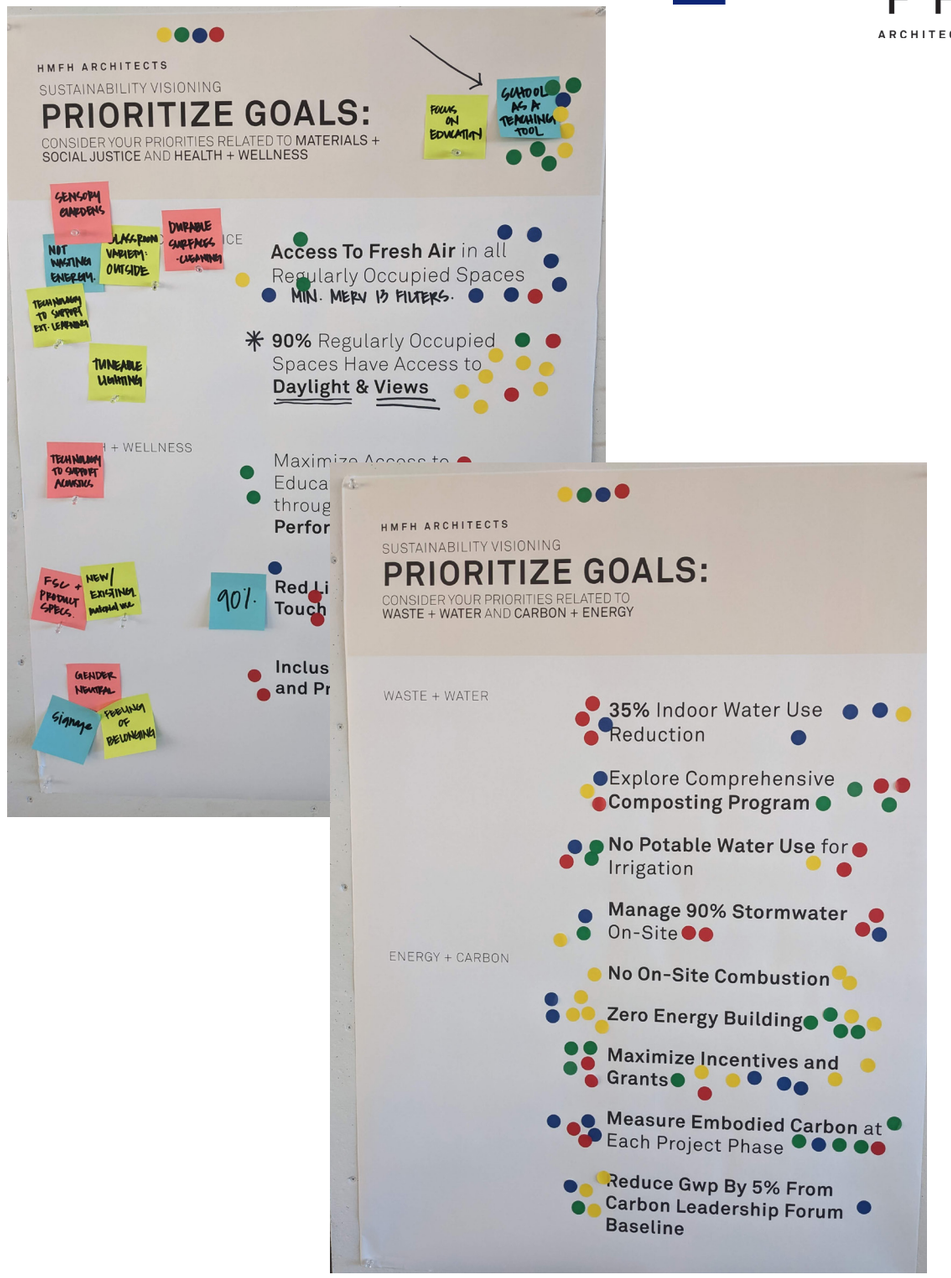
Converted Spaces

Subdivision of Larger Classroom to create two special education classrooms

(381)

Carbon reducing structures - Structural timber

1. This potential add has been identified as a primary approach for meeting the project sustainability goal of **reducing the projects Global Warming Potential by 5% from a regional baseline established by the Carbon Leadership Forum.**
2. The cost of structural timber in the northeast are highly impacted by a continually growing market. Costs for these elements are expected to drop as the market expands in the region in response to general interest in reducing carbon.



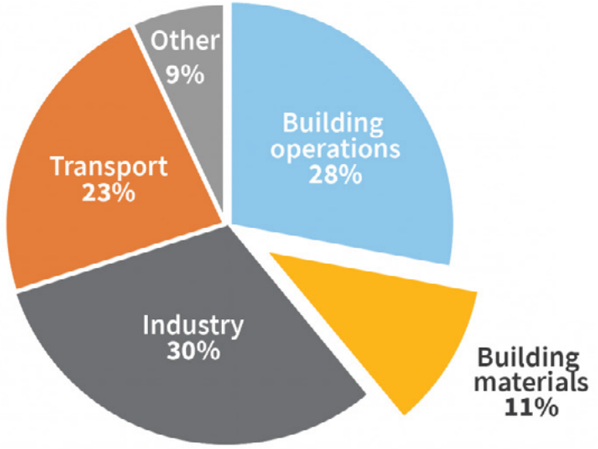
Why structural timber elements?

1. The construction industry contributes 11% of the worlds carbon in the atmosphere, and the production of major structural materials, such as steel and concrete, account for a significant portion of that carbon.

2. The use of structural timber elements reduce the use of steel and concrete, which have high contributions to embodied carbon. Timber sequesters carbon and will reduce the overall embodied carbon in a structure in perpetuity.

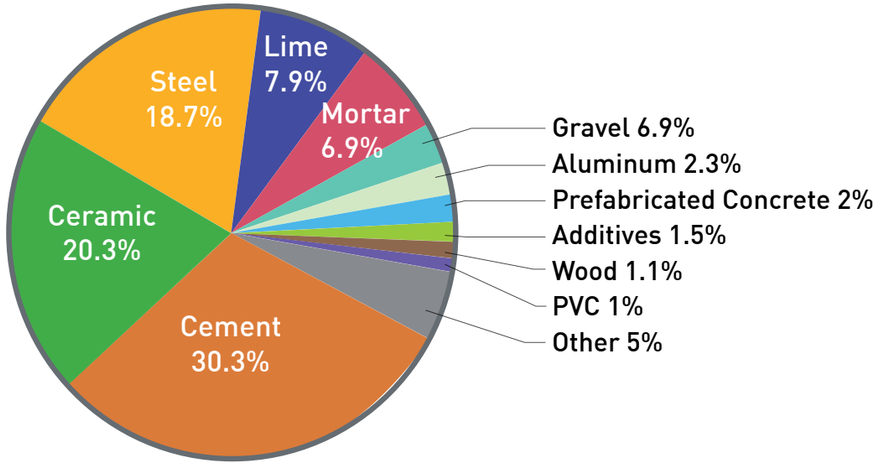
   This is only true if an "end-of-life plan" is developed and enacted to assure the timber is not ultimately placed in a landfill after the building's useful life.

   If the timber is not reused after the building is demolished, then it's ultimate carbon impact is similar to that of steel and concrete.



Global Carbon Emissions by Sector

Data Sources: UN Environment Global Status Report 2017, EIA International Energy Outlook 2017



Carbon Emissions of Building Materials

Heavy timber - What was owned in the estimate?

Heavy timber structure - add $7,556,000

~a 15% increase on the cost of the building structure

1. **The base project is a hybrid structure. Due to the size it includes a mixed timber, steel, and concrete structure, and will reduce carbon by:**
    - specifying low carbon content concrete mixtures to reduce the embodied carbon of structural concrete elements
    - specifying structural steel, rebar, and structural metal deck with high recycled content
    - evaluating building planning efficiency to reduce overall use of concrete.
2. **The add for Heavy Timber is limited to partial structures of timber floors, roofs and beams (horizontal members only) for public areas, which accounts for about 40% of the total building area.**
    - Building Spine (Connector of all public/academic spaces)
    - Gymnasium
    - Cafeteria
    - Media Center

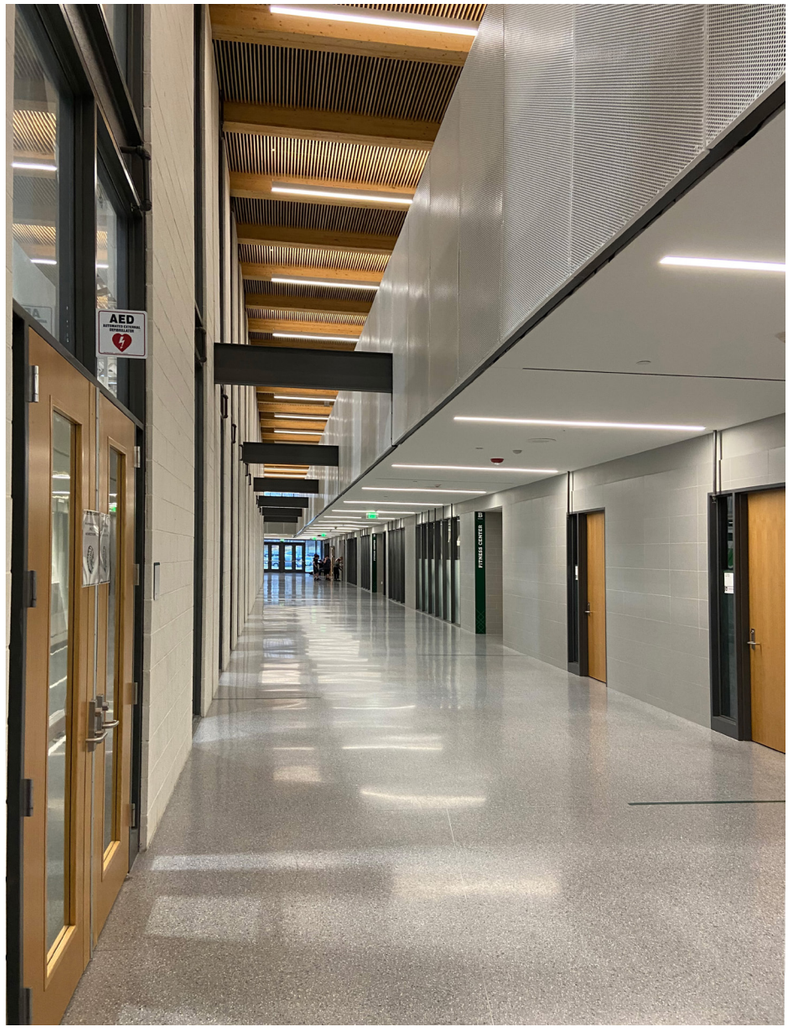
Heavy timber - What does that look like for the current plan configuration?

