

# TOWN OF BELMONT HIGH SCHOOL

MODULE 3: PREFERRED SCHEMATIC REPORT REVISION #2

SUBMISSION DATE: FEBRUARY 16, 2018

REV.1 SUBMISSION DATE: APRIL 12, 2018

REV.2 SUBMISSION DATE: MAY 9, 2018









BELMONT HIGH SCHOOL  
**MARAUDERS**

# ACKNOWLEDGEMENTS /

We wish to thank the following individuals and organizations for their contributions and assistance to this Feasibility Study.

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John Phelan – Belmont Superintendent of Schools

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Adam Dash - Board of Selectmen

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Phyllis Marshall, Treasure – Interim Town Administrator

Patricia Bruschi – Vice Chair

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Joel Mooney, Belmont Permanent Building Committee

Robert McLaughlin, Belmont Permanent Building Committee, Belmont Warrant Committee

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Nitsch Engineering

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### **HVAC / ELECTRICAL ENGINEERS**

BALA Consulting Engineers

### **PLUMBING / FIRE PROTECTION ENGINEERS**

Architectural Engineers, Inc

### **GEOTECHNICAL ENGINEERS**

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### **HAZARDOUS MATERIALS**

Universal Environmental Consultants

### **FOOD SERVICE CONSULTANT**

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### **CODE CONSULTANT**

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### **TRAFFIC CONSULTANT**

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### **COST ESTIMATING CONSULTANT**

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### **SPECIFICATION WRITING CONSULTANT**

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### **SURVEY CONSULTANT**

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### **TECHNOLOGY CONSULTANT**

Edvance Technology Design

### **HARDWARE CONSULTANT**

Campbell-McCabe, Inc.

### **ACOUSTICAL CONSULTANT**

Acentech

### **SUSTAINABILITY CONSULTANT**

AKF Group / In Posse





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# 3.3.1 - INTRODUCTION

## A. PROCESS OVERVIEW

This report summarizes the proceedings of the BHS Building Committee, the Town of Belmont, the Belmont School District, and the BHS Design Team, following the submission of the Preliminary Design Program (PDP). This Preferred Schematic Report (PSR) documents the numerous meetings, studies to space programming document, PDP findings, and the development of building options performed in the service of assisting the Building Committee Board members along with members of the community in their decision making process. During the PSR phase, nearly all the public meetings scheduled by the Building Committee scheduled were joint meetings of the Belmont High School Building Committee, School Committee and Board of Selectmen.

The Preliminary Design Program was submitted to the MSBA on December 13, 2017. The submission was followed by an Belmont High School Building Committee (BHSBC) meeting where community and board members expressed the desire for further traffic assessment of the site design options. The Committee proceeded to commission a full traffic study for the site. The results of this study were presented to the BHSBC in January 2018 by Nelson\ Nygaard Consulting Associates.

A series of interactive workshops were conducted throughout the PSR phase including a Belmont HS faculty workshop on December 13th, a Belmont community workshop on December 14th, and a Chenery MS faculty workshop on January 8th. The intent of these workshops were to bring the groups up to date and summarize the current design process, discuss how innovative educational programming can support future-ready environment, and build consensus around future pedagogy through interactive group exercises.

At the January 11th BHSBC meeting, the design team introduced for discussion an update to the PDP site strategy matrix that would allow the committee members to evaluate and provide pro/con criteria for each of the site design options, the substance of which was open for discussion. The updated matrix addressed the committee's previous concerns and the outcome provided revised site designs for options 2.1, 2.3, 2.4 and 3.1 to be considered for the PSR. This process proved to be a very useful tool for distilling the information gathered and presented about the options.

The Design Team presented revised site strategies at the January 16th, 2018 BHSBC meeting, showing updates to the 2.1, 2.3, 2.4 and 3.1 building schemes including detailed building plans, building massing on the site, site plans, site circulation diagrams,

athletic field limitations, and parking count distribution.

After a long and thoughtful deliberation within the Town - taking place at the open BHSBC meetings, in the town newspapers, social media, and at town events - the Belmont High School Committee and the Building Committee voted on the configuration and preferred option on January 23rd, 2018. First the School Committee voted on the configuration to be 7-12 with an unanimous vote to accommodate space for increased enrollment forecasts. Following the School Committee vote, the Building Committee selected Option C.2.4 as the preferred site option with a unanimous vote, which includes maintaining/renovating the existing pool, large fieldhouse gym, and small gym. The result of the vote thereby removed Options 2.1, 2.3 and 3.1 from consideration, as well as two other grade configurations: 9-12 and 8-12.

The design team continued to refine the remaining design options. On January 30, 2018, a meeting was held with the BHSBC Subcommittee on building operation and systems, to develop sustainable strategies for the new High School in order to determine the Town's priorities. The Design Team introduced core concepts of sustainability and showed how they might become integral to student life at the high school as well as providing long term benefits to the district by presenting Zero Net Energy strategies for potential building systems (MEP, FP, IT, Civil) that could service the new project and the process it would take to achieve and/or maximize these sustainable goals. During the ensuing discussion, it came to light that the extent of air-conditioning was a prime concern and should be considered among the highest priorities of any sustainable strategy. The operations subcommittee voted to move forward with the most recent LEED-S (Leadership in Energy and Environmental Design for Schools) as the sustainable green program that will record and rate all the energy efficiency / sustainability components of the project.

The Design Team continued to develop both the site and building design for Option 2.4 (Renovation Addition), and presented progress at the joint meeting of the a joint meeting of the BHSBC, SC and BOS on February 01, 2018.

During the February 13th joint meeting of the BHSBC, SC and BOS, the attendees voted to approve the material presented for inclusion in the PSR to MSBA on February 16, 2018.

## A. PROCESS OVERVIEW

### PSR TIMELINE

December 13, 2017

*PDP submission to MSBA*

December 13, 2017 : BHS Faculty Workshop

*Design Workshop with Belmont HS Faculty: Discussion on design options, working group activities on design solutions.*

December 14, 2017 : BHSBC Meeting #32

*Community Design Workshop: Discussion on design options, working group activities on design solutions.*

December 19, 2017 : Steering Group Meeting

*Review content and deliverables for PSR, review Design Workshop comments.*

January 2, 2018 : Steering Group Meeting

*Review MSBA PDP comments, review development of floor plans for PSR options.*

January 8, 2018 : CMS Faculty Workshop

*Design Workshop with Chenery Middle School Faculty : Discussion on design options, working group activities on design solutions.*

January 9, 2018 : Steering Group Meeting

*Review MSBA PDP comments, review development of floor plans for design options, review the 01/11/18 traffic presentation, prepare for 01/16/18 BC meeting.*

January 9, 2018 : BHSBC Meeting #33

*Presentation of School Department work on district configuration studies and how High School configuration affects entire K-12 district.*

January 11, 2018 : BHSBC Meeting #34

*Traffic presentation on PSR options*

January 16, 2018 : Steering Group Meeting

*Review progress information on district solutions, prepare for BC decision meeting 1-23-18.*

January 16, 2018 : BHSBC meeting #35

*Discussion on design options incorporating feedback from Design Workshop, discussion on District configurations impact.*

January 23, 2018 : Steering Group Meeting

*Review progress information on district solutions, prepare for Building Committee decision meeting that evening.*

January 23, 2018 : BHSBC Meeting #36

*Committee vote on grade configuration and preferred site design option.*

January 30, 2018 : Steering Group Meeting

*Review major building systems and NZE strategies*

January 31, 2018 : BHS Faculty Workshop

*Mash Up Exercise: Examine dynamic program adjacencies with Belmont High School faculty.*

February 01, 2018 : BHSBC Meeting #37

*Review PSR content and updates to preferred design option.*

February 06, 2018, 2018 : Steering Group Meeting

*Review and take action on PSR materials.*

February 13, 2018 : BHSBC Meeting #38

*Committee reviews PSR, votes for approval of PSR.*

February 16, 2018

*PSR submission to MSBA*

## 3.3.1 - INTRODUCTION

### B. PROJECT SCHEDULE UPDATE

The project schedule remains the essentially the same as that submitted with the Preliminary Design Program and as summarized below.

Submit Preferred Schematic Design to MSBA	February 21 <sup>st</sup> , 2018
Projected MSBA Board of Directors Approval to proceed to Schematic Design	April 10 <sup>th</sup> , 2018
Submit Schematic Design to MSBA	July 11 <sup>th</sup> , 2018
Projected MSBA Board of Directors Approval of Schematic Design and Project Scope Budget Agreement	August 29 <sup>th</sup> , 2018
Town of Belmont Debt Exclusion Ballot for Project Funding	November 6 <sup>th</sup> , 2018
Design Development Complete	June 2018
Construction Documents Complete	December 2019
Anticipated Start of Construction	April 2020
Substantial Completion	October 2023

It is anticipated that the project will use the Construction Manager at Risk (149A CM-R) delivery method. During the Schematic Design phase, a detailed procurement and construction schedule will be developed. This will include construction phasing plans and will investigate the possibly of early works packages in advance of the final construction documents.



## C. EXISTING CONDITIONS SUMMARY

### C. EXISTING CONDITIONS SUMMARY

**TRAFFIC:** At the January 11th BHSBC open meeting, Nelson Nygaard discussed several existing transportation and parking issues that inhibit the ability of students, parents, teachers, and staff to access the school safely and efficiently. These issues include high demand for parking during school hours, long traffic queues in all directions during peak pickup/drop-off periods, dangers for people crossing by foot and by bike across routes with high speeds, and vehicular traffic queues, and unwanted parking spillover from vehicles not accommodated on-site onto neighboring residential streets. Anticipated school population growth could compound these issues if not effectively mitigated. Belmont High School is expected to grow from its current enrollment of 1,300 students to about 1,450 students by 2024. In addition, Belmont Public Schools has considered enrolling seventh- and eighth-grade students at Belmont High School to ease population pressures at other schools in the district. This information is to set a baseline for potential future solutions and/or mitigation measures.

The current high school site creates off-site queues and intersection impacts that have grown over time with the general increase in driving to schools observed in Belmont, regionally, and nationally, as more students have access to their own car and parents are more inclined to giving their children rides instead of walking, biking or taking the bus. However, the high school's off-site impacts are mostly the result of three site design factors:

- First, a one-way driveway concentrates all entering traffic at the Hittinger & Underwood intersection, forcing all entering cars and buses to use only those smaller residential streets during morning drop-off when overall commute traffic is near its peak. This problem is compounded by allowing some exiting traffic to go back out into the Hittinger & Underwood intersection. Meanwhile, the majority of exiting traffic is concentrated at the Concord Ave. exit and can only turn right, which puts left-turn and U-turn burden on the next available intersection at Goden Street for all cars destined for points east and south, which is the typical commute direction.
- Second, the main parking lot has an entry and exit under 100-feet from the Hittinger & Underwood intersection, creating multiple conflict and decision points within a very short distance. This forces drivers to cautiously yield to other entering traffic, exiting traffic, entering bicycles, and students on foot at two crosswalks within a very short distance, contributing to delays.

- Third, while ample queue storage exists between the front door drop-off and the nearest intersection (Hittinger & Underwood), this is not the case with parking lot queues. Any delays created in the main lot can create a parking queue that readily spills the short distance (100-feet) onto the entry driveway, which is already a conflicted location, as noted above.

In summary, these three aspects of the existing site conditions cause extensive queuing on Hittinger & Underwood, which impacts their respective intersections with Brighton and Concord quite some distance away. To remedy this situation and accommodate the planned enrollment growth, the proposed site configuration resolves each of these three conditions. Firstly, the main driveway is recommended to be two-way, which enables trips to and from Concord as well as Hittinger. Nearly half the existing volume entering at Hittinger & Underwood is expected in the future, with approximately half of entrances and exits now occurring at Concord. Furthermore, the Concord exit is planned to allow lefts out of the site, eliminating any U-turn threat by providing direct eastbound access and encouraging the use of streets besides Goden to proceed southbound. Secondly, the driveway has no internal intersections for at least 300-feet into the site (from either Hittinger or Concord), eliminating the multiple conflict points which are causing most of the delay and queuing on Hittinger and Underwood. Not only is each end of the driveway separated from nearby intersections, conflicts are further minimized by reducing the multiple conflict points with walking and biking students by separating walk & bike desire lines from driving desire lines (walkers and bikers will primarily enter and exit a block west of the eastern driveway or a block east of the western driveway). Finally, if there is any queuing caused by any parking delays on-site, all parking is separated from the driveway's intersections by over 300-feet with no redundant conflict points in-between, helping store any potential queues internal to the site.

With respect to future student population growth, a conservative estimation of future enrollment growth in grades 9-12 projects about 200 new driving trips during drop-off or pick-up. However, the project hopes that rates of walking, biking and transit will increase with better programs to manage driving demand, including priced parking permits, reduced bus service fees, and new signalized crossings of Concord Ave. If implemented, these measures would offset any growth in enrollment. Meanwhile, the addition of 7th and 8th grades to the site is not expected to grow traffic significantly due to the known access patterns of students in these grades, which includes significantly higher rates of bus ridership, no on-site parking, and greater rates of walking and biking. This produces another 300 new

## 3.3.1 - INTRODUCTION

### D. ALTERNATIVES SUMMARY

driving trips, resulting in a maximum increase of 500 cars during drop-off or pick-up. The above circulation improvements will easily accommodate this growth without impact to surrounding streets.

More detail on the findings, refer to the traffic report found in Section 3.3.2 Evaluation of Existing Conditions.

**ZONING:** The Dover Amendment (MGL Chapter 40A Section 3) provides an exemption from some zoning regulations for educational facilities (among others), but permits reasonable regulation related to a building's height and mass, along with yard sizes, lot area, set backs, open space, parking, lighting, and building coverage requirements.

The Belmont High School Building Committee has arranged for meetings with the planning board and the TAC (Traffic Advisory Committee). Planning board meetings are scheduled to take place on April 10th and June 5th of 2018 to review the project status and provide input. The team is scheduled to meet with the TAC and their consultant BSC group on February 8th, 2018 and March 8th, 2018 to review existing traffic and circulation (bike, pedestrian, etc.) conditions and proposed solutions.

#### ALTERNATIVES SUMMARY

As noted in the PDP, 22 original options were presented to the Building Committee, administration and community members. They consisted of the following:

##### I. BASE REPAIRS ONLY

##### II. RENOVATION AND ADDITION

- **Option 2.1:** Major renovation minor addition (9-12/ 8-12/ 7-12)
- **Option 2.2:** Minor renovation major addition (9-12/ 8-12/ 7-12)
- **Option 2.3:** Minor renovation major addition (9-12/ 8-12/ 7-12)
- **Option 2.4:** Minor renovation major addition (9-12/ 8-12/ 7-12)
- **Option 2.5:** Minor renovation major addition (9-12/ 8-12/ 7-12)

•

##### III. NEW CONSTRUCTION

- **Option 3.1:** New construction West of BHS (9-12/ 8-12/ 7-12)
- **Option 3.2:** New construction West of stadium (9-12/ 8-12/ 7-12)

After the Building Committee vote, three were eliminated for the following reasons:

**Option 2.2:** Consolidated with Option 2.1 option.

**Option 2.5:** Separating the field house from the general educational facility was not desirable. The proposed building location was too close to the East side of the site - making traffic, parking, and circulation too challenging to develop.

**Option 3.2:** Required moving a newly constructed stadium and an ice rink, which is not part of our project. Due to cost and schedule, this option was eliminated.

The remaining 13 options were presented and noted as follows:

##### I. BASE REPAIRS ONLY

##### II. RENOVATION AND ADDITION

- **Option 2.1:** Major renovation minor addition (9-12/ 8-12/ 7-12)
- **Option 2.3:** Minor renovation major addition (9-12/ 8-12/ 7-12)
- **Option 2.4:** Minor renovation major addition (9-12/ 8-12/ 7-12)

##### III. NEW CONSTRUCTION

- **Option 3.1:** New construction on West side of BHS.

As noted previously, the Design Team had been working on multiple schemes on the existing site in order to fully explore the range of options that the site presented. During this period of study, the team developed a more viable design site option for the 2.3, 2.4, and 3.1 schemes based on feedback from the community and the building committee. These new options were presented to the Building Committee on January 16, 2018 and at this meeting the BHSBC allowed the design team to move forward with these updated site schemes.

The list of modified options are composed as follows:

## E. PREFERRED SOLUTION SUMMARY

- Option 2.3; Minor Renovation and Addition to existing building (grades 9-12 / 8-12 / 7-12)
- Option 2.4; Minor Renovation and Addition to existing building (grades 9-12 / 8-12 / 7-12)
- Option 3.1; New Construction to the west of existing building (grades 9-12 / 8-12 / 7-12)

At the January 23, 2018 BHSBC meeting prior to the PSR submission, Options 2.1, 2.3, and 3.1 were removed from further consideration by Building Committee vote. And as noted previously, at the same meeting the School Committee voted to remove the 9-12 and 8-12 grade configuration from further consideration, leaving only an 7-12 grade configuration, thus reducing the options to one:

- Option C.2.4: Minor Renovation and Major Addition to existing building (grades 7-12)

**COSTING:** Consideration and selection of the preferred options by the Building Committee could not be completed without a thorough evaluation of the cost implications of each. Given the early stage of the design process, the costing process would not involve producing a true budget, but a level 2 comparative cost analysis of each of the options. In order to ensure the most thorough analysis, Daedalus Projects, Inc. and the Design Team with PM&C, each prepared a cost analysis for each option that were reconciled and presented to the Building Committee.

Each site consideration includes all athletic fields to ensure that the sites remained roughly equivalent in athletic program amenities to the existing program with the notable exception of tennis courts.

In summary, the Comparative Cost Analysis indicated the existing BHS building site to be the least costly option, but does not satisfy the new selected grade configuration of 7-12.

The following summary includes Project Costs with both hard and soft costs. Option 2.1 a is considered in response to the MSBA PDP letter and was reviewed by the BHSBC, cost estimator, OPM for content, project duration, and cost. The information was presented in a joint meeting with BHSBC, SC, BOS and is referenced in this section only. More detailed information on all other options can be found in Section 3.3.3 Final Evaluation of Alternatives and in Section 3.3.4 Preferred Solution.

- Option 1.0: \$111.5 million
- Option 2.1: \$302.1 million

- Option 2.1 a: \$279.8 million
- Option 2.3: \$307.3 million
- Option 2.4: \$307.2 million
- Option 3.1: \$293.8 million

**SUSTAINABILITY:** The MSBA sustainability program is required of all their funded projects, with emphasis placed on reducing energy and water consumption. The MSBA requires that all core program projects be registered with USGBC LEED-S Version 4 or Northeast CHPS Version 3, and comply with a series of options, two of which allowed for an additional 2% of reimbursement provided higher targets were met for sustainability. The Design Team is working with LEED due to it's familiarity and higher level of development.

During the PDP phase, the Design Team organized a joint meeting with BHSBC, BOS and SC on December 07, 2017 where a number of potential objectives and strategies were outlined, with the intent of clarifying those that most aligned with the Town's needs. On January 30, 2018, the design team met with the BHSBC's Subcommittee on Building Operation and Systems and introduced core concepts of sustainability and showed how they might become integral to student life at the high school as well as providing long term benefits to the district by presenting Zero Net Energy strategies for potential building systems (MEP, FP, IT, Civil) that could service the new project and the process it would take to achieve and/or maximize these sustainable goals. During the ensuing discussion, it came to light that the extent of air-conditioning was a prime concern and should be considered among the highest priorities of any sustainable strategy. The subcommittee voted to move forward with the most recent LEED-S (Leadership in Energy and Environmental Design for Schools) as the sustainable green program that will record and rate all the energy efficiency / sustainability components of the project.

### PREFERRED SOLUTION SUMMARY

In order to assist the BHSBC in their decision making process, the design team worked with the committee to develop a matrix that would allow for each site option to be weighed according to a series of criteria agreed upon by all. These ranged from delivery of educational program to traffic to impact to neighbors and scheduling, with each Board member selecting their preferred

## 3.3.1 - INTRODUCTION

### E. PREFERRED SOLUTION SUMMARY

option and grade configuration by open vote, the results adding up to a higher ranked option. This matrix distilled the concerns that had been raised by the Board member themselves as well as those of the Town residents and neighbors who spoke at the many Town meetings passionately in favor of one option or another.

This matrix, in conjunction with the Comparative Cost Analysis, provided the means for the Committee to make a decision about which option to proceed with, though in the end the proposed preservation of the existing pool / fieldhouse and siting advantages of Option C.2.4, proved itself most advantageous to the Town of Belmont, and was selected on January 23, 2018 as the preferred solution by a unanimous vote.

After the preferred selection, the Design Team continued to develop the plans, making revisions to the location of the academic neighborhoods and common program that would allow for public access without traveling through the more private areas of the school. Due to construction phasing issues, the team recommended that the lower school grades be located to the East of the existing Fieldhouse/pool, organized vertically, thereby minimizing the concerns of disrupting existing educational programs.

The design of the overall site continued to be organized to maintain current athletic field activities and increased parking count, as well as the parent drop off and public access to off hours community areas in the school.

Among the issues raised, during BHSBC meetings after the preferred solution vote, was concern for the height of the building, noise mitigation from the MBTA rail line, improved traffic conditions and pedestrian / bike safety into and throughout site. Traffic review will continue to be addressed in the Schematic Design phase.



## F. MSBA PDP REVIEW

On January 18, 2018, the MSBA released comments from their review of the Preliminary Design Program.

# Massachusetts School Building Authority

Deborah B. Goldberg  
*Chairman, State Treasurer*

James A. MacDonald  
*Chief Executive Officer*

John K. McCarthy  
*Executive Director / Deputy CEO*

January 18, 2018

Mr. Jim Williams, Chair  
Belmont Board of Selectmen  
Office of the Board of Selectmen  
455 Concord Avenue, 2<sup>nd</sup> Floor  
Belmont, MA 02478

Re: Town of Belmont, Belmont High School

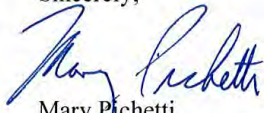
Dear Mr. Williams:

The Massachusetts School Building Authority (the "MSBA") is forwarding review comments for the Module 3 Feasibility Study Preliminary Design Program submission for the Belmont High School project in the Town of Belmont, received by the MSBA on December 5, 2017.

Responses to the attached comments shall be forwarded to Jess Deleconio (Jess.Deleconio@MassSchoolBuildings.org) through the Owner's Project Manager. Please review and return responses within 14 days of receipt of this letter.

If you have any questions or comments, please do not hesitate to contact Karl Brown (Karl.Brown@MassSchoolBuildings.org).

Sincerely,



Mary Pichetti  
Director of Capital Planning

Cc: Legislative Delegation  
Patrice Garvin, Belmont Town Administrator  
Phyllis Marshall, Assistant Town Administrator  
Floyd S. Carman, Belmont Treasurer & Collector  
Lisa Fiore, Chair, Belmont School Committee  
John P. Phelan, Superintendent, Belmont Public Schools  
William D. Lovallo, Chair, Belmont High School Building Committee  
Richard Marks, Owner's Project Manager, Daedalus Projects, Inc.  
Thomas Gatzunis, Owner's Project Manager, Daedalus Projects, Inc.  
Brooke Trivas, Designer, Perkins+Will  
File: Letters 10.2 (Region 4)

40 Broad Street, Suite 500 • Boston, MA 02109 • Tel: 617-720-4466 • [www.MassSchoolBuildings.org](http://www.MassSchoolBuildings.org)



# 3.3.1 - INTRODUCTION

## F. MSBA PDP REVIEW

### ATTACHMENT A MODULE 3 – PRELIMINARY DESIGN PROGRAM REVIEW COMMENTS

**District:** Town of Belmont  
**School:** Belmont High School  
**Owner’s Project Manager:** Daedalus Projects, Inc.  
**Designer Firm:** Perkins+Will  
**Submittal Due Date:** December 13, 2017  
**Submittal Received Date:** December 13, 2017  
**Review Date:** December 13, 2017 - January 12, 2018  
**Reviewed by:** A.Waldron, K.Brown, J.Jumpe

#### MSBA REVIEW COMMENTS

The following comments<sup>1</sup> on the Preliminary Design Program (PDP) submittal are issued pursuant to a review of the project submittal document for the proposed project presented as a part of the Feasibility Study submission in accordance with the MSBA Module 3 Guidelines.

#### ITEMS REQUIRING IMMEDIATE ACTION:

*The December 15, 2017 cursory review email identified several items in the Educational Program that require additional elaboration as detailed below in section 3.1.2. The District was requested to provide those items while this review is in process, and as noted below, MSBA required a revised Educational Program that includes those clarifications in the District’s response to the cursory review (note that this revised Educational Program was provided to MSBA on January 16, 2018. MSBA will provide supplemental review comments for this document after it is reviewed).*

*As detailed below in section 3.1.6 Preliminary Evaluation of Alternatives, MSBA requests that the District/design team include an add/reno option for consideration in the following PSR submittal that includes the minimum renovation and addition required to meet current code and comply with the educational program.*

#### 3.1 PRELIMINARY DESIGN PROGRAM

Overview of the Preliminary Design Program Submittal	Complete	Provided; <i>Refer to comments following each section</i>	Not Provided; <i>Refer to comments following each section</i>	Receipt of District’s Response; <i>To be filled out by MSBA Staff</i>
OPM Certification of Completeness and Conformity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Table of Contents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<sup>1</sup> The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA’s guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project’s planning process or plans and specifications.



## F. MSBA PDP REVIEW

Overview of the Preliminary Design Program Submittal	Complete	Provided; <i>Refer to comments following each section</i>	Not Provided; <i>Refer to comments following each section</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
3.1.1 Introduction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.2 Educational Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.3 Initial Space Summary	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.4 Evaluation of Existing Conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.5 Site Development Requirements	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.6 Preliminary Evaluation of Alternatives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.7 Local Actions and Approvals Certification(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.8 Appendices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 3.1.1 INTRODUCTION

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Summary of the Facility Deficiencies and Current S.O.I.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Date of invitation to conduct a Feasibility Study and MSBA Board Action Letter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Executed Design Enrollment Certification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Narrative of the Capital Budget Statement and Target Budget	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Project Directory with contact information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Updated Project Schedule	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

#1) As noted in the December 15, 2017 cursory review email, provide a brief summary of the facility deficiencies identified by the District in the Statement of Interest.

No further review comments for this section.