Keeping the same approach:

The add for Heavy Timber is limited to partial structures of timber floors, roofs and beams (horizontal members only).

The following is a suggestion regarding reduction strategy broken out by program space:

1. **Partial Building Spine** - Areas viewed from the ground and first floor lobby spaces and cafeteria (most public) **~12%, ~$2,270,000**
2. **Media Center and Business Suite** - Visible from the main entrance, hub of the academic wing **~5%, ~$950,000**
3. Gymnasium **~4%, ~$760,000**

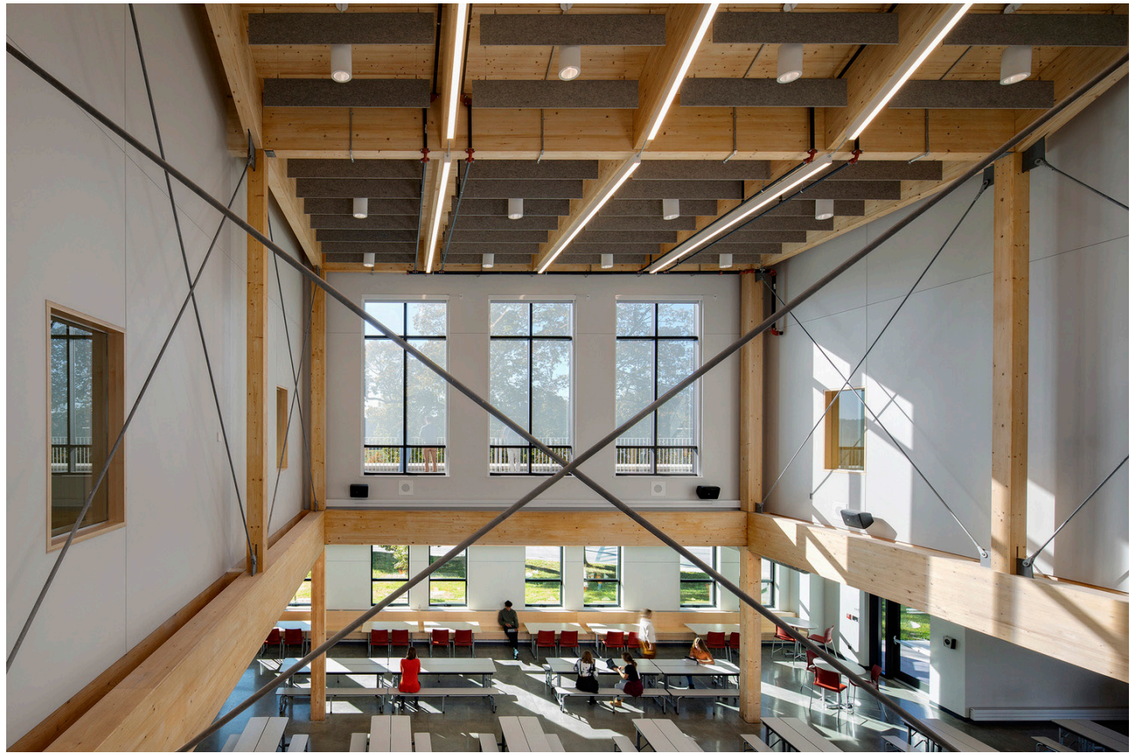


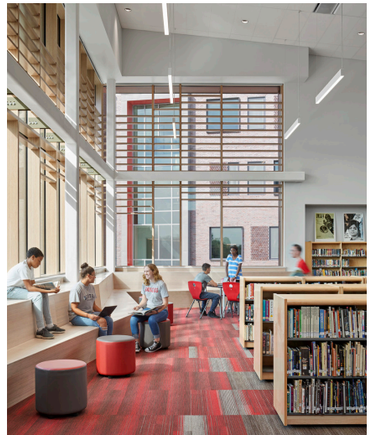
Billerica High School - Perkins and Will Architects

How can we meet Andover's carbon reduction goals without heavy timber structures?

1. Evaluating building planning efficiency to reduce overall use of concrete and steel (working with Andover Admin to 'right size' the building program)
2. Specifying replacements for cement in concrete mixtures
3. Specifying metals (structural steel, rebar, and structural metal deck) with high recycled content - and using steel from electric arc furnaces
4. Carbon emissions -
    - Review mechanical systems for carbon emissions over a period of time (determined through the Life Cycle Cost Analysis) - this will be important to review as the project progresses and we watch legislation for carbon accounting.
5. Review building materials (exterior cladding/curtainwall, interior finishes) for embodied carbon contribution
    - Using durable, natural materials as appropriate
    - Using recycled materials
    - Exposing structural elements (not adding finishes to cover up building elements)

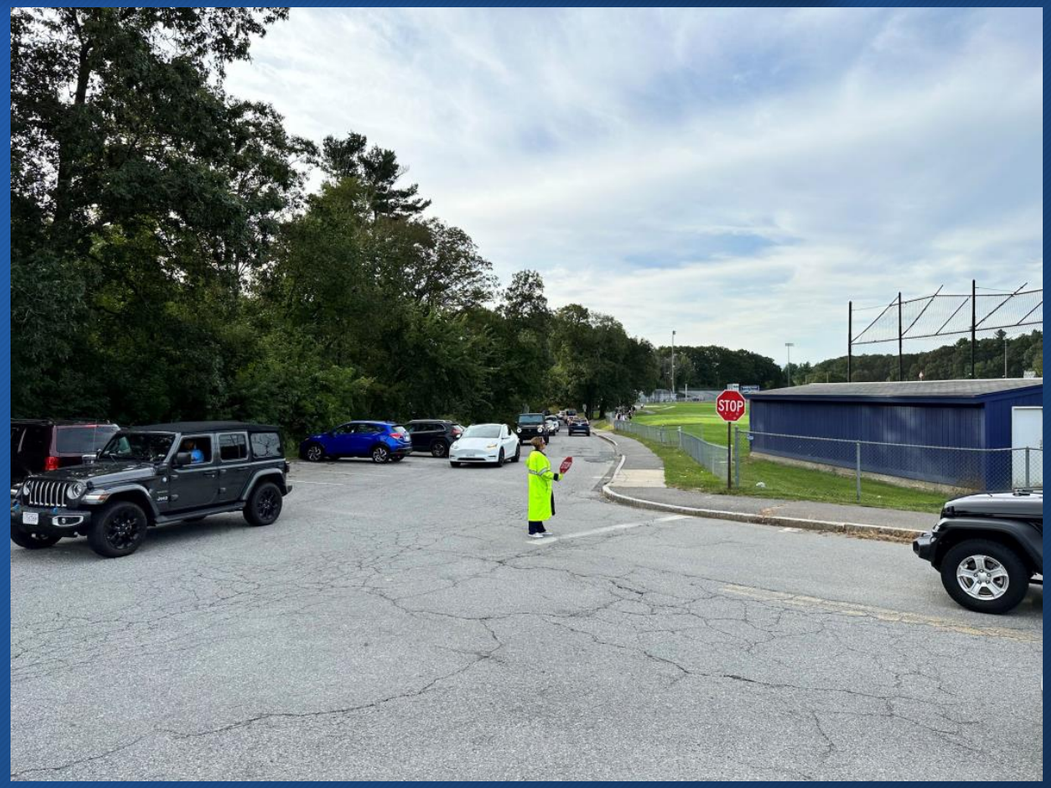
Examples of reduced carbon structures





Andover High School Reconstruction

AHS / WMS Traffic & On-Site Circulation



Samuel W. Gregorio, PE, PTOE, RSP1
TEC, Inc.
School Building Committee - September 28, 2023

Existing conditions

- *April 2023* – Traffic Volume Counts for three (3) main campus driveways.
- *September 2023* – Traffic Volume Counts for Stevens Street, Lincoln Street, and MS Circular Driveway
- *September 2023* – Internal observations of student traffic vs. pick-up / drop-off. Who is who [Students, Parents, Staff, Buses]

Balanced from April to September Negligible

- All counts and observations look at vehicles, pedestrians, and bicycles. Vehicles separate out trucks, buses, etc.