### 3.3.1 - INTRODUCTION

#### F. MSBA PDP REVIEW

##### 3.1.2 EDUCATIONAL PROGRAM

Provide a summary and description of the existing educational program, and the new or expanded educational vision, specifications, process, teaching philosophy statement, as well as the District's curriculum goals and objectives of the program. Include description of the following items:

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Grade and School Configuration Policies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Class Size Policies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	School Scheduling Method	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Teaching Methodology and Structure				
	a) Administrative and Academic Organization/Structure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	b) Curriculum Delivery Methods and Practices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) English Language Arts/Literacy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Mathematics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Science	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Social Studies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) World Languages	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	h) Academic Support Programming Spaces	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	i) Student Guidance and Support Services	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Teacher Planning and Professional Development	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Pre-kindergarten	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Kindergarten	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Lunch Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Technology Instruction Policies and Program Requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Media Center/Library	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Visual Arts Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Performing Arts Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Physical Education Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Special Education Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Vocation and Technology Programs				
	a) Non-Chapter 74 Programming	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Chapter 74 Programming	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Transportation Policies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Functional and Spatial Relationships	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18	Security and Visual Access Requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## F. MSBA PDP REVIEW

### MSBA Review Comments:

The December 15, 2017 cursory review email identified the following items in the Educational Program that require additional elaboration (note that a revised Educational Program was provided to MSBA on January 16, 2018. MSBA will provide supplemental review comments for this document after it is reviewed).

#3) Provide a description of the current and proposed school scheduling method.

#4a,4i) Provide a detailed description of the following (both existing and proposed):

- Administrative and academic organization/structure (e.g., academies, departments, houses, grade based cohorts, teams, rooms, assignment policies, teams, etc.)
- Student Administrative Guidance and Support Services
- Teaching Methodology

#17) Elaborate on the following (both existing and proposed):

- Functional and spatial relationships
- Key programmatic adjacencies

No further review comments for this section.

### 3.1.3 INITIAL SPACE SUMMARY

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	Space summary; one per approved design enrollment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Floor plans of the existing facility	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Narrative description of reasons for all variances (if any) between proposed net and gross areas as compared to MSBA guidelines	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### MSBA Review Comments:

1) The MSBA has performed an initial review of the space summary and offers the following:

- *Study Enrollment Options:*
  - Option 1: 2,215 students in grades 7-12
  - Option 2: 1,845 students in grades 8-12
  - Option 3: 1,470 students in grades 9-12

*General comment applicable to all space categories below - note that all new construction must comply with the MSBA standards for eligibility, whether in a new building or an addition / renovation project. The MSBA considers it critical that the Districts and their Designers aggressively pursue design strategies to achieve compliance with the MSBA guidelines for all proposed projects in the new program and strive to meet the gross square footage allowed per student and the core classroom space standards, as outlined in the guidelines. The MSBA also*

### 3.3.1 - INTRODUCTION

#### F. MSBA PDP REVIEW

*considers its stance on core classroom space critical to its mission of supporting the construction of successful school projects throughout the Commonwealth that meet current and future educational demands. The MSBA does not want to see this critical component of education suffer at the expense of larger or grander spaces that are not directly involved in the education of students.*

- **Core Academic** – *Proposed programmatic spaces appear to exceed the MSBA guidelines. This is due to additional classrooms above guideline, additional small group seminar areas, and ELL spaces. Per the information provided, the submittal proposes the following spaces:*

Anticipated Core Academic Spaces*	Grades 7-12 Option	Grades 8-12 Option	Grades 9-12 Option
General Classrooms	85	70	63
Teacher Planning	8 (MS) + 6 (HS)	4 (MS) + 6 (HS)	6 (HS)
Small Group Seminar	6	5	4
Science Classroom/Lab	20	16	12
Prep Room	10	8	6
Central Chemical Storage Room	1	1	1
ELL	2	2	1

*\*Provide proposed scheduling information specific to these spaces.*

*\*\*The MSBA will rely on the District’s Educational Program and additional information to understand how proposed spaces that are unique to the District will be utilized in the proposed project.*

*The MSBA calculates all three enrollment options as having a utilization rate in the 71-77% range. Provide an explanation for why additional classrooms above guidelines are proposed. The MSBA targets a utilization rate of 85% and will look for the District to find efficiencies in future submittals.*

- **Special Education** – *Proposed programmatic spaces appear to exceed the MSBA guidelines. Note that the Special Education program is subject to approval by the Department of Elementary and Secondary Education (“DESE”). The District should provide the required information required with the Schematic Design submittal. Formal approval of the District’s proposed Special Education program by the DESE is a prerequisite for executing a Project Funding Agreement with the MSBA.*
- **Art & Music / Voc- Tech** – *Combined proposed programmatic spaces in these categories appear to exceed the MSBA guidelines for the 9-12 options and appear to be below the MSBA guidelines for the 7-12 and 8-12 options. Confirm that no Chapter 74 programs are being proposed. Given the relatively low utilization rate in the Core Academic category as noted above, the MSBA will look for continued efficiency refinements in future submittals within all educational capacity-generating spaces, including “specials” in the Art/Music and Voc-tech categories. No further preliminary comments.*
- **Health & Physical Education** – *Proposed programmatic spaces appear to exceed the MSBA guidelines, in both the new construction and the addition/renovation options. The proposed existing gymnasium area is 30,183 nsf. For new building options, the submittal proposes the MSBA maximum allowable gymnasium area of 18,000 nsf, as well as various PE Alternatives spaces. Depending on the District’s preferred option and grade configuration selected in the*



## F. MSBA PDP REVIEW

*following submittal, any area in excess of MSBA space guidelines will be considered ineligible for reimbursement (refer to the attached Memorandum which presents MSBA policy regarding auditorium and gym spaces beyond those included in the guidelines). No further preliminary comments.*

- **Media Center** – Proposed programmatic spaces appear to align with the MSBA guidelines. No further preliminary comments.

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  - **Auditorium/Drama** – Proposed programmatic spaces appear to exceed the MSBA guidelines, based on providing auditorium / drama spaces for the entire design enrollment including the middle school grades. This overage is due to a larger stage area and the inclusion of a 3,000 nsf Black Box Theatre in each option. Although the MSBA does not take issue with these added spaces, the overall nsf of this category should comply with MSBA’s guidelines for each design enrollment. Depending on the District’s preferred option and grade configuration selected in the following submittal, any area in excess of MSBA space guidelines will be considered ineligible for reimbursement (refer to the attached Memorandum which presents MSBA policy regarding auditorium and gym spaces beyond those included in the guidelines). No further preliminary comments.
  - **Dining & Food Service** – Proposed programmatic spaces appear to align with the MSBA guidelines. No further preliminary comments.
  - **Medical** – Proposed programmatic spaces appear to align with the MSBA guidelines for the 9-12 options and exceed guidelines for the 8-12 and 7-12 options. This overage appears to result from inherent inefficiencies relating to separating medical spaces between middle school and high school students. The MSBA will evaluate the eligibility for funding for areas in excess of the guidelines in future submittals. No further preliminary comments.
  - **Administration & Guidance** – Proposed programmatic spaces appear to exceed the MSBA guidelines. MSBA will evaluate the eligibility for funding for areas in excess of the guidelines in future submittals. No further preliminary comments.
  - **Custodial & Maintenance** – Proposed programmatic spaces appear to exceed the MSBA guidelines. This overage is due to the inclusion of a 150 nsf maintenance equipment area. MSBA will evaluate the eligibility for funding for areas in excess of the guidelines in future submittals. No further preliminary comments.
  - **Other** –For each option, this category contains: District Offices, Technology Offices and associated conference room, Metco Classroom and office, BEA Office, Food Service Director Office, District Nurse Office, Resource Officer, and School Store. In the subsequent PSR submittal, the District must fully describe the function, intended users and scheduling of each of these spaces. Confirm that the Food Service Director Office is a District wide space. If it is not, reallocate this area to the Dining and Food Service category. MSBA will evaluate the eligibility for funding for areas in excess of the guidelines in future submittals. Note that all area associated with any District function in any option will be ineligible for reimbursement.
- Addition/ Renovation options also include the renovation of the existing 9,067 nsf area associated with the pool. Costs associated with pool and associated pool support spaces and systems must be itemized in each cost estimate moving forward in the MSBA process. Per 963 CMR 2.16(5), any work associated with this renovated pool & support space will be*

### 3.3.1 - INTRODUCTION

#### F. MSBA PDP REVIEW

*considered ineligible for reimbursement, and, MSBA will not support a project that includes a newly constructed swimming pool.*

*Note that upon selection of a preferred solution, the District may be required to adjust spaces/square footage that exceeds the MSBA guidelines and is not supported by the Educational Program provided. No further preliminary comments.*

*No further review comments for this section.*

#### 3.1.4 EVALUATION OF EXISTING CONDITIONS

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Confirmation of legal title to the property.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Determination that the property is available for development.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Existing historically significant features and any related effect on the project design and/or schedule.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Determination of any development restrictions that may apply.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Initial Evaluation of building code compliance for the existing facility.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Initial Evaluation of Architectural Access Board rules and regulations and their application to a potential project.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Preliminary evaluation of significant structural, environmental, geotechnical, or other physical conditions that may impact the cost and evaluations of alternatives.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Determination for need and schedule for soils exploration and geotechnical evaluation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Environmental site assessments minimally consisting of a Phase I: Initial Site Investigation performed by a licensed site professional.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Assessment of the school for the presence of hazardous materials.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Previous existing building and/or site reports, studies, drawings, etc. provided by the district, if any.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

*3) The submittal includes a letter from the Belmont Historic District Commission (dated November 21, 2017) in which the town describes the landscaped area including the Clay Pit Pond and the 1910/1932 White Memorial Field House two-story brick structure (currently used as team locker rooms and DPW Park maintenance equipment) as historic. Include in the schedule submitted with the schematic design, the timeline associated with filing with the*



**F. MSBA PDP REVIEW**

Massachusetts Historical Commission (“MHC”) and obtaining MHC approval prior to construction bids. The District should keep the MSBA informed of any decisions and/or proposed actions and should confirm that the proposed project is in conformance with Massachusetts General Law 950, CRM 71.00.

7) The existing conditions analysis notes that the Clay Pit Pond & surrounding landscaped area are classified as a wetlands area (which includes the associated buffer area requirements), and is considered to be “Protected Open Space”. This area is also located in Zone AE, within the 100 year, 1% annual flood plain zone. In the District’s response to this review, provide a summary description how this may affect site development and costs for this project.

In addition, list any development restrictions (if any) and potential added costs associated with the following site conditions described in the submittal:

- building adjacent to the existing MBTA Fitchburg rail line along the northern site border,
- the existing multi-generational walking path and amenities around the pond,
- the onsite future Belmont community path parallel to the rail line, and
- the potential future pedestrian connecting underpass at Alexander St./ MBTA Fitchburg rail line.

8) The report provided by McPhail Associates indicates the use of previous borings and foundation recommendations from the construction of the existing Belmont High School, and that additional testing should be done during the PSR phase to identify specific pile types required. Provide any updated information in the subsequent Preferred Schematic Report (“PSR”) submittal.

9) The Phase 1 assessment identified two Recognized Environmental Conditions (one associated with the site’s historical use as a landfill, the other with the presence of an abandoned Underground Storage Tank near the hockey rink). However, this Phase 1 report does not state definitively whether (or not) additional Phase 2 geo-environmental investigations are recommended. In response to these comments, clarify and describe any future potential site investigations in this regard. Additionally, MSBA notes that all costs associated with abatement of contaminated soil from any source, and abatement of underground storage tanks must be itemized in the cost estimates for the following Schematic Design submittal as ineligible for MSBA reimbursement.

10) MSBA notes that all costs associated with the removal of asbestos containing floor and ceiling tiles are categorically ineligible for MSBA reimbursement. Additionally, the project team should be aware of the current policies associated with MSBA’s participation in the abatement and removal of hazardous materials.

No further review comments for this section.

**3.1.5 SITE DEVELOPMENT REQUIREMENTS**

Provide the following Items		Complete; No response required	Provided; District’s response required	Not Provided; District’s response required	Receipt of District’s Response; To be filled out by MSBA Staff
1	A narrative describing project requirements related to site development to be considered during the preliminary and final evaluation of alternatives.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Existing site plan(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 3.3.1 - INTRODUCTION

#### F. MSBA PDP REVIEW

**MSBA Review Comments:**

*1) In the District's response to these comments, for each option considered for further evaluation, describe how the proposed building massing, major educational spaces and classroom areas are configured on the site in response to solar orientation and views to the exterior. Describe any limitations in this regard that may affect the proposed design(s), how these limitations could be mitigated, and how these limitations may determine the District's selection of a preferred option. Describe any intended sun control or shading devices that may respond to the proposed orientation; i.e. window configuration, exterior louvers, shading devices, roof overhangs, interior deflecting shelves, etc.*

*In response to these comments, describe how the onsite number of parking spaces for each of staff, student drivers, and visitors will be determined. Describe whether the required parking will be determined by school needs, after-hours athletic/performance needs, and/or local zoning requirements. In addition, provide a timeline associated with the needed permits, filings, and reviews discussed in this section.*

*The MSBA notes that the existing historic White Memorial Field House is proposed to be demolished and replaced with athletic parking adjacent to the skating rink. Describe whether this proposed parking area is functionally associated with the skating rink, or how this may be associated with the educational operation of the school (eligibility of MSBA funding for this scope of work will be determined in the Project Scope and Budget phase of the Feasibility Study).*

*No further review comments for this section.*

#### 3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

	Provide the following Items	Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	Analysis of school district student school assignment practices and available space in other schools in the district	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Tuition agreement with adjacent school districts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Rental or acquisition of existing buildings that could be made available for school use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Code Upgrade option that includes repair of systems and/or scope required for purposes of code compliance; with no modification of existing spaces or their function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Renovation(s) and/or addition(s) of varying degrees to the existing building(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Construction of new building and the evaluation of potential locations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	List of 3 distinct alternatives (including at least 1 renovation and/or addition option) are recommended for further development and evaluation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## F. MSBA PDP REVIEW

### MSBA Review Comments:

*(General comment about the District's Preliminary Evaluation of Alternatives)*

~~As stated in the enrollment letter, the MSBA's study enrollment recommendations assume full utilization of all school facilities. Accordingly, the District will be required to determine the enrollment capacity of each existing facility anticipated to remain in service if a grade reconfiguration is determined to be the Preferred Solution. The District will be required to demonstrate in the Preferred Schematic Report that any reconfiguration proposed as the District's Preferred Solution has been approved by the School Committee and other necessary District officials. Further, the MSBA will require a written plan from the District describing the process for determining local support for potential grade reconfiguration.~~

*Note that these recommendations do not represent an affirmation by the MSBA for approval of any of these options, and are intended only to provide a framework to inform the feasibility study to be conducted as a mean of determining the most cost effective and educationally sound solution to be agreed upon by the District and the MSBA.*

2) The submittal notes that the District has removed themselves as a member town from the Minuteman Regional Vocational Technical School District, and will be seeking alternative vocational programming for their students, including continuing to send students as "Out of District" students. In response to these comments, confirm that no Chapter 74 programming is being proposed for this project.

5) Option 2.1 is the only addition/renovation option recommended for further evaluation that maintains more than field house and pool functions of the existing school, although it is unclear how much is retained other than the auditorium. The submittal notes that the 'entire building structure- including caissons, foundations, concrete floor, roof slabs, and concrete beams- would remain and be reused'. This implies that exterior envelope and all interior partitions would be demolished, as well as all systems in the building. Based on the submitted options, the MSBA has concerns that keeping the spaces ineligible for MSBA funding such as the pool and field house may be limiting the District's choice of options (please clarify). For the following PSR submittal, the MSBA asks that the District / design team include an add/reno option for evaluation for the selected grade configuration that includes the minimum renovation and addition required to meet current building code and comply with the necessary educational program meeting MSBA space guidelines; i.e., bringing any "existing-to-remain" portions of the building up to code, modifying partition locations only as needed, re-assigning space locations to meet the program, and any building addition required to provide MSBA space guideline area.

*Documents in the following submittal should include floor plans that clearly delineate new, renovated and existing-to-remain areas.*

6) All options for the project are located on the existing High School site due to a lack of alternate sites in the community of the size required for this project (no alternate sites are under consideration). No response required.

7) See comment 5.

*No further review comments for this section.*

### 3.3.1 - INTRODUCTION

#### F. MSBA PDP REVIEW

##### 3.1.7 LOCAL ACTIONS AND APPROVAL

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	Certified copies of the School Building Committee meeting notes showing specific submittal approval vote language and voting results, and a list of associated School Building Committee meeting dates, agenda, attendees and description of the presentation materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Signed Local Actions and Approvals Certification(s):				
	a) Submittal approval certificate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Grade reconfiguration and/or redistricting approval certificate (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	<b><i>Applicable for Districts proposing grade reconfiguration and/or redistricting /consolidation</i></b> Provide the following items to document approval and public notification of school configuration changes associated with the proposed project				
	a) A description of the local process required to authorize a change to the existing grade configuration or redistricting in the district	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	b) A list of associated public meeting dates, agenda, attendees and description of the presentation materials	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	c) Certified copies of the governing body (e.g. School Building Committee) meeting notes showing specific grade reconfiguration and/or redistricting, vote language, and voting results if required locally	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	d) A certification from the Superintendent stating the District's intent to implement a grade configuration or consolidate schools, as applicable. The certification must be signed by the Chief Executive Officer, Superintendent of Schools, and Chair of the School Committee	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

*2b, 3a-d) In the event that the District selects a grade configuration / preferred option in the PSR phase of the feasibility study that is not the current high school 9-12 configuration (i.e. the 7-12 and 8-12 configurations described in the Study Certification), the PSR submittal should include the appropriate documentation associated with grade reconfiguration noted above in (3.1.7) 2b and 3a-d.*

*No further review comments for this section.*



## F. MSBA PDP REVIEW

### 3.1.8 APPENDICES

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Current Statement of Interest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	MSBA Board Action Letter including the invitation to conduct a Feasibility Study	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Design Enrollment Certification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

*No review comments for this section.*

**Additional Comments:**

*The MSBA issues project advisories from time to time, as informational updates for Districts, Owner's Project Managers (OPM's), and Designers in an effort to facilitate the efficient and effective administration of proposed projects currently pending review by the MSBA. The advisories can be found on the MSBA's website. In response to these review comments, please confirm that the District's consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable.*

**End**

## 3.3.1 - INTRODUCTION

### F. MSBA PDP REVIEW

#### MEMORANDUM

TO: Board of Directors, Massachusetts School Building Authority  
FROM: Maureen G. Valente, Chief Executive Officer  
John K. McCarthy, Executive Director, Deputy Chief Executive Officer  
SUBJECT: Staff Recommendation for policy revisions to allow for auditorium and  
gymnasium spaces in excess of the MSBA Space Summary Guidelines at the  
district's sole expense  
DATE: November 2, 2016

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Based upon review of project data and discussions with the Board of Directors, staff is recommending a policy revision to the Massachusetts School Building Authority (the "MSBA") space guidelines specifically for Auditorium and Gymnasium related spaces that are in excess of those included in the MSBA space summary guidelines.

#### **Background**

Based on project reviews in late fall 2015, the Board of Directors requested that staff provide information regarding the potential to revise the policies for space guidelines to allow for requests by districts for spaces in excess of the MSBA's guidelines at the district's sole expense. Staff presented an overview of current policies and practices at the March 16, 2016 Board of Directors meeting and followed with additional information regarding potential revisions at the March 30, 2016 Board of Directors meeting.

Based on the discussions and input received from the Board members, staff has prepared a Potential Revised Policy, included as Attachment A, which will allow districts to include spaces in excess of the MSBA's space summary guidelines at the district's sole expense for two program areas: auditorium and gymnasium. Staff has received favorable feedback regarding this proposed revision to the MSBA's policies, and as noted at the September 29, 2016 Board of Directors meeting and further reviewed at the October 19, 2016 Facilities Assessment Subcommittee meeting, staff have prepared this recommendation to revise the MSBA's policy for the Board of Directors approval.

#### **Recommendation**

Specific details are set forth in Attachment A: Potential Revised Policy – Auditorium and Gymnasium spaces above guidelines requested to support community use at district's sole expense.

Key features of the policy revision include:

## F. MSBA PDP REVIEW

- Areas in excess of the MSBA guidelines will be at the sole expense of the district;
  - Community support must be demonstrated prior to MSBA approval of a district’s proposed project scope and budget;
  - The MSBA will exclude from its grant the cost of the total gross square foot (“gsf”) above guidelines for these areas as shown below in the sample calculation. This amount will not change over the term of the grant even if the bids come in at a lower amount.
- 
- High Schools:
    - Upper limits on allowable nsf in excess of guidelines include:
      - The district may choose to build an auditorium in excess of MSBA guidelines, but no more than 13,300 net square foot (“nsf”) (based upon an upper limit of 1,000 seats). The MSBA funding limit will vary depending on the agreed-upon design enrollment but will not exceed 10,400 nsf; and
      - The district may choose to build a gymnasium and related spaces in excess of MSBA guidelines, but in no event shall the gymnasium exceed 18,000 nsf. The MSBA will participate in a gymnasium of up to 12,000 nsf unless adjusted by the MSBA to increase teaching stations for enrollment and/or the educational plan.
  - Middle Schools/Elementary Schools:
    - Upper limits on allowable nsf in excess of guidelines include:
      - The district may choose to build an auditorium even though the MSBA space guidelines do not include an auditorium and no portion of the design and construction of an auditorium will be reimbursed, including the stage, regardless of whether the district chooses not to include a stage in its cafeteria or gymnasium. If the district chooses to build an auditorium, the auditorium cannot be larger than 13,300 nsf; and
      - The district may choose to build a gymnasium and related spaces in excess of MSBA guidelines, but in no event shall the gymnasium itself exceed 12,000 nsf. The MSBA will participate in a gymnasium up to no more than 6,000 nsf, unless adjusted by the MSBA to increase teaching stations for enrollment and/or the education plan.
    - Sample Calculation for Auditorium space in a high school in excess of guidelines at the district’s sole expense:

Total net square footage (nsf) requested by the District	13,300 nsf
Total nsf for Auditorium Category allowed as eligible by MSBA space guidelines	10,400 nsf
Excess net square footage equals District request minus net	2,900 nsf



### 3.3.1 - INTRODUCTION

#### F. MSBA PDP REVIEW

square footage allowable by MSBA space guidelines	
Gross square foot (gsf) exclusion = Excess net square feet times the project's grossing factor. For illustration purposes, project's sample grossing factor is 1.5	$2,900 \text{ nsf} \times 1.5 = 4,350 \text{ gsf}$
Total cost of exclusion = Gross square foot times the project's total construction cost/square foot. For illustration purposes, project's total construction cost/square foot is \$375 per square foot.	$4,350 \text{ gsf} \times \$375/\text{gsf} = \$1,631,250$
Total cost of exclusion	\$1,631,250

#### Recommendation

MSBA staff is recommending a policy revision to the MSBA space guidelines specifically for Auditorium and Gymnasium related spaces that are in excess of those included in the MSBA space summary guidelines. This recommendation would be effective for districts that are approved to proceed into schematic design on or after January 1, 2017.





<b>LOCAL ACTIONS &amp; APPROVALS</b>	<b>3.3.5</b>	<b>PREFERRED SOLUTION</b>	<b>3.3.4</b>	<b>FINAL EVALUATION OF ALTERNATIVES</b>	<b>3.3.3</b>	<b>EVALUATION OF EXISTING CONDITIONS</b>	<b>3.3.2</b>	<b>INTRODUCTION</b>	<b>3.3.1</b>
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## 3.3.1 - INTRODUCTION

### G. DISTRICT PDP RESPONSE

On February 02, 2018, the District issued their responses to the MSBA. Additional responses not due until the delivery of the PSR can be found within the PSR submittal.

#### ATTACHMENT A MODULE 3 – PRELIMINARY DESIGN PROGRAM REVIEW COMMENTS

**District:** Town of Belmont  
**School:** Belmont High School  
**Owner's Project Manager:** Daedalus Projects, Inc.  
**Designer Firm:** Perkins+Will  
**Submittal Due Date:** December 13, 2017  
**Submittal Received Date:** December 13, 2017  
**Review Date:** December 13, 2017 - January 12, 2018  
**Reviewed by:** A.Waldron, K.Brown, J.Jumpe  
**BELMONT RESPONSE: February 1, 2018**

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#### MSBA REVIEW COMMENTS

The following comments<sup>1</sup> on the Preliminary Design Program (PDP) submittal are issued pursuant to a review of the project submittal document for the proposed project presented as a part of the Feasibility Study submission in accordance with the MSBA Module 3 Guidelines.

#### MSBA TEAM,

**Below, please find in red our team's response for each issue outlined by the MSBA with attachments as required. All attachments will be clearly labeled with a DOCUMENT number provided herein. Let us know if you require any additional information from the team. Thank you. Thank you for your detailed attention to the Belmont High School project.**

#### ITEMS REQUIRING IMMEDIATE ACTION:

*The December 15, 2017 cursory review email identified several items in the Educational Program that require additional elaboration as detailed below in section 3.1.2. The District was requested to provide those items while this review is in process, and as noted below, MSBA required a revised Educational Program that includes those clarifications in the District's response to the cursory review (note that this revised Educational Program was provided to MSBA on January 16, 2018. MSBA will provide supplemental review comments for this document after it is reviewed).*

*As detailed below in section 3.1.6 Preliminary Evaluation of Alternatives, MSBA requests that the District/design team include an add/reno option for consideration in the following PSR submittal that includes the minimum renovation and addition required to meet current code and comply with the educational program.*

### 3.1 PRELIMINARY DESIGN PROGRAM

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<sup>1</sup> The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA's guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project's planning process or plans and specifications.

## G. DISTRICT PDP RESPONSE

Overview of the Preliminary Design Program Submittal	Complete	Provided; <i>Refer to comments following each section</i>	Not Provided; <i>Refer to comments following each section</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
OPM Certification of Completeness and Conformity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Table of Contents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.1 Introduction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.2 Educational Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.3 Initial Space Summary	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.4 Evaluation of Existing Conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.5 Site Development Requirements	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.6 Preliminary Evaluation of Alternatives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.7 Local Actions and Approvals Certification(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.8 Appendices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 3.1.1 INTRODUCTION

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Summary of the Facility Deficiencies and Current S.O.I.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Date of invitation to conduct a Feasibility Study and MSBA Board Action Letter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Executed Design Enrollment Certification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Narrative of the Capital Budget Statement and Target Budget	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Project Directory with contact information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Updated Project Schedule	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

#1) *As noted in the December 15, 2017 cursory review email, provide a brief summary of the facility deficiencies identified by the District in the Statement of Interest.*

***See attached Document #1- Summary of Facility Deficiencies/ PSR Section 3.3.2 a/b***

*No further review comments for this section.*

### 3.3.1 - INTRODUCTION

#### G. DISTRICT PDP RESPONSE

##### 3.1.2 EDUCATIONAL PROGRAM

Provide a summary and description of the existing educational program, and the new or expanded educational vision, specifications, process, teaching philosophy statement, as well as the District’s curriculum goals and objectives of the program. Include description of the following items:

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Grade and School Configuration Policies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Class Size Policies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	School Scheduling Method	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Teaching Methodology and Structure				
	a) Administrative and Academic Organization/Structure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	b) Curriculum Delivery Methods and Practices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) English Language Arts/Literacy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Mathematics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Science	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Social Studies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) World Languages	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	h) Academic Support Programming Spaces	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	i) Student Guidance and Support Services	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Teacher Planning and Professional Development	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Pre-kindergarten	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Kindergarten	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Lunch Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Technology Instruction Policies and Program Requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Media Center/Library	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Visual Arts Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Performing Arts Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Physical Education Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Special Education Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Vocation and Technology Programs				
	a) Non-Chapter 74 Programming	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Chapter 74 Programming	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**G. DISTRICT PDP RESPONSE**

16	Transportation Policies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Functional and Spatial Relationships	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18	Security and Visual Access Requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

The December 15, 2017 cursory review email identified the following items in the Educational Program that require additional elaboration (note that a revised Educational Program was provided to MSBA on January 16, 2018. MSBA will provide supplemental review comments for this document after it is reviewed).