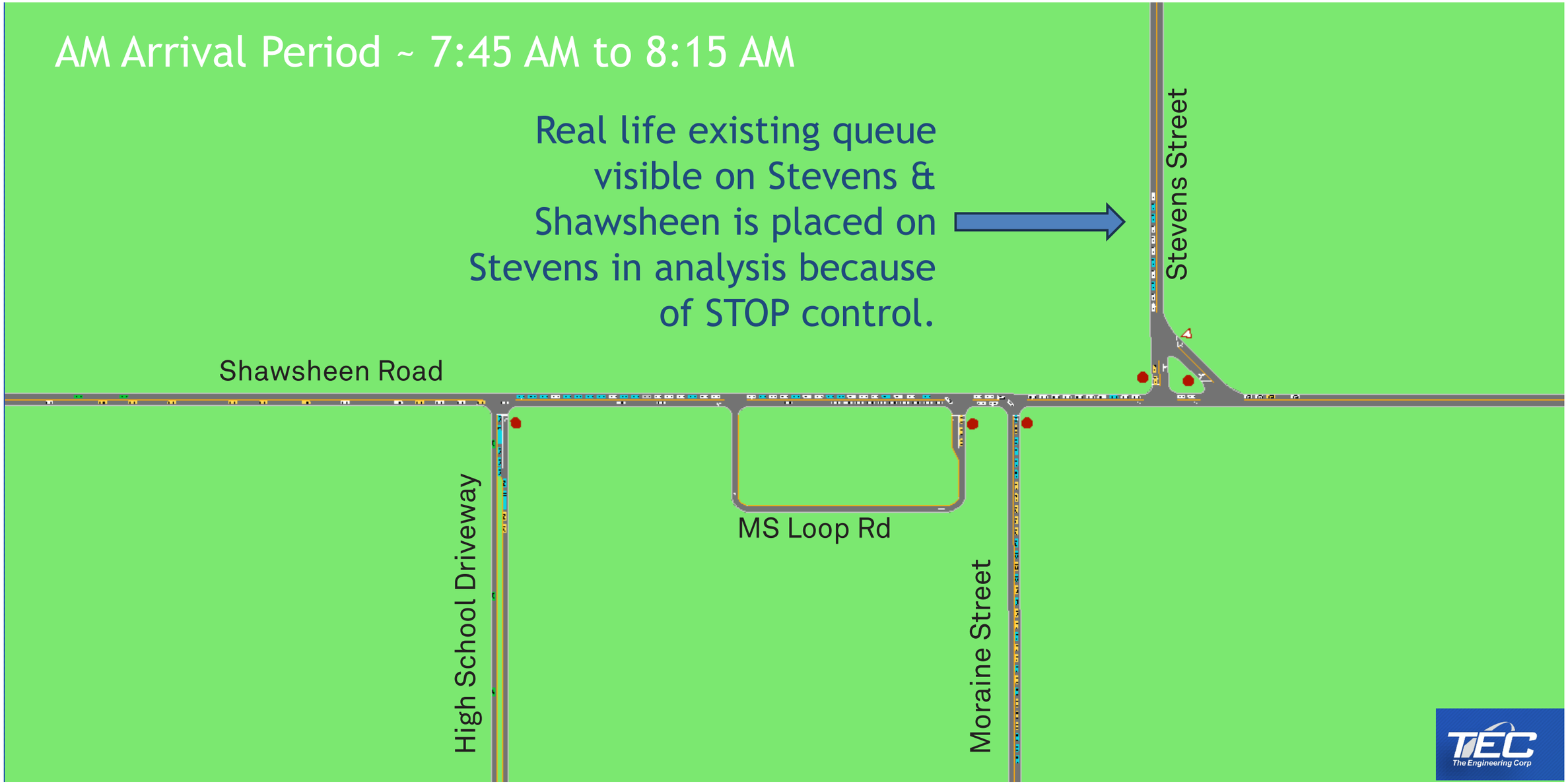
Existing conditions

- *Weekday Morning Arrival (7:30 AM to 8:30 AM)*
  - 1,530 Total Trips (939 Entering and 591 Exiting)
    - 146 Students (146 Entering and 0 Exiting)
    - 159 HS Staff (159 Entering and 0 Exiting)
    - 43 MS Staff (43 Entering and 0 Exiting)
    - 48 Buses (24 Entering and 24 Exiting)
    - 344 MS Parent Drop-Off (172 Entering and 172 Exiting)
    - 790 HS Parent Drop-Off (395 Entering and 395 Exiting)
- *Weekday Afternoon Dismissal (2:45 PM to 3:45 PM)*
  - 917 Total Trips (241 Entering and 676 Exiting)
    - 143 Students (0 Entering and 143 Exiting)
    - 223 HS Staff (0 Entering and 223 Exiting)
    - 47 MS Staff (0 Entering and 47 Exiting)
    - 24 Buses (1 Entering and 23 Exiting)
    - 142 MS Parent Pick-up (71 Entering and 71 Exiting)
    - 338 HS Parent Pick-up (169 Entering and 169 Exiting)

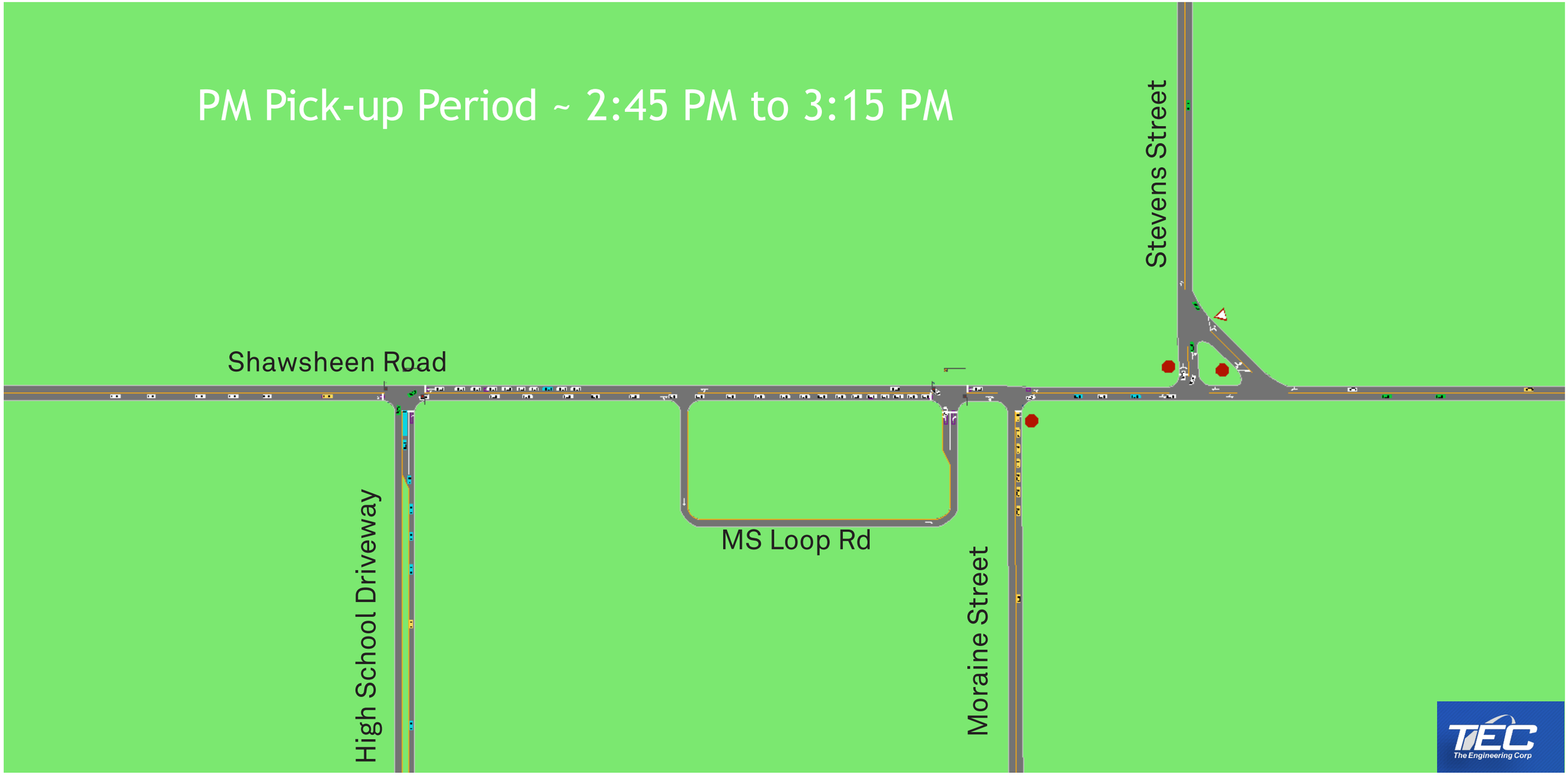
75% of all trips to or from the HS/MS campus is parent drop-off related