#3) Provide a description of the current and proposed school scheduling method.

**Submitted to MSBA on January 16, 2018 / hand delivered.**

#4a,4i) Provide a detailed description of the following (both existing and proposed):

- o Administrative and academic organization/structure (e.g., academies, departments, houses, grade based cohorts, teams, rooms, assignment policies, teams, etc.)
- o Student Administrative Guidance and Support Services
- o Teaching Methodology

**Submitted to MSBA on January 16, 2018 / hand delivered.**

#17) Elaborate on the following (both existing and proposed):

- o Functional and spatial relationships
- o Key programmatic adjacencies

**Submitted to MSBA on January 16, 2018 / hand delivered.**

No further review comments for this section.

**3.1.3 INITIAL SPACE SUMMARY**

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	Space summary; one per approved design enrollment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Floor plans of the existing facility	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Narrative description of reasons for all variances (if any) between proposed net and gross areas as compared to MSBA guidelines	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

1) The MSBA has performed an initial review of the space summary and offers the following:

- Study Enrollment Options:
  - o Option 1: 2,215 students in grades 7-12
  - o Option 2: 1,845 students in grades 8-12

### 3.3.1 - INTRODUCTION

#### G. DISTRICT PDP RESPONSE

- Option 3: 1,470 students in grades 9-12

General comment applicable to all space categories below - note that all new construction must comply with the MSBA standards for eligibility, whether in a new building or an addition / renovation project. The MSBA considers it critical that the Districts and their Designers aggressively pursue design strategies to achieve compliance with the MSBA guidelines for all proposed projects in the new program and strive to meet the gross square footage allowed per student and the core classroom space standards, as outlined in the guidelines. The MSBA also considers its stance on core classroom space critical to its mission of supporting the construction of successful school projects throughout the Commonwealth that meet current and future educational demands. The MSBA does not want to see this critical component of education suffer at the expense of larger or grander spaces that are not directly involved in the education of students.

- **Core Academic** – Proposed programmatic spaces appear to exceed the MSBA guidelines. This is due to additional classrooms above guideline, additional small group seminar areas, and ELL spaces. Per the information provided, the submittal proposes the following spaces:

Anticipated Core Academic Spaces*	Grades 7-12 Option	Grades 8-12 Option	Grades 9-12 Option
General Classrooms	85	70	63
Teacher Planning	8 (MS) + 6 (HS)	4 (MS) + 6 (HS)	6 (HS)
Small Group Seminar	6	5	4
Science Classroom/Lab	20	16	12
Prep Room	10	8	6
Central Chemical Storage Room	1	1	1
ELL	2	2	1

\*Provide proposed scheduling information specific to these spaces.

\*\*The MSBA will rely on the District's Educational Program and additional information to understand how proposed spaces that are unique to the District will be utilized in the proposed project.

The MSBA calculates all three enrollment options as having a utilization rate in the 71-77% range. Provide an explanation for why additional classrooms above guidelines are proposed. The MSBA targets a utilization rate of 85% and will look for the District to find efficiencies in future submittals. \

**Below is a link to the spreadsheet used to calculate 85% utilization for all classes, 9-12. It includes art and ELL rooms by the district. It is based on the assumption that a classroom is in use 6 out of 7 periods/day. It does not occur for all classrooms simultaneously – it is divided throughout the day. In other words, all the rooms are not going to be unused at the same time – each room will be unused one period/day (per the 85% utilization guideline) but it will not be the same period for each room. While the open room may not be used as a traditional classroom at that time it will be used for teachers' prep, small group discussions, free study time etc..."**

**SEE LINK TO THE SPREADSHEET:**

<https://docs.google.com/spreadsheets/d/1S20d4eLeGs6ZduPp3-FbjRdl9BDrrPugX3AYI6P9EQ/edit?usp=sharing>

**G. DISTRICT PDP RESPONSE**

**Special Education** – Proposed programmatic spaces appear to exceed the MSBA guidelines. Note that the Special Education program is subject to approval by the Department of Elementary and Secondary Education (“DESE”). The District should provide the required information required with the Schematic Design submittal. Formal approval of the District’s proposed Special Education program by the DESE is a prerequisite for executing a Project Funding Agreement with the MSBA.

**To be submitted to DESE during Schematic Design Phase.**

- **Art & Music / Voc- Tech** – Combined proposed programmatic spaces in these categories appear to exceed the MSBA guidelines for the 9-12 options and appear to be below the MSBA guidelines for the 7-12 and 8-12 options. Confirm that no Chapter 74 programs are being proposed. Given the relatively low utilization rate in the Core Academic category as noted above, the MSBA will look for continued efficiency refinements in future submittals within all educational capacity-generating spaces, including “specials” in the Art/Music and Voc-tech categories. No further preliminary comments.

**The Belmont Public Schools will not seek Chapter 74 Programming for the Belmont High School Building Project with the MSBA.**

- **Health & Physical Education** – Proposed programmatic spaces appear to exceed the MSBA guidelines, in both the new construction and the addition/renovation options. The proposed existing gymnasium area is 30,183 nsf. For new building options, the submittal proposes the MSBA maximum allowable gymnasium area of 18,000 nsf, as well as various PE Alternatives spaces. Depending on the District’s preferred option and grade configuration selected in the following submittal, any area in excess of MSBA space guidelines will be considered ineligible for reimbursement (refer to the attached Memorandum which presents MSBA policy regarding auditorium and gym spaces beyond those included in the guidelines). No further preliminary comments.

**Memo has been reviewed and acknowledged.**

- **Media Center** – Proposed programmatic spaces appear to align with the MSBA guidelines. No further preliminary comments.

**Acknowledged.**

- **Auditorium/Drama** – Proposed programmatic spaces appear to exceed the MSBA guidelines, based on providing auditorium / drama spaces for the entire design enrollment including the middle school grades. This overage is due to a larger stage area and the inclusion of a 3,000 nsf Black Box Theatre in each option. Although the MSBA does not take issue with these added spaces, the overall nsf of this category should comply with MSBA’s guidelines for each design enrollment. Depending on the District’s preferred option and grade configuration selected in the following submittal, any area in excess of MSBA space guidelines will be considered ineligible for reimbursement (refer to the attached Memorandum which presents MSBA policy regarding auditorium and gym spaces beyond those included in the guidelines). No further preliminary comments.

**Memo has been reviewed and acknowledged.**

## 3.3.1 - INTRODUCTION

### G. DISTRICT PDP RESPONSE

- **Dining & Food Service** – Proposed programmatic spaces appear to align with the MSBA guidelines. No further preliminary comments.

*Acknowledged.*

**Medical** – Proposed programmatic spaces appear to align with the MSBA guidelines for the 9-12 options and exceed guidelines for the 8-12 and 7-12 options. This overage appears to result from inherent inefficiencies relating to separating medical spaces between middle school and high school students. The MSBA will evaluate the eligibility for funding for areas in excess of the guidelines in future submittals. No further preliminary comments.

*Acknowledged.*

- **Administration & Guidance** – Proposed programmatic spaces appear to exceed the MSBA guidelines. MSBA will evaluate the eligibility for funding for areas in excess of the guidelines in future submittals. No further preliminary comments.

*Acknowledged.*

- **Custodial & Maintenance** – Proposed programmatic spaces appear to exceed the MSBA guidelines. This overage is due to the inclusion of a 150 nsf maintenance equipment area. MSBA will evaluate the eligibility for funding for areas in excess of the guidelines in future submittals. No further preliminary comments.

*Acknowledged.*

- **Other** – For each option, this category contains: District Offices, Technology Offices and associated conference room, Metco Classroom and office, BEA Office, Food Service Director Office, District Nurse Office, Resource Officer, and School Store. In the subsequent PSR submittal, the District must fully describe the function, intended users and scheduling of each of these spaces. Confirm that the Food Service Director Office is a District wide space. If it is not, reallocate this area to the Dining and Food Service category. MSBA will evaluate the eligibility for funding for areas in excess of the guidelines in future submittals. Note that all area associated with any District function in any option will be ineligible for reimbursement.

*To be submitted in the PSR Document.*

*PSR COMMENTS 2.16.18/ The spaces noted in the OTHER CATEGORY and as defined above are for the Districts use. The Town of Belmont understands that these spaces will be evaluated by the MSBA team and discussed with the Town of Belmont for eligibility. The METCO Spaces are noted in the Educational Program within this PSR Document.*

*Addition/ Renovation options also include the renovation of the existing 9,067 nsf area associated with the pool. Costs associated with pool and associated pool support spaces and systems must be itemized in each cost estimate moving forward in the MSBA process. Per 963 CMR 2.16(5), any work associated with this renovated pool & support space will be considered ineligible for reimbursement, and, MSBA will not support a project that includes a newly constructed swimming pool.*

*Acknowledged.*



## G. DISTRICT PDP RESPONSE

*Note that upon selection of a preferred solution, the District may be required to adjust spaces/square footage that exceeds the MSBA guidelines and is not supported by the Educational Program provided. No further preliminary comments.*

*No further review comments for this section.*

### 3.1.4 EVALUATION OF EXISTING CONDITIONS

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	Confirmation of legal title to the property.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Determination that the property is available for development.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Existing historically significant features and any related effect on the project design and/or schedule.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Determination of any development restrictions that may apply.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Initial Evaluation of building code compliance for the existing facility.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Initial Evaluation of Architectural Access Board rules and regulations and their application to a potential project.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Preliminary evaluation of significant structural, environmental, geotechnical, or other physical conditions that may impact the cost and evaluations of alternatives.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Determination for need and schedule for soils exploration and geotechnical evaluation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Environmental site assessments minimally consisting of a Phase I: Initial Site Investigation performed by a licensed site professional.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Assessment of the school for the presence of hazardous materials.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Previous existing building and/or site reports, studies, drawings, etc. provided by the district, if any.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

3) *The submittal includes a letter from the Belmont Historic District Commission (dated November 21, 2017) in which the town describes the landscaped area including the Clay Pit Pond and the 1910/1932 White Memorial Field House two-story brick structure (currently used as team locker rooms and DPW Park maintenance equipment) as historic. Include in the schedule submitted with the schematic design, the timeline associated with filing with the Massachusetts Historical Commission ("MHC") and obtaining MHC approval prior to construction bids. The District should keep the MSBA informed of any decisions and/or proposed*

## 3.3.1 - INTRODUCTION

### G. DISTRICT PDP RESPONSE

actions and should confirm that the proposed project is in conformance with Massachusetts General Law 950, CRM 71.00.

~~Clarification to be submitted in the PSR Document.~~

*As noted in MSBA comments, this will be submitted in the Schematic Design Phase not PSR.*

7) The existing conditions analysis notes that the Clay Pit Pond & surrounding landscaped area are classified as a wetlands area (which includes the associated buffer area requirements), and is considered to be “Protected Open Space”. This area is also located in Zone AE, within the 100 year, 1% annual flood plain zone. In the District’s response to this review, provide a summary description how this may affect site development and costs for this project.

**FEMA flood mapping indicates that the Zone AE area is in close proximity to Clay Pit Pond. The current schemes under consideration does not include the construction of any structure or critical facility with the Zone AE. The Zone AE would remain open space and available for flood storage as required.**

In addition, list any development restrictions (if any) and potential added costs associated with the following site conditions described in the submittal:

- building adjacent to the existing MBTA Fitchburg rail line along the northern site border, **At this time the project team does not anticipate any additional cost to the project. All proposed work is within the project site boundary.**
- the existing multi-generational walking path and amenities around the pond, **The multi-generation path is a separately funded project being implemented by the Town of Belmont. The portion that runs along the north side of Claypit Pond will be an important component of the school’s circulation needs for emergency access to the building, access to the fields and pedestrian circulation through the site. Only the portions of this pathway that are required to meet the school’s circulation needs may be incorporated into the school project construction due to their integrated nature with the site design. The site plan has been designed to accommodate the multi-generational path and the community path at no additional cost to the project.**
- the onsite future Belmont community path parallel to the rail line, and **Site improvements for the school site design are being developed to leave sufficient space where existing on-site conditions do not preclude the Community Path to be constructed as a separately funded project. No cost impact to the school project is anticipated to accommodate this separate project.**
- the potential future pedestrian connecting underpass at Alexander St./ MBTA Fitchburg rail line. **No impact to project cost. The underpass is not part of the project scope.**

8) The report provided by McPhail Associates indicates the use of previous borings and foundation recommendations from the construction of the existing Belmont High School, and that additional testing should be done during the PSR phase to identify specific pile types required. Provide any updated information in the subsequent Preferred Schematic Report (“PSR”) submittal.