52% of all trips to or from the HS/MS campus is parent pick-up related

Existing conditions



Existing conditions



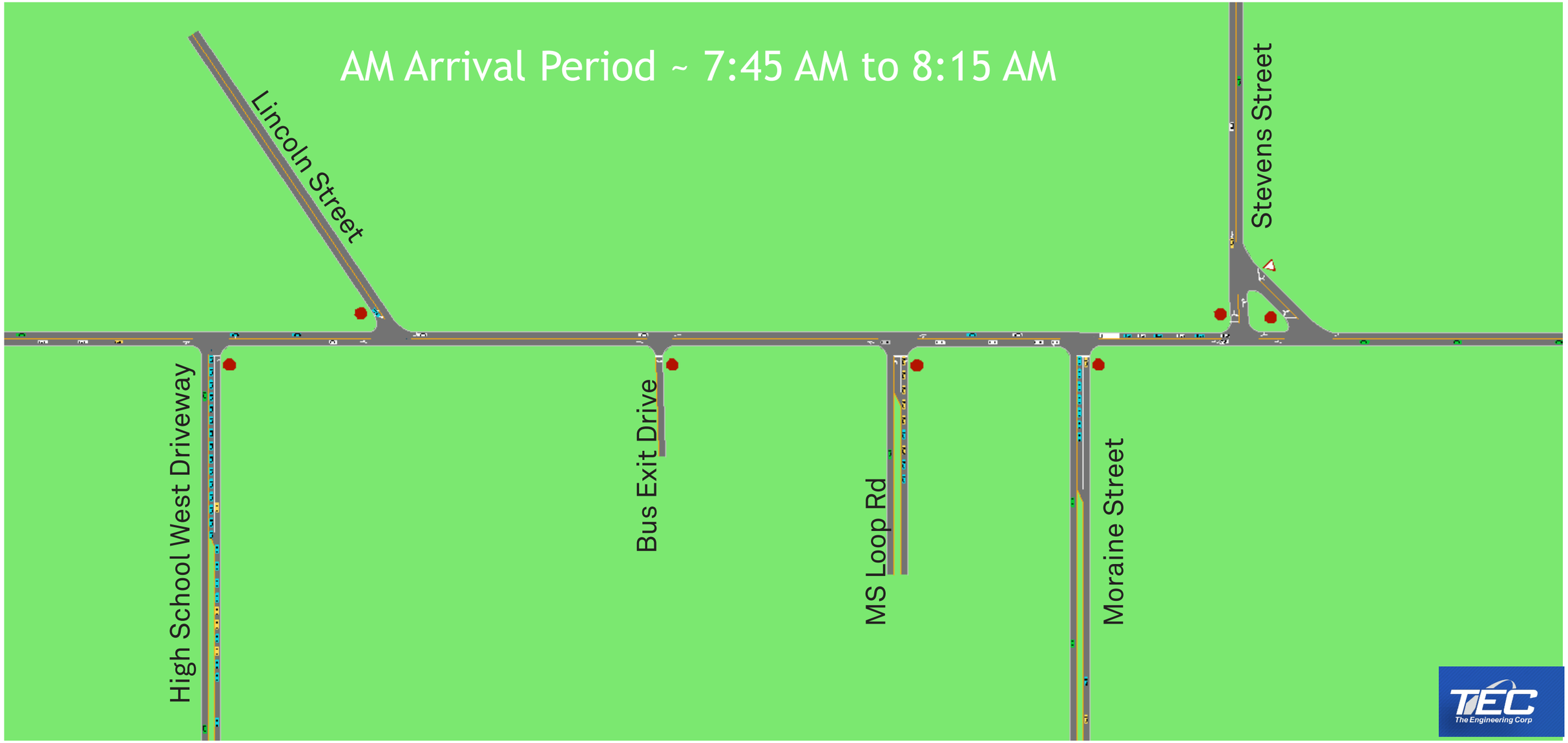
Proposed conditions

- *Look at Condition with 1,900 students and comparable increase in MS Students, HS Staff, & MS Staff (11.6% increase).*
- *Generally, keep the same external origin or external destination as existing condition. Slight modifications based on existing condition limitations.*
  - *Also generally keeps peak hour factors the same over network (PR) vs intersection (EX).*
- *Relocation of HS Driveway further west, addition of bus exit driveway, and replacement of MS Driveway system.*
- *Allowance of full access/egress to all three (3) main driveways.*
  - *Note that drop-off and pick-up enters a certain way requiring exiting a certain way.*

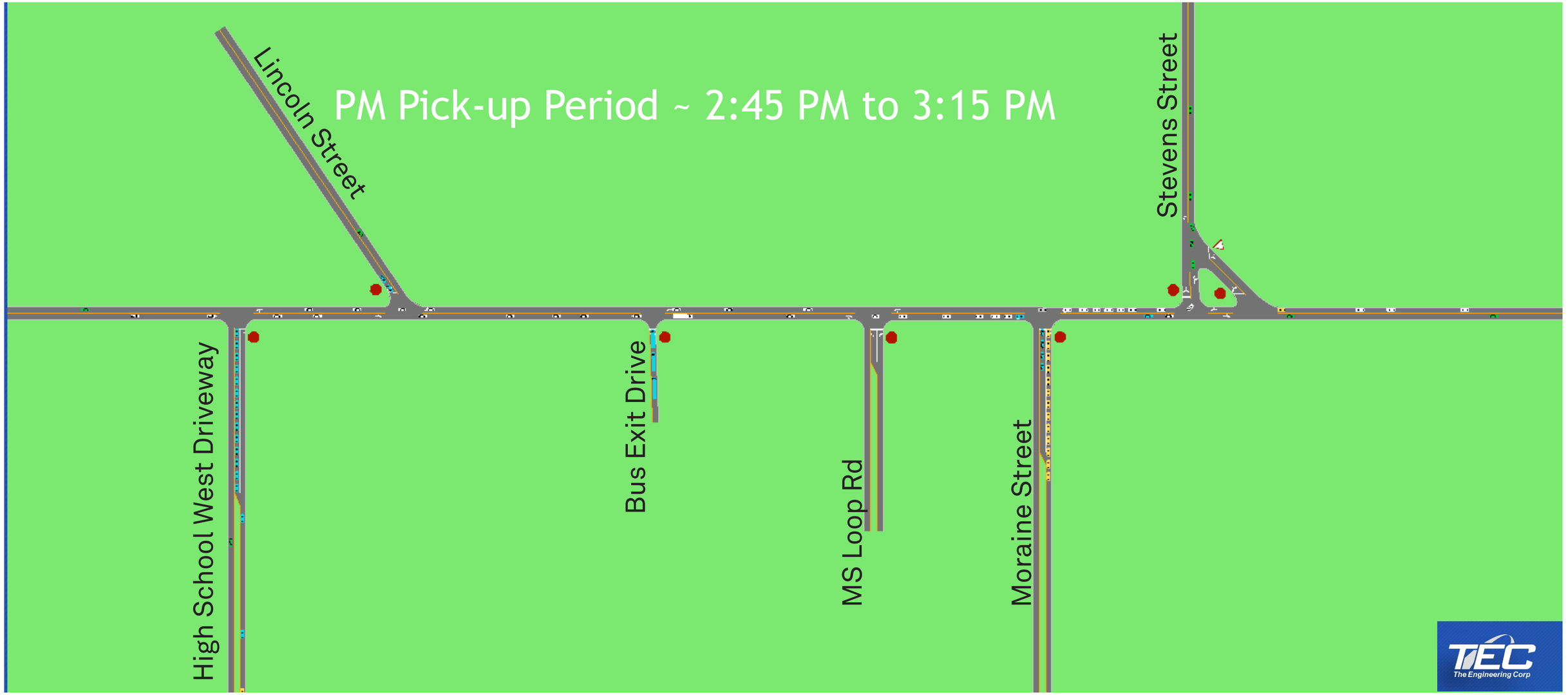
Proposed conditions

- *<u>Needs</u>:*
  - *Exclusive left-turn and right-turn lanes on HS Driveway, MS Driveway, Moraine Street N (Shawsheen), and Moraine Street (Red Spring).*
  - *Preferable to have Shawsheen Street crosswalk at Moraine to be on west side (school side) of intersection to limit conflicts with WB left-turns.*
  - *Preferable to have Shawsheen Street crosswalk at HS Driveway to be on east side (school side) of intersection to limit conflicts with EB right-turns.*
  - *Limit number of crosswalks across Shawsheen to three (additional one at new MS Driveway.*
- *<u>Desires</u>:*
  - *Exclusive left-turn lane on Shawsheen Road at Moraine Street (limited cross-section) – Could we shift the Moraine Street approach to west (could gain up to 4 cars of queue space).*
  - *Realignment of Stevens Street outlet to Shawsheen Road to more perpendicular approach (could gain up to 4 cars of queue space).*

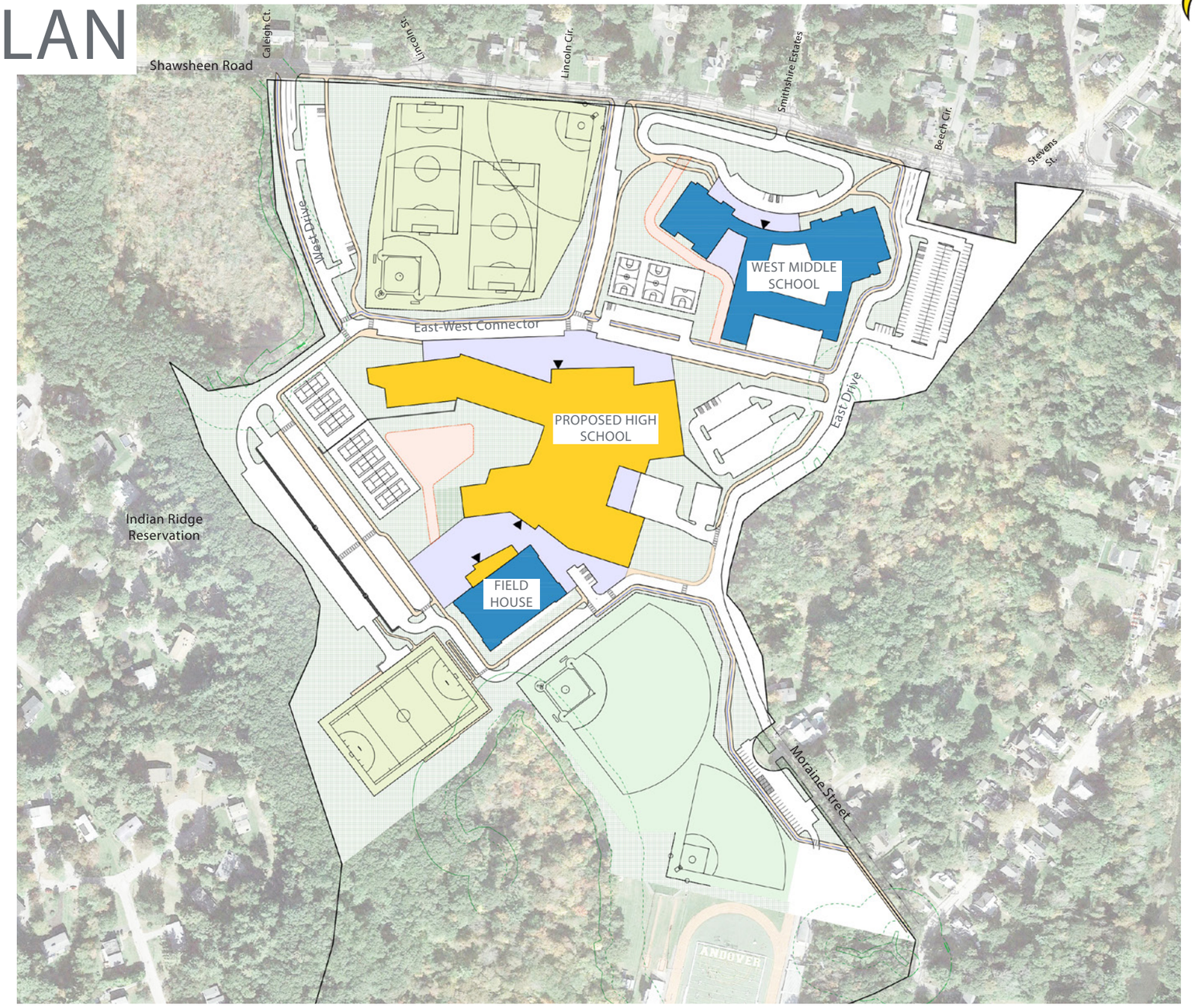
Proposed conditions



Proposed conditions



CONTEXT PLAN

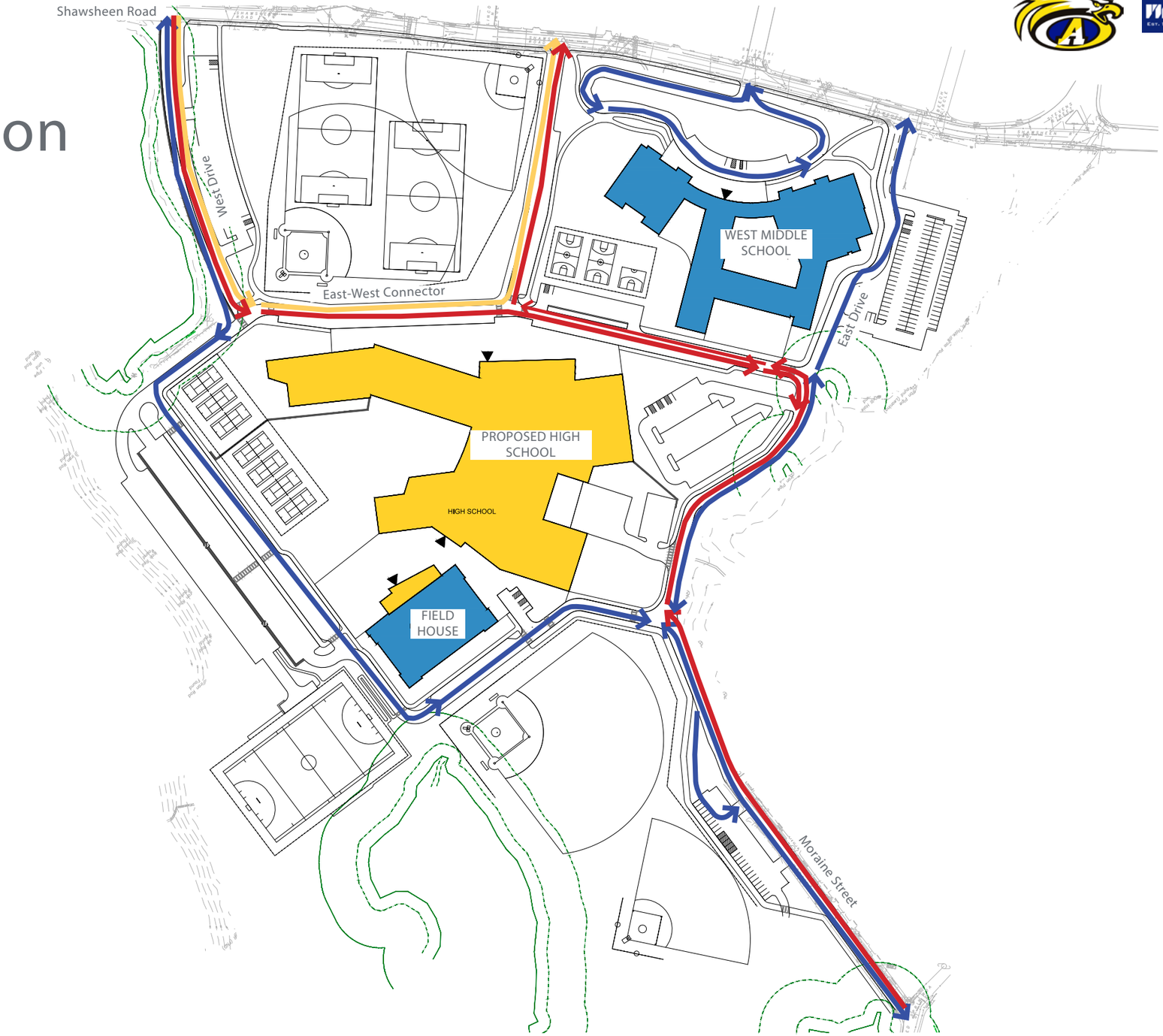


SITE PLAN -
Vehicular Circulation

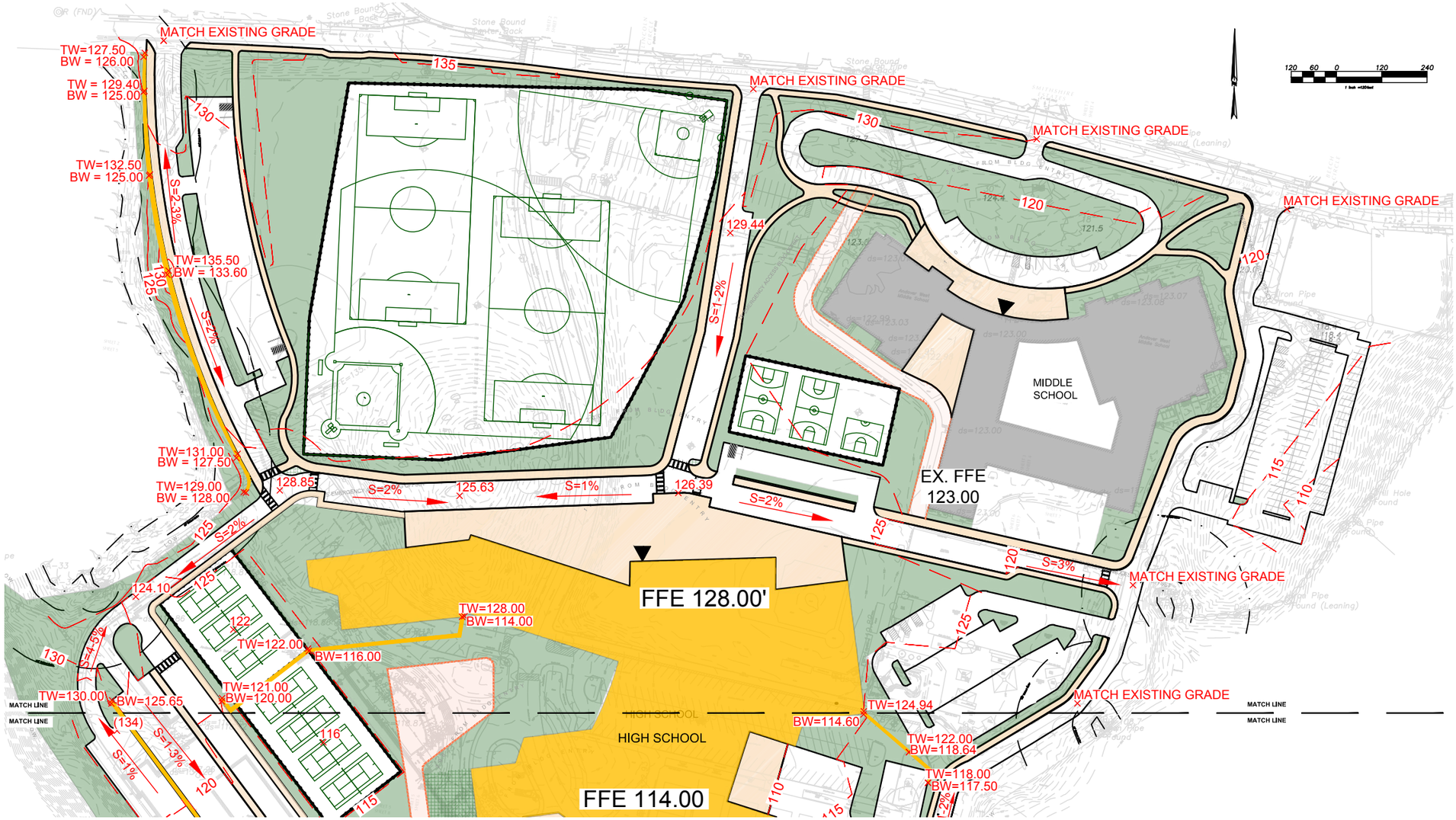
Shawsheen buses

Moraine buses

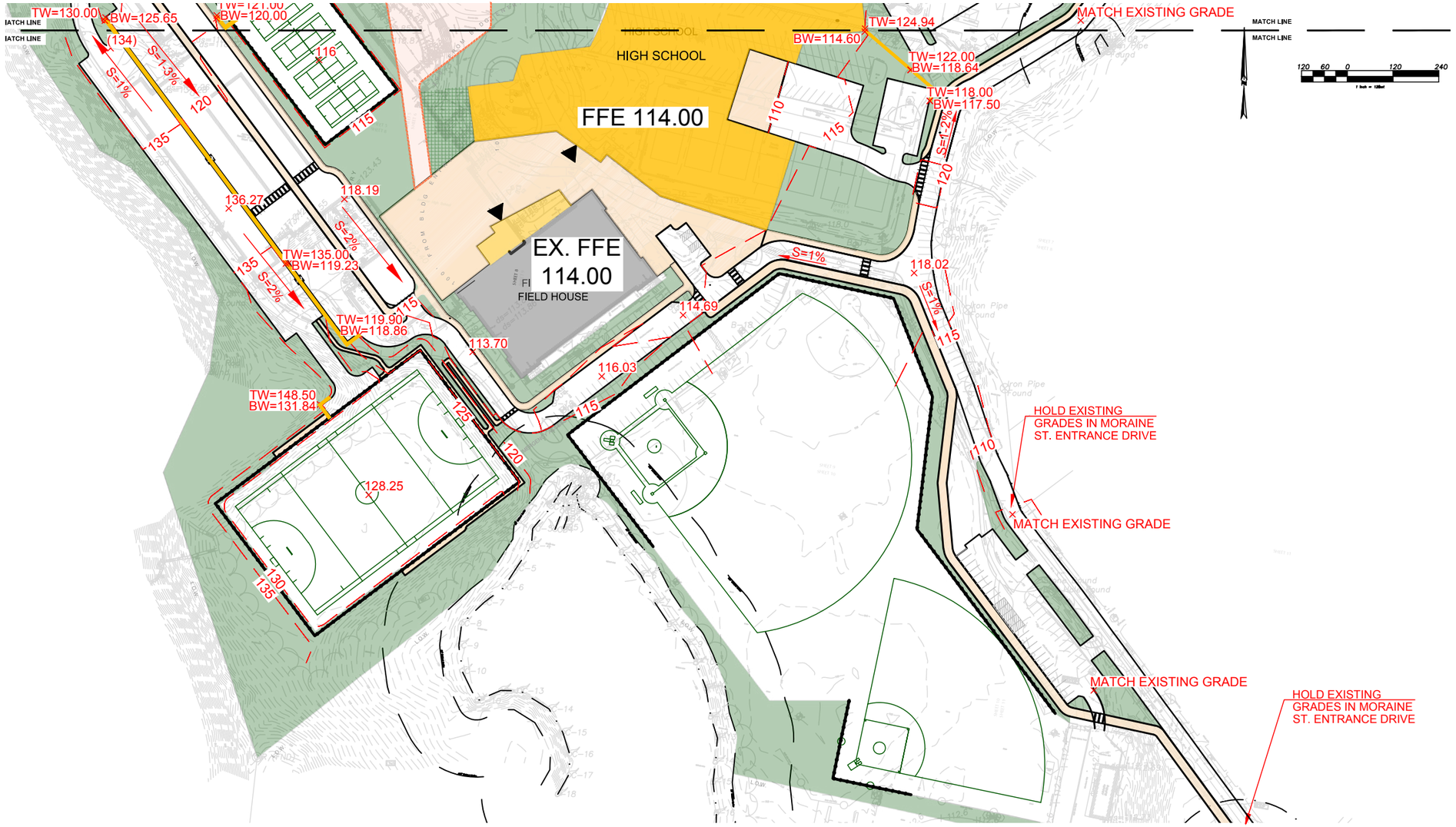
Cars