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9) The Phase 1 assessment identified two Recognized Environmental Conditions (one associated with the site's historical use as a landfill, the other with the presence of an abandoned Underground Storage Tank near the hockey rink). However, this Phase 1 report does not state definitively whether (or not) additional Phase 2 geo-environmental investigations are recommended. In response to these comments, clarify and describe any future potential site investigations in this regard. Additionally, MSBA notes that all costs associated with abatement of contaminated soil from any source, and abatement of underground storage tanks must be itemized in the cost estimates for the following Schematic Design submittal as ineligible for MSBA reimbursement.

***During Schematic Design, investigations will be conducted to determine subsurface conditions in areas of future site development (building foundations, utilities, site improvements), and in areas that will be impacted by demolition and removal of existing structures and utilities. The goal of these investigations will be to obtain site-specific data on both geotechnical and environmental conditions that would impact project design, construction, and cost. Explorations will be performed to provide representative data as required by the Massachusetts Building Code and Massachusetts Contingency Plan (MCP). Specifically, we anticipate:***

- ***test borings will be drilled within the future building footprint to inform foundation design;***
- ***explorations will be conducted within future utility alignments and roadways for their design;***
- ***soil samples retrieved from explorations will be tested, as appropriate, to determine engineering properties and/or chemical constituents;***
- ***representative analytical soil testing will be performed in areas where soils will be generated by project construction and require off-site disposal; and***
- ***as appropriate, explorations, sampling, and testing will be conducted to determine the nature and extent of contamination and to provide data to maintain MCP regulatory compliance.***

***The area near the hockey rink will be investigated to determine the presence, condition, and configuration of the underground storage tank presumed to be present. If an underground storage tank exists and it is not in consumptive use or found to be impaired, it will be removed in accordance with applicable regulations. It is understood that all costs associated with abatement of contaminated soil from any source and abatement of underground storage tanks must be itemized in the Schematic Design submittal cost estimates as ineligible for MSBA reimbursement.***

***The subsurface exploration activities are expected to begin in the Spring/Summer of 2018.***

10) MSBA notes that all costs associated with the removal of asbestos containing floor and ceiling tiles are categorically ineligible for MSBA reimbursement. Additionally, the project team should be aware of the current policies associated with MSBA's participation in the abatement and removal of hazardous materials.

***Acknowledged.***

*No further review comments for this section.*

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#### G. DISTRICT PDP RESPONSE

##### 3.1.5 SITE DEVELOPMENT REQUIREMENTS

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	A narrative describing project requirements related to site development to be considered during the preliminary and final evaluation of alternatives.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Existing site plan(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

*1) In the District's response to these comments, for each option considered for further evaluation, describe how the proposed building massing, major educational spaces and classroom areas are configured on the site in response to solar orientation and views to the exterior. Describe any limitations in this regard that may affect the proposed design(s), how these limitations could be mitigated, and how these limitations may determine the District's selection of a preferred option. Describe any intended sun control or shading devices that may respond to the proposed orientation; i.e. window configuration, exterior louvers, shading devices, roof overhangs, interior deflecting shelves, etc.*

***See attached Document #2- Summary of Solar Orientation, Views, Sun Control, Shading***

*In response to these comments, describe how the onsite number of parking spaces for each of staff, student drivers, and visitors will be determined. Describe whether the required parking will be determined by school needs, after-hours athletic/performance needs, and/or local zoning requirements. In addition, provide a timeline associated with the needed permits, filings, and reviews discussed in this section.*

***The Town of Belmont has exercised its rights under the Dover Amendment for all of its previous school projects and will continue this practice for the High School Project. We have already begun discussions with the local regulatory officials and the Planning Board. The Site Plan review will be conducted with the Planning Board during the Schematic Design. We do not anticipate the need for any Zoning Variances for this project. The number of parking spaces required will be based on the demands for Faculty, Staff, Students and Visitors. The anticipated timeline will follow the normal by-right permitting process. No special hearings or Town Meetings are anticipated. Actual Building permits will be issued at the completion of the Construction Document Phase once a contractor is engaged.***

*The MSBA notes that the existing historic White Memorial Field House is proposed to be demolished and replaced with athletic parking adjacent to the skating rink. Describe whether this proposed parking area is functionally associated with the skating rink, or how this may be associated with the educational operation of the school (eligibility of MSBA funding for this scope of work will be determined in the Project Scope and Budget phase of the Feasibility Study).*

***The proposed parking adjacent to the Skating Rink will serve two purposes. It will be used for school parking during normal daily activities. It will also serve the needs of the skating rink, and other school athletic activities during non-school hours for players, coaches, staff, and some spectators.***

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*No further review comments for this section.*

### 3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	Analysis of school district student school assignment practices and available space in other schools in the district	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Tuition agreement with adjacent school districts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Rental or acquisition of existing buildings that could be made available for school use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Code Upgrade option that includes repair of systems and/or scope required for purposes of code compliance; with no modification of existing spaces or their function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Renovation(s) and/or addition(s) of varying degrees to the existing building(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Construction of new building and the evaluation of potential locations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	List of 3 distinct alternatives (including at least 1 renovation and/or addition option) are recommended for further development and evaluation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

*(General comment about the District's Preliminary Evaluation of Alternatives)*

*As stated in the enrollment letter, the MSBA's study enrollment recommendations assume full utilization of all school facilities. Accordingly, the District will be required to determine the enrollment capacity of each existing facility anticipated to remain in service if a grade reconfiguration is determined to be the Preferred Solution. The District will be required to demonstrate in the Preferred Schematic Report that any reconfiguration proposed as the District's Preferred Solution has been approved by the School Committee and other necessary District officials. Further, the MSBA will require a written plan from the District describing the process for determining local support for potential grade reconfiguration.*

*Note that these recommendations do not represent an affirmation by the MSBA for approval of any of these options, and are intended only to provide a framework to inform the feasibility study to be conducted as a mean of determining the most cost effective and educationally sound solution to be agreed upon by the District and the MSBA.*

***See attached Document #3- Utilization/reconfiguration of existing facilities summaries.***

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#### G. DISTRICT PDP RESPONSE

2) The submittal notes that the District has removed themselves as a member town from the Minuteman Regional Vocational Technical School District, and will be seeking alternative vocational programming for their students, including continuing to send students as “Out of District” students. In response to these comments, confirm that no Chapter 74 programming is being proposed for this project.

**The Belmont Public Schools will not seek Chapter 74 Programming for the Belmont High School Building Project with the MSBA.**

5) Option 2.1 is the only addition/renovation option recommended for further evaluation that maintains more than field house and pool functions of the existing school, although it is unclear how much is retained other than the auditorium. The submittal notes that the ‘entire building structure- including caissons, foundations, concrete floor, roof slabs, and concrete beams- would remain and be reused’. This implies that exterior envelope and all interior partitions would be demolished, as well as all systems in the building. Based on the submitted options, the MSBA has concerns that keeping the spaces ineligible for MSBA funding such as the pool and field house may be limiting the District’s choice of options (please clarify). For the following PSR submittal, the MSBA asks that the District / design team include an add/reno option for evaluation for the selected grade configuration that includes the minimum renovation and addition required to meet current building code and comply with the necessary educational program meeting MSBA space guidelines; i.e., bringing any “existing-to-remain” portions of the building up to code, modifying partition locations only as needed, re-assigning space locations to meet the program, and any building addition required to provide MSBA space guideline area.

Documents in the following submittal should include floor plans that clearly delineate new, renovated and existing-to-remain areas.

**See attached Document #4- Option 2.1 Clarification of Scope**

- **Option 2.1 Plans/ clarifying scope of work**
- **Option 2.1 Phasing Plan**
- **Option 2.1 Costing Memo from Peter Bradley PMC**

**See ADDENDA #1 Option 2.1a Light Touch Major Renovation Minor Addition.**

6) All options for the project are located on the existing High School site due to a lack of alternate sites in the community of the size required for this project (no alternate sites are under consideration). No response required.

**Acknowledged.**

7) See comment 5.

No further review comments for this section.

#### 3.1.7 LOCAL ACTIONS AND APPROVAL

Provide the following Items	Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
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1	Certified copies of the School Building Committee meeting notes showing specific submittal approval vote language and voting results, and a list of associated School Building Committee meeting dates, agenda, attendees and description of the presentation materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Signed Local Actions and Approvals Certification(s):				
a)	Submittal approval certificate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b)	Grade reconfiguration and/or redistricting approval certificate (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	<b><i>Applicable for Districts proposing grade reconfiguration and/or redistricting /consolidation</i></b> Provide the following items to document approval and public notification of school configuration changes associated with the proposed project				
a)	A description of the local process required to authorize a change to the existing grade configuration or redistricting in the district	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b)	A list of associated public meeting dates, agenda, attendees and description of the presentation materials	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c)	Certified copies of the governing body (e.g. School Building Committee) meeting notes showing specific grade reconfiguration and/or redistricting, vote language, and voting results if required locally	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d)	A certification from the Superintendent stating the District’s intent to implement a grade configuration or consolidate schools, as applicable. The certification must be signed by the Chief Executive Officer, Superintendent of Schools, and Chair of the School Committee	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

*2b, 3a-d) In the event that the District selects a grade configuration / preferred option in the PSR phase of the feasibility study that is not the current high school 9-12 configuration (i.e. the 7-12 and 8-12 configurations described in the Study Certification), the PSR submittal should include the appropriate documentation associated with grade reconfiguration noted above in (3.1.7) 2b and 3a-d.*

***To be submitted in the PSR Document.***

***See 3.3.5.A Local Actions & Approvals Certification, Appendix.A Grade Configuration Presentations.***

*No further review comments for this section.*



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### 3.1.8 APPENDICES

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	Current Statement of Interest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	MSBA Board Action Letter including the invitation to conduct a Feasibility Study	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Design Enrollment Certification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

*No review comments for this section.*

**Complete.**

**Additional Comments:**

*The MSBA issues project advisories from time to time, as informational updates for Districts, Owner's Project Managers (OPM's), and Designers in an effort to facilitate the efficient and effective administration of proposed projects currently pending review by the MSBA. The advisories can be found on the MSBA's website. In response to these review comments, please confirm that the District's consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable.*

**End**

*We confirm that the District's consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable*





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# 3.3.1 - INTRODUCTION

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### 3.1.1 - INTRODUCTION

#### A. SUMMARY OF FACILITY DEFICIENCIES

On March 3rd, 2015 the Town of Belmont submitted to the MSBA a Statement of Interest (SOI) that identified priorities related to facility deficiencies along with the need to address the increasing population at the Belmont High School and the district overall. The Belmont High School opened in 1970 and was constructed as a new building on a vacant site. There have been no additions or major renovations since the facility opened. The existing infrastructure contains original equipment with the exception of replacement of all HVAC units on the roof of the building.

The increase in the Belmont Public School's enrollment is a major concern for the district. A district wide master planning facilities study was prepared in 2004 which addressed the Belmont Public School's (BPS) enrollment. BPS has seen a recent increase of 531 students and is projected to see at least a total of 725 new students over a ten-year period. This projection does not take into account two potential building projects within the town which, when completed, would bring over 400 units of living space (via apartments and condominiums) to Belmont. Additionally, the district is experiencing an increase in international students. It is difficult to project the increase in international student population in the future. The international student population is creating the need for additional spaces in the High School Facility.

The 2004 Master plan identified significant deficiencies with respect to the mechanical, plumbing, and electrical systems, resulting in subpar energy efficiencies, substandard air quality, and high energy costs. All components of the building's mechanical and electrical systems require constant service, as they have reached the end of their useful life. The boilers are oil-fired steam, feeding roof mounted air handling units directly and supplying hot water via converters to unit ventilators on the periphery of the building. The steam system is very difficult to control. The building's electrical system is also original to the construction, with the exception of some minor updates to the telephone and data network made due to changing technologies. The power distribution system is beyond its expected useful life. As components fail in the facility replacement parts are becoming scarcer with time. A full report of the building deficiencies are contained in the Section 3.1.4.

In addition to addressing the BHS Building Deficiencies the MSBA has allowed the Town to review three grade configurations in order to best support the district's needs (see item D below).

The entire team including the Building Committee, OPM and Designer has developed an extensive and very inclusive, community driven and engaged process to solicit feedback, show the PDP development, to inform the students, staff, parents, and overall Belmont Community (see the Project Directory for the full list of Committee, regulatory, and community outreach meetings conducted during the PDP). All the meetings were publicly advertised and many were shown on the local cable television. The contents of all of the meetings including agendas, meeting minutes, and presentations are uploaded to the Belmont High School website for reference.

The complete Statement of Interest can be found in Appendix A.

#### BUILDING CODE

The Belmont High School having been constructed in 1970, with minimal renovations since, has numerous areas where compliance with the current building code (780 CMR 9th Edition, Massachusetts State Building Code) is not achieved. Notable areas of noncompliance include the lack of a sprinkler system, insufficient protection of exit stair enclosures, and inaccessible areas and building features that do not comply with 521 CMR, Architectural Access Board Rules and Regulations. Based on lack of system and envelope upgrades, there are also substantial areas of improvement for compliance with the current energy usage requirements for the 2015 International Energy Conservation Code.

#### ACCESS CODE

Compliance with the accessibility provisions of 521 CMR and the Americans with Disabilities Act is deficient in many areas throughout the existing high school including the following key elements:

- A majority of the toilet rooms are not accessible. Signed accessible toilet rooms are not fully compliant (e.g. door clearances, toilet paper dispenser locations, etc.).
- The elevator is not accessible based on the size of the cab and locations of controls/signage
- The courtyard has no accessible access or means of egress
- The theater is not provided with accessible seating. An accessible route is also not provided from the theater seating to the stage.
- The tiered lecture hall is not provided with accessible seating
- Gymnasium bleacher seating on the mezzanine is not accessible
- Locker rooms are not accessible

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- Numerous instances of non-accessible door hardware with knobs
- Many cross-corridor door opening widths are less than the required 32" minimum
- Stairs are generally not compliant as they have abrupt nosings, and non-compliant handrails due to shape, no extensions, etc.