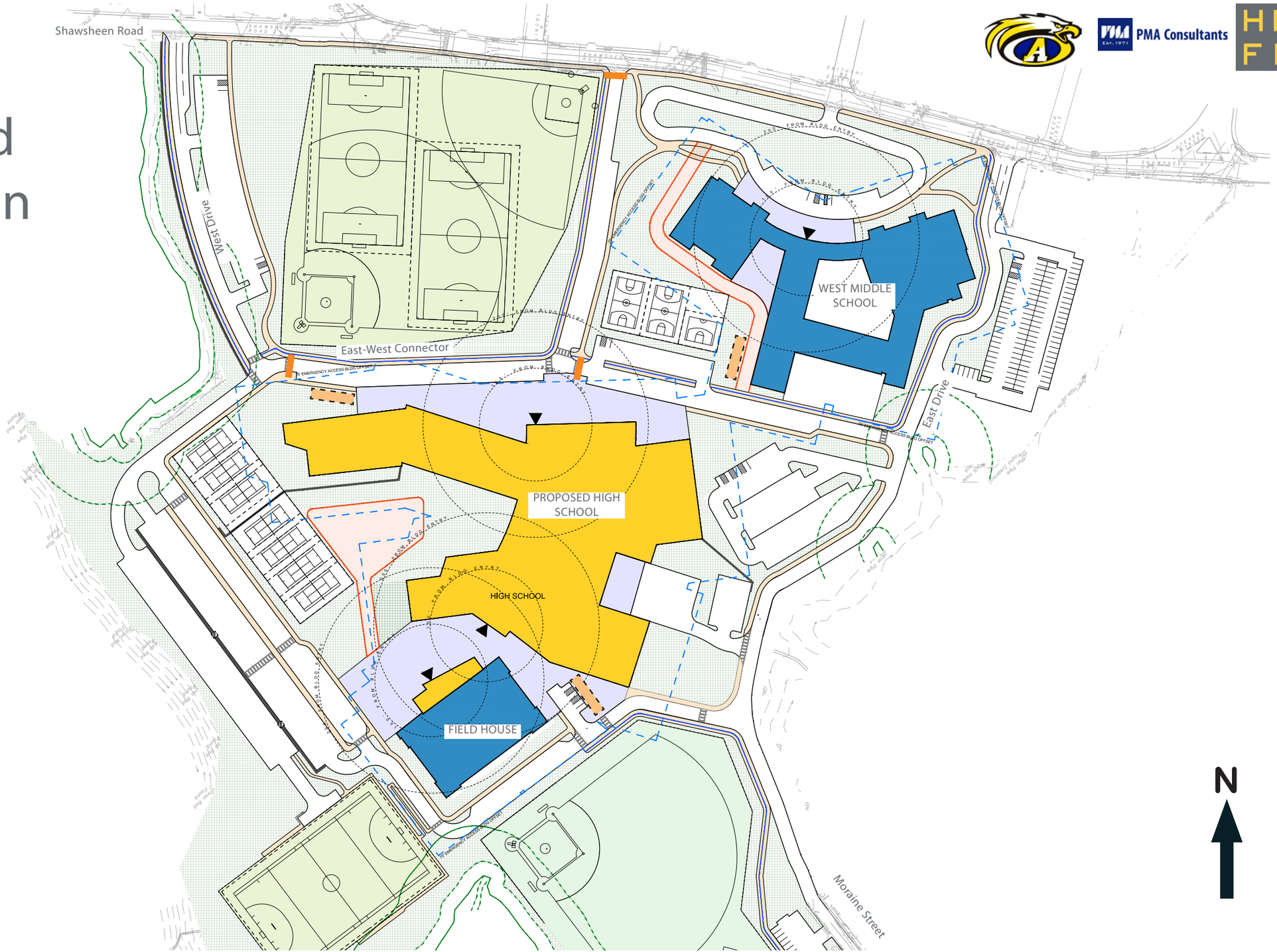
SITE PLAN -
Grading



SITE PLAN -
Grading

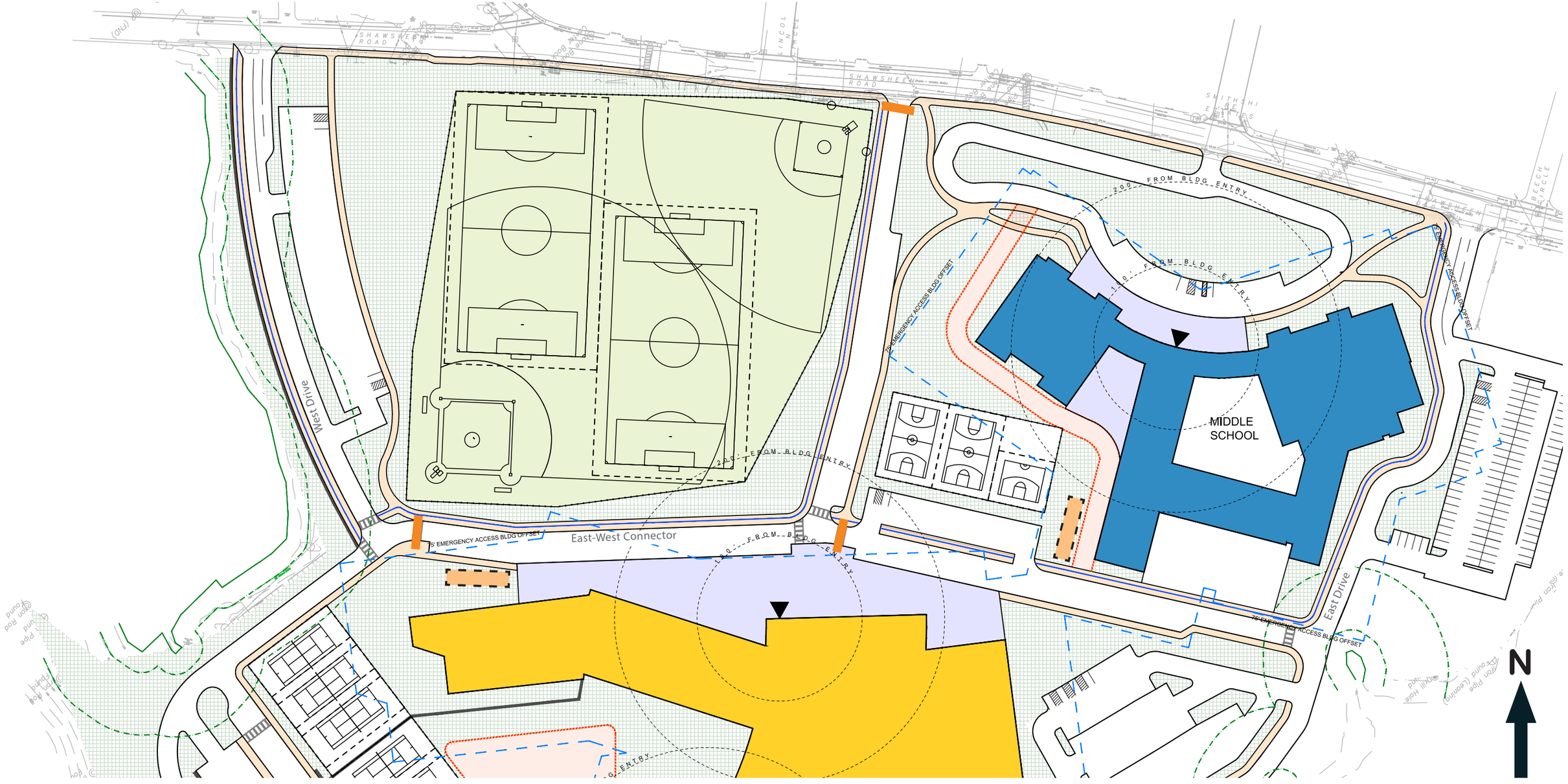


SITE PLAN -
Pedestrian and Bike Circulation

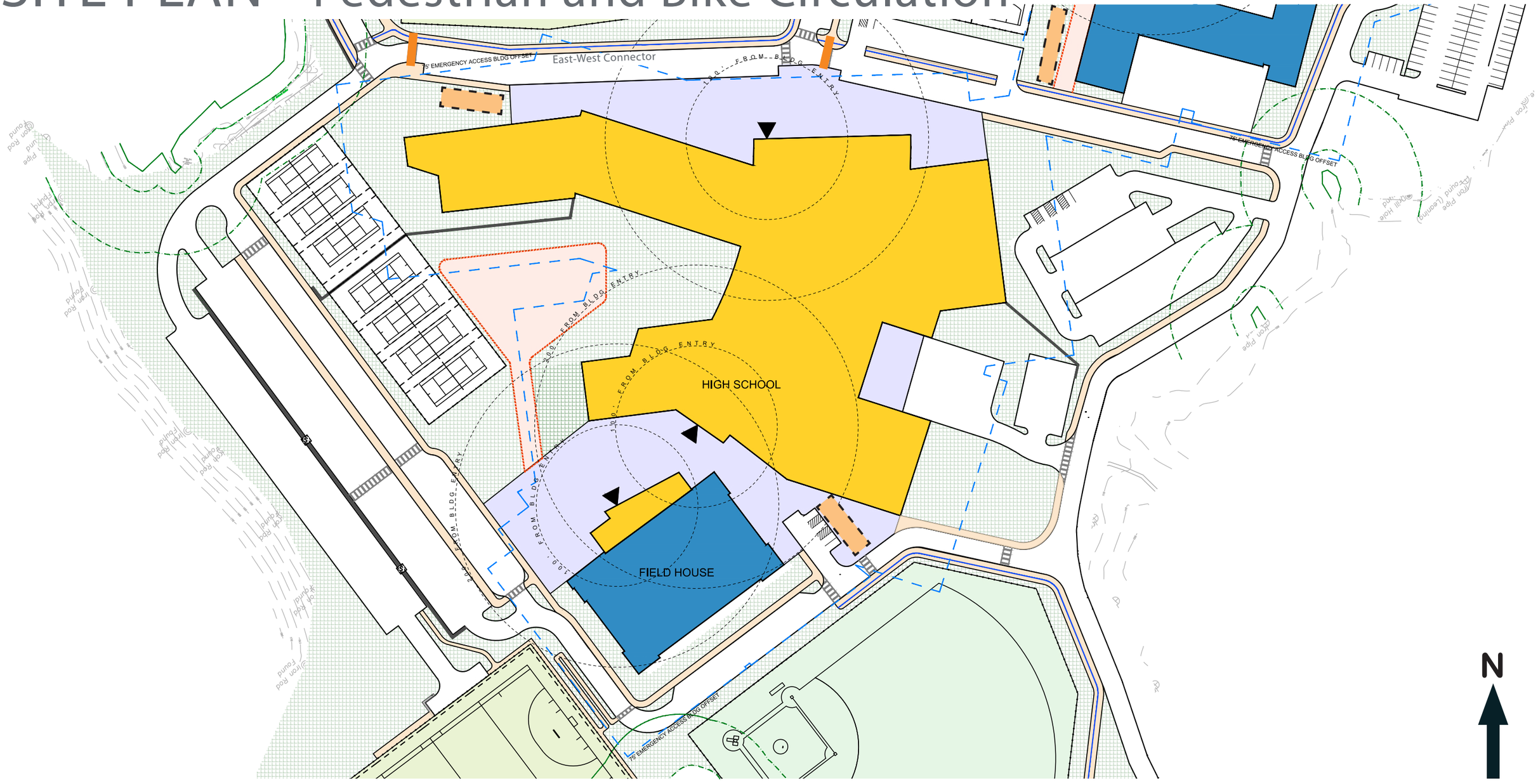


Shawsheen Road

SITE PLAN - Pedestrian and Bike Circulation

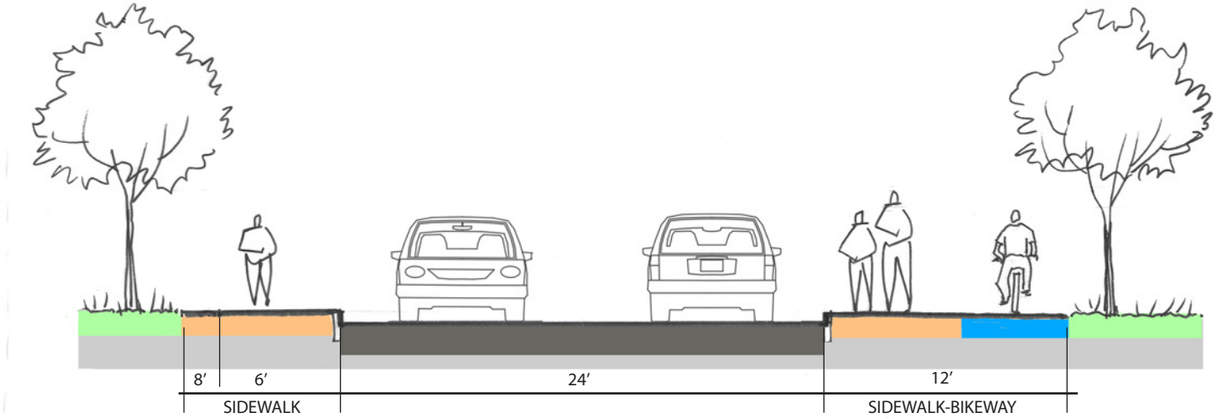


SITE PLAN - Pedestrian and Bike Circulation



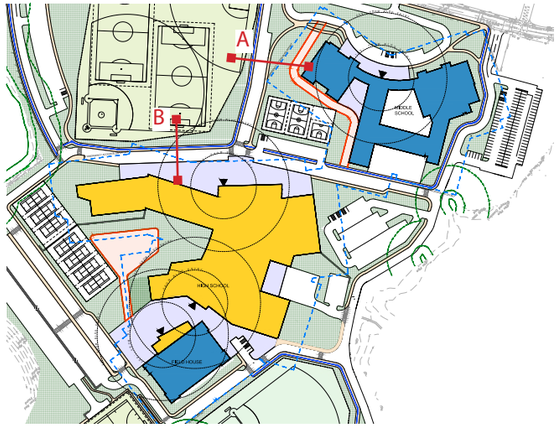
PRECEDENT IMAGERY - Bike Lanes

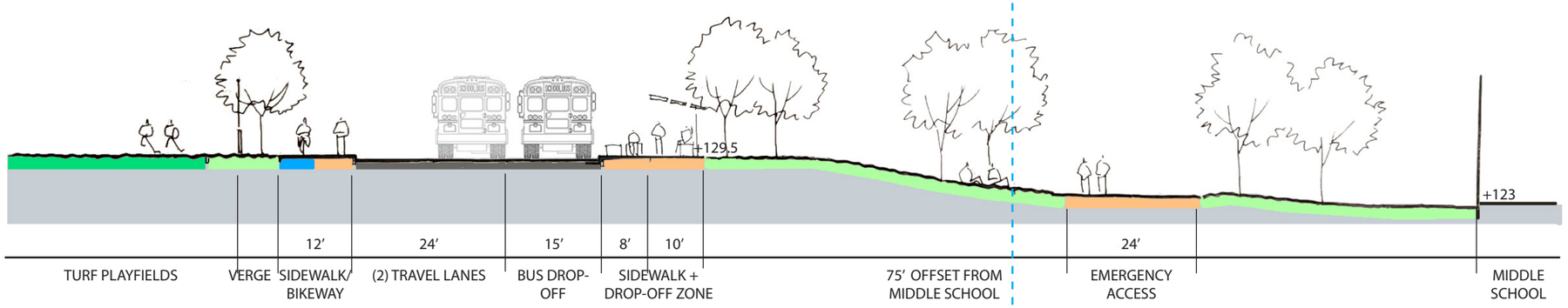
Typical sidewalk-bikelane configuration



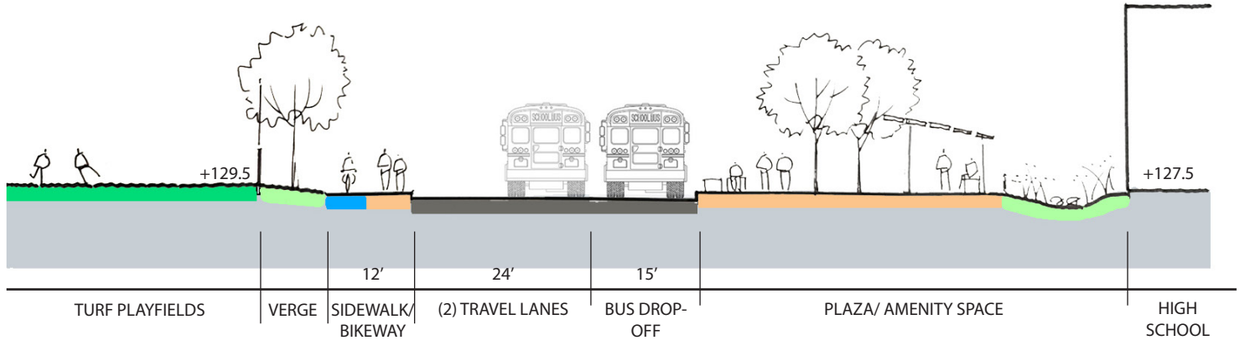
Proposed sidewalk-bikelane configuration