### CIVIL

**Storm Drainage:** Record drawings from the Belmont High School 1968 plans indicate that the stormwater from the site appears to be collected by three separate drainage systems and flow to Claypit pond. There appear to be no stormwater quality measures implemented on the site and no known detention, retention, or infiltration systems.

**Site Utilities:** The existing building is served by a network of existing utilities including water, sewer, gas, and electrical as documented in the 1968 record drawings.

The sewer system for the school is currently serviced by five sewer services connecting to the 24-inch sewer main in the school driveway. An existing 6-inch water service connects to the 8-inch water main that loops through the site north of the building. The existing 3.5-inch gas service connects to the 6-inch gas main in Concord Avenue. The existing electrical service is underground and comes from an electrical substation building east of the school, adjacent to the softball field.

**Pavement:** Pavement was assessed during the 2017 site visit. Images from google street view suggests that the parking lot was resurfaced in 2013. The asphalt pavement the parking lot, front drive, and walkways adjacent to the school were observed to be in fair condition with some cracking and degradation. The pavement in the driveway to the rear of the school was in poor condition. Curbing on the site is granite, and bituminous concrete in the southwest parking lot. Bituminous concrete curbing appears to be in fair condition. Granite curbing appears to be in good condition. It is possible that the existing curb material is suitable for reuse.

### LANDSCAPE

Warner Larson Landscape Architects visited the site on August 28, 2017 to observe existing site conditions and prepared a Landscape Existing Conditions Report which was submitted

on October 10, 2017 for inclusion in the PDP. In addition to information collected during our site visit, we subsequently reviewed other existing conditions documentation provided by Perkins + Will and other sources. That report excluded utilities and drainage which were reviewed separately by Nitsch Engineering.

There have been no substantive changes or updates to the Landscape Existing Conditions Report submitted on October 10, 2017 that might impact the final evaluation of alternatives. The reader should refer to the Landscape Existing Conditions Report included in the PDP submission to reference any specifics regarding the existing conditions analysis.

### ARCHITECTURAL

The existing Belmont High School was designed and built in its entirety from 1969 to 1970 as a new public high school facility for the town of Belmont located near Clay Pit Pond. Currently, the facility is still owned and run as a high school. The building has been fairly maintained over the past 47 years, but the building enclosure systems and finishes are at the end of their useful life for both exterior and interior.

Much of the interior within the High School have generally not been updated (with exception to the Media Center), leading to worn ceilings, walls, and floors with moderate to minimal damage. At the same time, exterior precast Concrete Lintels, Precast Concrete Columns and Concrete Platforms show signs of deterioration/crumbling around entire exterior perimeter.

### STRUCTURAL

Based on visual observations by the Engineers, the school structure is currently performing well. Signs of water leaks were observed at a few locations. Water infiltration through the slab-on-grade in the Field House was noted. Some cracks in the interior masonry walls and through the floor finishes were observed at some locations, as well as in the masonry façade. There was no evidence of foundation settlement, nor was there evidence of undue vibrations due to footfall on the floor slab.

### FOOD SERVICE

The existing kitchen and serving facilities were built at least forty years ago and have exceed their design capacity and useful life expectancy. A new facility sized for the future student body will offer a space better able to serve the population by providing greater cooking capacity, increased circulation in the servery, and

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diverse serving station options more in line with current trends. Additionally the design will observe all health department related codes to bring the facility up to compliance.

All storage and cooking equipment should be evaluated and considered for replacement. New gas and electrical equipment shall be selected that meets the performance demands and provides the highest level of energy efficiency available.

##### HVAC

The heating system for the building includes steam boilers and steam piping that are original to the building construction (47+ years old). The original No. 4 oil burners were replaced in 2011-2012 with dual fuel burners capable of burning No. 2 fuel oil and natural gas. Natural gas is typically used. The boilers have been re-tubed several times to keep them in working order. The steam piping is at the end of its expected life. Steam traps require regular servicing.

Steam is piped to rooftop units, some unit ventilators and a steam convertor in the boiler room. The steam convertor provides heating hot water to most of the classroom unit ventilators and to cabinet heaters. Steam and hot water piping are distributed through a pipe tunnel/trench from the boiler room through the first two segments of the building. Access to this confined space is extremely limited. Replacement of this piping will most likely involve rerouting above ceilings and in corridors.

The unit ventilators in classrooms are also original equipment. These units have mechanical damper linkages and pneumatic controls, which requires continuous maintenance.

Automatic temperature controls are pneumatic and are also original installation with the exception of the air compressors. Maintenance requires specialized technicians that have knowledge of pneumatic systems, which is in large part an obsolete technology.

Rooftop air handling units were replaced in 2004 and 2008. The older units are within 2 to 5 years of their normal life expectancy.

There is no central cooling system in the building. Some rooftop units have self-contained DX cooling, including interior classrooms, the library, administration, and some other areas.

The pool is heated and ventilated by two air handling units. There is no dehumidification system. An exhaust system was added to exhaust low near the pool deck to help limit the buildup

of chloramines and also provides negative pressurization for the pool. The system is ducted through the exterior wall to an exhaust fan that is mounted on grade. A pool water UV filter system was added in 2014.

There have been some improvements and upgrades to the mechanical systems in recent years including new dual fuel burners for the boilers and replacement of the rooftop units and roof exhaust fans plus other small-er improvements. However, other systems and equipment that are original, such as the boilers, steam and hot water piping, unit ventilators, and automatic temperature controls have all exceeded their typical expected useful life and are in need of replacement.

The building structure has sprayed-on fire proofing that contains asbestos, which makes it difficult to do any work in the building that requires routing systems above the ceilings.

##### FIRE PROTECTION

The existing building is not equipped with an automatic fire suppression system.

##### PLUMBING

In general, the plumbing systems and fixtures appear to be original to the building. These systems, while continuing to function, have served their useful life. Most of the systems could continue to be used with maintenance and replacement of failed components as they age.

All plumbing fixtures are in working condition. Attempts have been made to make bathroom fixtures accessible; however, most fixtures do not meet current accessibility codes. In general, the fixtures appear to have served their useful life. Water conservancy is governed by provisions of the Plumbing Code. The code does not mandate that plumbing fixtures be upgraded. However, where new fixtures are to be installed, as will be the case with any renovations to the existing high school, new fixtures need to be of the water conserving types with lead free faucets and be supplied with lead free water piping systems.

Domestic hot water is supplied by larger steam-fired heaters and scattered electric water heaters throughout the various wings of the building. The larger water heaters have served their useful life and should be replaced.

Sanitary and roof drainage piping systems are made of cast iron. Where visible, the piping systems appear to be in fair condition.

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There are areas where new piping has been installed.

Rainwater from flat roof areas are collected in roof drains that appear to be in good condition and were clear of debris. Internal storm water piping was not visible.

The natural gas service to the school is fairly new and in good condition. This system could stay and be re-used in a renovation. A separate gas service was brought over to the cafeteria kitchen and is capped in place outside the building. This could also be re-used.

The Boy's and Girl's locker rooms and shower areas are older and in fair condition. The shower area layouts do not meet current ADA requirements.

The cafeteria kitchen plumbing equipment is older and in need of replacement. The interior grease trap does not appear to be used or maintained.

The science labs have sinks that do not empty into an acid neutralization system as they should. The waste from these labs currently leaves the building and ties into the town sewer system without being treated. This condition needs to be corrected.

**ELECTRICAL**

The majority of electrical systems are in excess of 40 years of age and have reached the end of their service life.

Main electric service and distribution, there is little or no physical or electrical capacity to add onto existing system/equipment. Repairs and/or additions to existing service and distribution equipment will require significant rework of existing facilities to suit new equipment and meet code. Working clearances and systems foreign to electrical installations create code violations and safety hazards for school and service personnel.

Existing lighting throughout the building consist of luminaires original to the building. Lamp sources are primarily fluorescent with the exception of the field house and pool where LED luminaires have been installed. The age of the fixtures present serviceability and maintenance issues, energy inefficiencies as well as poor quality light levels and visual comfort.

Lighting controls consist of local switching. There is no use of occupancy/vacancy or day lighting controls. Energy codes require automatic controls for interior and exterior lighting.

A new fire alarm system was recently installed. The system

provides complete voice audio/visual, manual pull stations and 100 percent smoke detector coverage.

Emergency power system consists of an exterior 180kW diesel-fired generator manufactured by Kohler. The generator primarily serves the building's emergency lighting system and would not have capacity to serve additional loads. The existing distribution system does not meet current code requirements for separation of life safety and non-life safety systems.

The majority of spaces throughout the building have receptacles that are original to the building, device quantities are minimal.

**AUDIOVISUAL**

During our site visit to Belmont High School on August 28, 2017, the existing audiovisual systems were reviewed. The technology being used in the school is outdated and does not support current standards. For this reason, these systems have reached the end of their serviceable lives. Additionally, there did not appear to be standardization in the system components used from room to room that would simplify work for technical staff.

New audiovisual presentation systems, consisting of video displays/projection and sound systems for audio playback (and voice reinforcement in larger spaces) are recommended for the Auditorium, Music Classrooms, Cafeteria, Classrooms, Lecture Hall, and Book Rooms. New sound systems are recommended for the Gymnasium, Natatorium, and Field House. Additionally, a video wall in the Entry Hall can be used to display electronic artwork, and can also be used to display other images and announcements.

**TECHNOLOGY**

**Structured Cabling Systems:** There is a district-wide fiber backbone connecting all facilities. The fiber network handles general data as well as Phone (VoIP) and security for the school district and the Town. Any future project must take into consideration the requirement for continued connectivity between and among facilities. The high school MDF is located off the Tech Office on the second floor. The fiber enters the building underground on The Theater/parking lot side of the building and is routed internally to the MDF. Horizontal cabling from the MDF and IDFs to endpoint is Category 5. The Cat5 and cabling represents a bottleneck on the existing network and therefore has reached the end of its serviceable life. Any future project should include the installation of horizontal cabling based on current

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standards at the time of design, 20GbE backbone and dedicated MDF/IDF rooms with proper power and environmental treatments.

**Data and Voce Communication System:** The wireless hardware is Alcatel-Lucent. The controller is at the high school with a backup controller at Cheney Middle School. Most APs within the school are mounted based on availability of data outlets because of the difficulty in adding cabling due to building/ceiling conditions. The second floor MDF is the centralized management point for all data communications for the high school, the school district and the town. IDFs are equipped with Alcatel-Lucent OS6450 Switches, stacked. Any future project should provide updated networking hardware for the MDF and IDFs based on current technology, with special attention paid to maintaining the functionality of the school-district and town wide network and services. VoIP is server-based NEC Univerge SV8300. The server is located in the high school MDF. The system is 10-12 years old. Any future project should expand upon the NEC VoIP platform, upgrade to the newest technology, and consolidate systems as much as possible.

**Distributed Communication System:** The Intercom system is a Simplex 5100 Series Building Communication System. The master clock system is a Simplex 2350 Master Time System. The intercom main equipment is located in the Main Office. The master clock system is located in the TELCO demark, mounted on the voice termination wallboard. Any future project should provide a new system based on current technology.

#### GEOTECHNICAL

The report provided by McPhail Associates in PDP indicates the use of previous borings and foundation recommendations from the construction of the existing Belmont High School, and that additional testing should be done during the PSR phase to identify specific pile types required. Provide any updated information in the subsequent Preferred Schematic Report ("PSR") submittal.

The Phase 1 Assessment identified two Recognized Environmental Conditions (one associated with the site's historical use as a landfill, the other with the presence of an abandoned Underground Storage Tank near the hockey rink). However, this Phase 1 report does not state definitively whether (or not) additional Phase 2 geo-environmental investigations are recommended. In response to the comments, clarify and describe any future potential site investigations in this regard.

Additionally, MSBA notes that all costs associated with abatement of contaminated soil from any source, and abatement of underground storage tanks must be itemized in the cost estimates for the following Schematic Design submittal as ineligible for MSBA reimbursement.

During Schematic Design, investigations will be conducted to determine subsurface conditions in areas of future site development (building foundations, utilities, site improvements), and in areas that will be impacted by demolition and removal of existing structures and utilities. The goal of these investigations will be to obtain site-specific data on both geotechnical and environmental conditions that would impact project design, construction, and cost. Explorations will be performed to provide representative data as required by the Massachusetts Building Code and Massachusetts Contingency Plan (MCP). Specifically, we anticipate:

- test borings will be drilled within the future building footprint to inform foundation design;
- explorations will be conducted within future utility alignments and roadways for their design;
- soil samples retrieved from explorations will be tested, as appropriate, to determine engineering properties and/or chemical constituents;
- representative analytical soil testing will be performed in areas where soils will be generated by project construction and require off-site disposal; and
- as appropriate, explorations, sampling, and testing will be conducted to determine the nature and extent of contamination and to provide data to maintain MCP regulatory compliance.

The area near the hockey rink will be investigated to determine the presence, condition, and configuration of the underground storage tank presumed to be present. If an underground storage tank exists and it is not in consumptive use or found to be impaired, it will be removed in accordance with applicable regulations. It is understood that all costs associated with abatement of contaminated soil from any source and abatement of underground storage tanks must be itemized in the Schematic Design submittal cost estimates as ineligible for MSBA reimbursement.