SECTIONS



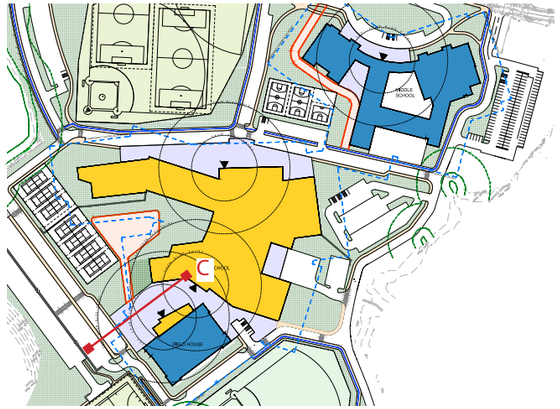


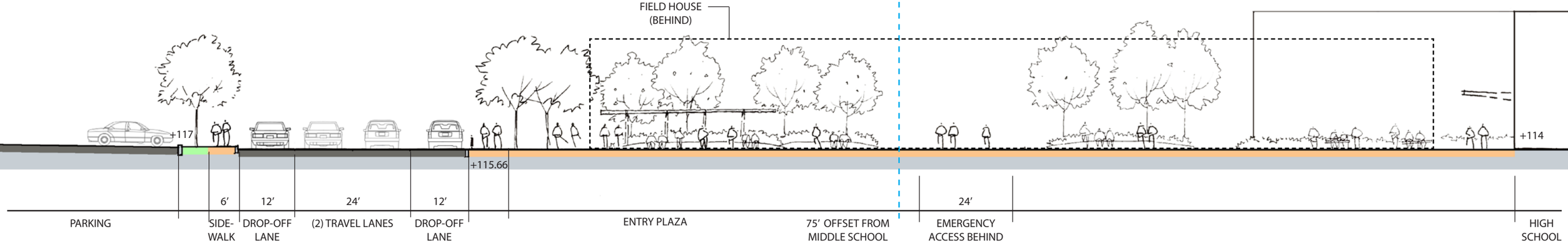
Section A



Section B

SECTIONS

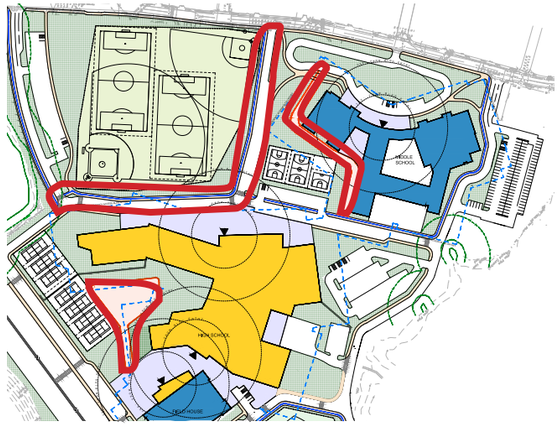




Section C

PRECEDENT IMAGERY -

East-West Connector/ Pedestrian Zone with Emergency Access



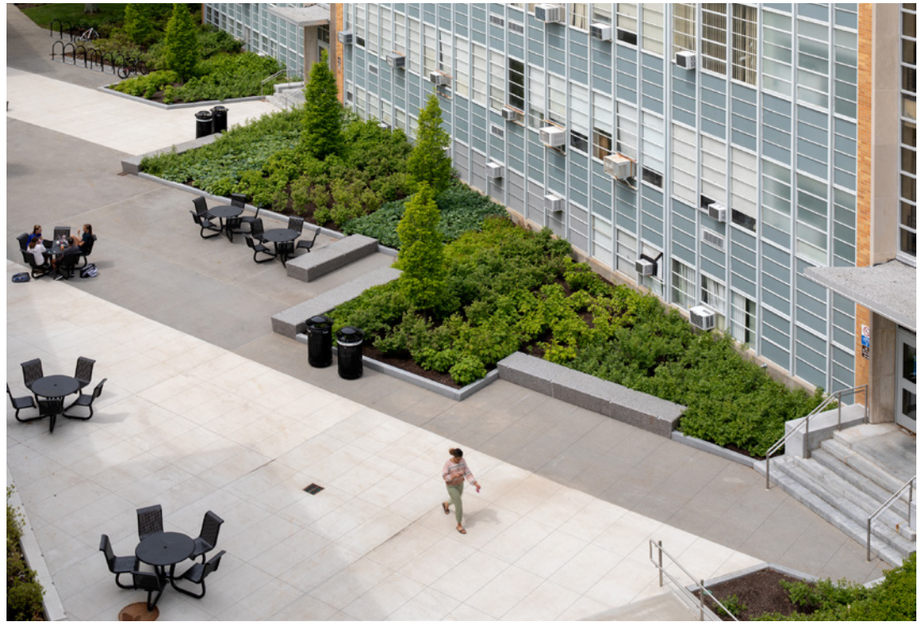
Before

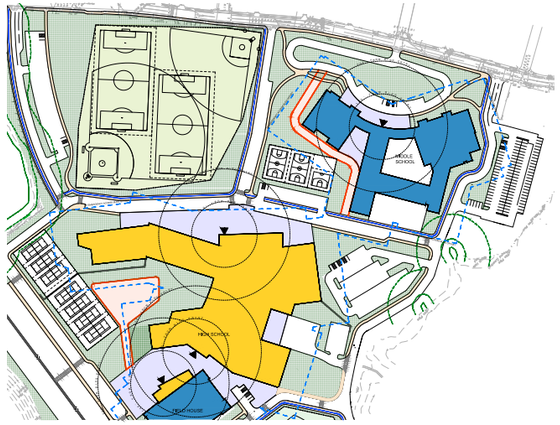
After

PRECEDENT IMAGERY - Bus/ car drop-offs

Existing Conditions

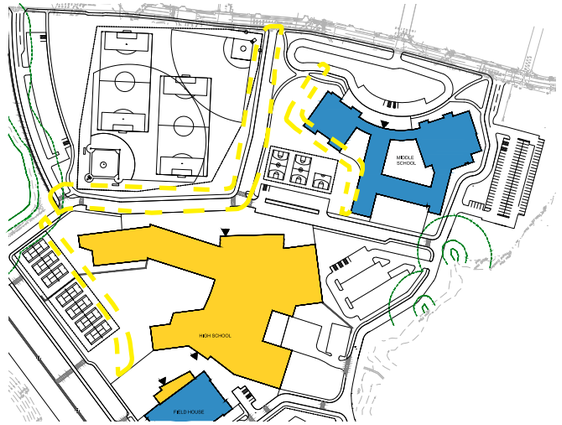
PRECEDENT IMAGERY - Entry Plaza





PRECEDENT IMAGERY -

East-West Connector/ Emergency Access



How people can get involved

COME TO A COMMITTEE MEETING

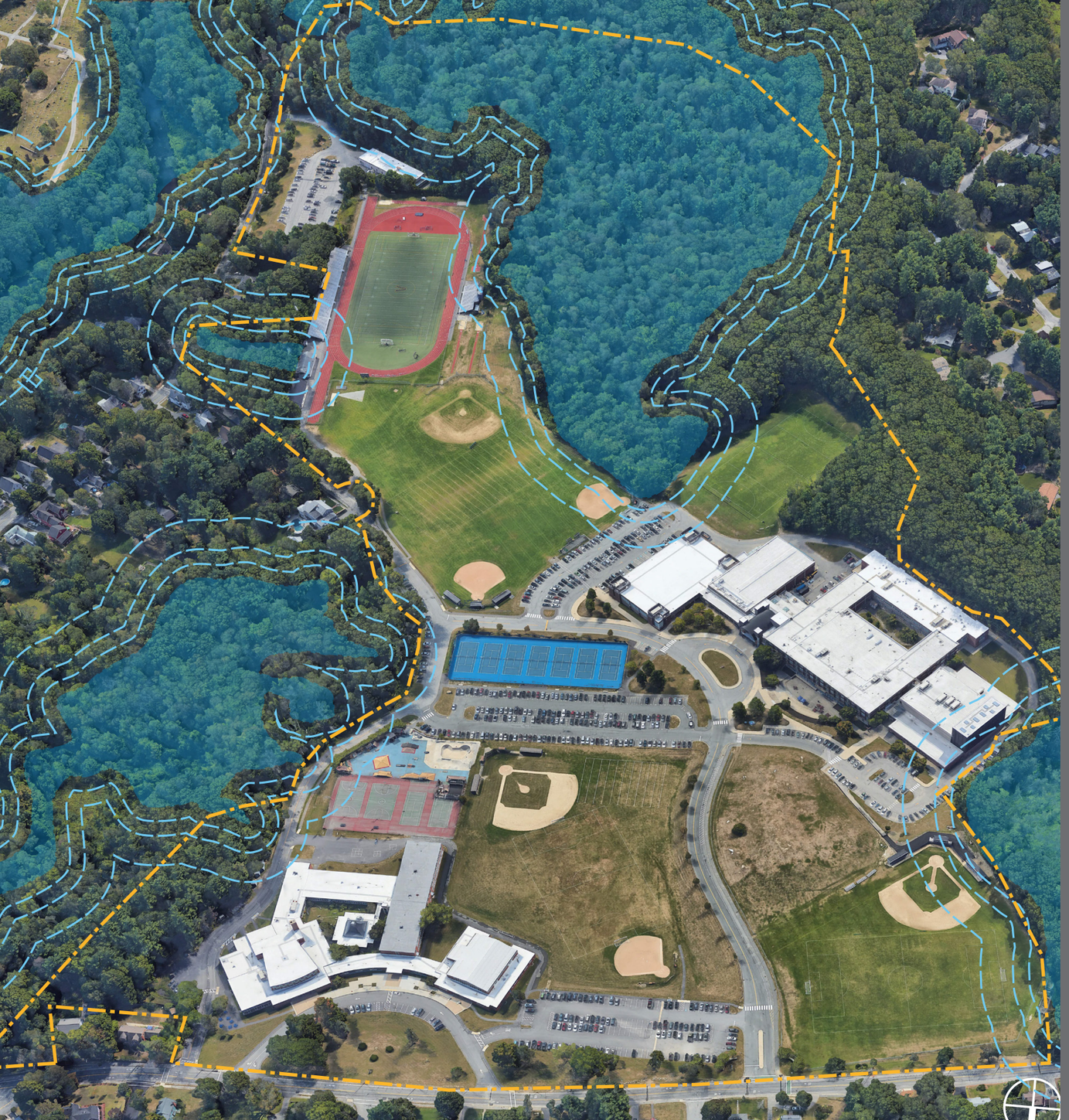
Web site: andoverhighbuildingproject.org

Email: andoverhighbuildingproject@andoverma.us

Facebook: www.facebook.com/AndoverHighBuildingProject

Watch past meetings at:

www.andovertv.org/andover-high-school-building-committee



THANK YOU

HMFH ARCHITECTS