The subsurface exploration activities are expected to begin in the

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Spring/Summer of 2018.

## HAZARDOUS MATERIAL

Universal Environmental Consultants (UEC) conducted a thorough and detailed hazardous materials identification analysis at the High School, Belmont, MA, which include the following services as part of the feasibility study of he school:

- Asbestos Containing Materials inspection and sampling;
- Polychlorinated Biphenyls Electrical Equipment and Light Fixtures inspection;
- PCB's Caulking inspection;
- Mercury in Rubber Flooring inspection and sampling;
- Airborne Mold inspection and sampling;
- Radon Sampling;
- Underground Storage Oil Tanks inspection.

Please refer to the PDP for the full report.

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### G. DISTRICT PDP RESPONSE / Document #2

DOCUMENT # 2

### 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

#### OPTION 1 - C. CONCEPT DRAWING

**ENVELOPE-** Limited thermal and vapor performance upgrades would be executed making meeting the schools performance goals difficult

**ORIENTATION-** The orientation is fixed making optimized daylighting challenging for existing east and west facing learning environments.

**SKIN TO VOLUME RATIO-** The skin to volume ratio of the base repair scheme is fixed.

**WINDOW TO WALL RATIO-** The window to wall ratio of the base repair scheme is fixed making daylighting and heat gain optimization challenging.

**PV POTENTIAL-** The ability to retrofit the existing roof structure is challenged by the placement of existing mechanical equipment and shafts as well as the roof's structural capacity.

**SITE ENVIRONMENTAL PERFORMANCE-** This scheme allows for one large geo-exchange field but allows limited performative landscape to deal with storm water quality and quantity due to the position of the existing road.



### 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

#### OPTION 2.1 - C. CONCEPT DRAWING

**ENVELOPE** – Select thermal and vapor performance upgrades would be executed in areas with substantial renovation, the finite scope of façade reconstruction and the existence of brick cavity walls with limited existing insulation makes meeting the schools performance goals difficult.

**ORIENTATION-** The orientation is fixed for the majority of the building making optimized daylighting challenging for existing east and west facing learning environments. Added spaces will build over and to the west of the existing structures with public spaces oriented to the south and most new teaching spaces receiving glare free light from the north

**SKIN TO VOLUME RATIO-** The skin to volume ratio of the major renovation minor addition scheme is the least efficient in that it stretches the building out to its least concise footprint.

**WINDOW TO WALL RATIO-** The window to wall ratio of the base repair scheme will attempt to achieve 30-40 glazing balancing heat gain with effective daylighting.

**PV POTENTIAL-** The ability to retrofit the existing roof structure is challenged by the placement of existing mechanical equipment and shafts as well as the roof’s structural capacity. Over-built structure may be able to accommodate a more flexible arrangement of panels.

**SITE ENVIRONMENTAL PERFORMANCE-** This scheme allows for one contiguous but smaller geo-exchange field due to the expanded building footprint but allows for more performative landscape adjacent to the pond allowing outdoor teaching space to overlap with site sustainable strategies at the water edge.

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## 3.3.1 - INTRODUCTION

### G. DISTRICT PDP RESPONSE / Document #2

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### OPTION 2.3 - C. CONCEPT DRAWING

**ENVELOPE** – Aggressive performance will be pursued in the new wall make-up including a goal of R-28 and minimized thermal bridging with the intent of minimizing air and vapor movement

**ORIENTATION**- This scheme orients the majority of teaching spaces to the north with the intent of eliminating glare and the majority of public and common spaces to the south.

**SKIN TO VOLUME RATIO**- The skin to volume ratio of the minor renovation- major addition schemes are similar and attempt to form a concise footprint while maximizing daylight.

**WINDOW TO WALL RATIO**- The window to wall ratio of the scheme will attempt to achieve 30-40 glazing balancing heat gain with effective daylighting.

**PV POTENTIAL**- This scheme stacks in massing to the north creating roof surfaces that do not shade themselves and optimizes roof top yield by orienting itself in the east-west direction.

**SITE ENVIRONMENTAL PERFORMANCE**- This scheme allows for one contiguous large geo-exchange field and allows for more performative landscape adjacent to the pond allowing outdoor teaching space to overlap with site sustainable strategies at the water edge.

### 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

#### OPTION 2.4 - C. CONCEPT DRAWING

**ENVELOPE** – Aggressive performance will be pursued in the new wall make-up including a goal of R-28 and minimized thermal bridging with the intent of minimizing air and vapor movement

**ORIENTATION**- This scheme orients the majority of teaching spaces to the south and north with the intent of eliminating glare to the north and shading for glare control to the south. Public spaces will be day lit from above and through borrowed light

**SKIN TO VOLUME RATIO**- The skin to volume ratio of the minor renovation- major addition schemes are similar and attempt to form a concise footprint while maximizing daylight.

**WINDOW TO WALL RATIO**-The window to wall ratio of the scheme will attempt to achieve 30-40 glazing balancing heat gain with effective daylighting.

**PV POTENTIAL**- This scheme creates a simple continuous roof surface that does not shade its selves and optimizes roof top yield by orienting itself in the east-west direction.

**SITE ENVIRONMENTAL PERFORMANCE**- This scheme allows for one contiguous large geo-exchange field and allows for more performative landscape adjacent to the pond allowing outdoor teaching space to overlap with site sustainable strategies at the water edge.

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## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### OPTION 3.1 - C. CONCEPT DRAWING

**ENVELOPE-** Aggressive performance will be pursued in the new wall make-up including a goal of R-28 and minimized thermal bridging with the intent of minimizing air and vapor movement

**ORIENTATION-** This scheme orients the majority of teaching spaces to the south and north with the intent of eliminating glare and the majority of public and common spaces to the south.

**SKIN TO VOLUME RATIO-** The skin to volume ratio of the new construction scheme is the most efficient but will rely on daylighting internal spaces from above which may conflict with PV placement.

**WINDOW TO WALL RATIO-** The window to wall ratio of the new construction scheme will attempt to achieve 30-40 glazing balancing heat gain with effective daylighting.

**PV POTENTIAL-** - This scheme creates a simple continuous roof surface that does not shade its selves and optimizes roof top yield by orienting itself in the east-west direction.

**SITE ENVIRONMENTAL PERFORMANCE-** This scheme also allows for one contiguous large geo-exchange field and allows for more performative landscape adjacent to the pond allowing outdoor teaching space to overlap with site sustainable strategies at the water edge. It also places the building mass close to the existing ice rink allowing for potential future synergies in energy and waste heat use.

**BELMONT PUBLIC SCHOOLS**  
Belmont, Massachusetts

**TO:** Massachusetts School Building Authority      **DATE:** January 25, 2018  
**FROM:** John P. Phelan  
Superintendent of Schools      **RE:** School Committee Minutes

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Attached please see the Belmont School Committee Minutes of January 23, 2018.

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### G. DISTRICT PDP RESPONSE / Document #3

**BELMONT SCHOOL COMMITTEE/BELMONT HIGH SCHOOL BUILDING COMMITTEE JOINT MEETING34  
MINUTES  
WELLINGTON ELEMENTARY SCHOOL CAFETERIA  
JANUARY 23, 2018**

Present: Dr. Lisa Fiore, Chair  
Ms. Susan Burgess-Cox, Secretary  
Ms. Kate Bowen  
Mr. Thomas Caputo  
Mr. Murat Bicer  
Ms. Andrea Prestwich  
Mr. John Phelan, Superintendent  
Ms. Janice Darias, Assistant Superintendent for Curriculum & Instruction  
Mr. Anthony DiCologero, Director of Finance, Business and Operations

Also in attendance: William Lovallo, Belmont High School Building Committee Chair  
Patricia Brusch, Belmont High School Building Committee Member  
Joel Mooney, Belmont High School Building Committee Member  
Diane Miller, Belmont High School Building Committee Member  
Chris Messer, Belmont High School Building Committee Member  
Jamie Shea, Belmont High School Building Committee Member  
Robert McLaughlin, Belmont High School Building Committee Member  
Joseph DeStefano, Belmont High School Building Committee Member  
Emma Thurston, Belmont High School Building Committee Member  
Adam Dash, Board of Selectmen Chair  
Phyllis Marshall, Assistant Town Administrator  
Daniel Richards, Belmont High School Principal

1. **CALL TO ORDER**

School Committee Chair Dr. Lisa Fiore called the School Committee meeting to order at 7:06 p.m.

Belmont High School Building Committee Chair Bill Lovallo called the Belmont High School Building Committee meeting to order at 7:06 p.m.

2. **COMMENTS FROM BELMONT RESIDENTS**

Chair Bill Lovallo provided an overview of the agenda and then invited members of the audience to ask questions or voice any concerns. Some members of the community expressed concerns about the impact on the students in lower grades depending on which grade configuration option was chosen for the project. Other members expressed concerns about the potential cost.

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### 3. PROJECT COSTS

Chair Lovallo discussed how the costs are derived. Costs are derived from the square footage of the design. The numbers tend to be high for public schools due to the economy and prevailing wages for public projects. The square footage is controlled by MSBA and they do not allow for reduced square footage. In addition to construction costs, there are related fees for furniture, technology, etc.

### 4. SUB-COMMITTEE ON BUILDING SYSTEMS AND OPERATIONS

Chair Lovallo had previously asked for recommendations on subcommittees. Members of the subcommittee will meet approximately six times between now and July with one full design workshop. That subcommittee will report back to the regular Building Committee.

### 5. PRELIMINARY SITE DESIGN UPDATES

Chair Lovallo invited Brooke Trivas of Perkins and Wil to speak on the preliminary site design options. Brooke provided an overview of each of the design options explaining the pros and cons of each. The four options to be considered are:

- C.2.1 – Major Renovation/Minor Addition
- C.2.3 – Minor Renovation/Major Addition
- C.2.4 – Minor Renovation/Major Addition
- C.3.1 – New Construction

Brooke Trivas noted the MSBA will not take part in a project that includes the addition of a pool so if the decision is to continue to have a pool, the current one would need to be saved but could be renovated. The building committee is working with Superintendent Phelan and Athletic Director Jim Davis on the placement of athletic fields. Member of the School Committee and Building Committee discussed the different options and asked questions.

### 4. SELECTION OF GRADE CONFIGURATION (SCHOOL COMMITTEE)

Superintendent Phelan presented an overview of the different grade configurations and process used to determine which grade configurations were best. Belmont asked the MSBA to explore different options based on the increasing enrollment taking place over the past several years. The total number of students enrolled in Belmont during the 2016-17 school year was 4408 with a projection of 4888 for 2024-25.

Superintendent Phelan explained the impact of the different grade configurations. With a 9-12 the middle school and elementary enrollment and space issues would not be addressed; with an 8-12 the high school and middle school would have more space but the elementary space issues would not be addressed; with a 7-12 all levels would have increased space to accommodate enrollment.

Superintendent Phelan also provided an overview of a K-6 grade configuration option. This option would allow for 6 classes per grade in grade 6 at the Chenery, 4 classes per grade at the Wellington, 3 classes per grade at the Winn Brook, 2 classes per grade at the Butler, and 2 classes per grade at the Burbank. This configuration would cause a shortage of 204 total seats across those schools.

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The 9-12, 8-12, 7-12 grade configuration options would all fit on the current high school site location. The grade configuration that fits the district's need best is 7-12. Superintendent Phelan stated his recommendation to the Belmont School Committee is that the district would be best served by a 7-12 configuration.

Belmont High School Building Committee Chair Bill Lovallo requested the Belmont High School Building Committee members leave the table while the School Committee discussed the grade configuration options.

On a motion offered by Tom Caputo and seconded by Murat Bicer, it was

**VOTED** unanimously by the six School Committee members to accept the recommendation of Superintendent Phelan for a 7-12 grade configuration for the Belmont High School project.

On a motion offered by Murat Bicer and seconded by Tom Caputo, it was

**VOTED** unanimously to adjourn the School Committee meeting at 9:18 p.m.

#### 5. SELECTION OF PREFERRED SOLUTION (BUILDING COMMITTEE)

The Belmont High School Building Committee returned to the meeting.

On a motion offered by Robert McLaughlin and seconded by Joel Mooney, it was

**VOTED** unanimously by the 11 Belmont High School Building Committee members to approve Option C.2.4 for the Belmont High School site design.

#### 6. FUTURE BUSINESS

Upcoming Meetings:

February 6, 2018  
Finance Subcommittee Meeting  
SAB Conference Room – 7:30 a.m.

February 6, 2018  
School Committee Meeting  
CMS Community Room – 7:00 p.m.



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7. ENCLOSURES

Strategic Plan  
Important Dates for School Committee

8. ADJOURN

Respectfully submitted by \_\_\_\_\_  
Susan Burgess-Cox, Secretary

DRAFT

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### BPS ELEMENTARY AND MIDDLE SCHOOLS PLANNING STUDY

The charge of this study is to identify short & long term options for Belmont Public Schools elementary and middle years in the context of the ongoing high school study. Three grade configuration options are being considered for the high school: 9 - 12; 8 - 12 and 7 - 12.

How can the elementary and middle schools best serve the students and community to complement the secondary grade configurations?

**Anticipated Design Enrollment** – 360 students / grade level = 3,240 students K-8 + PreK

**Assumptions:**

Capacity of the existing school buildings is an important component of the analysis. Criteria used for determining the long term capacity includes the following assumptions:

- Modular classrooms are seen as short term solutions and are not included in building capacity numbers
- All schools contain appropriate learning environments for art, music and physical education
- All schools contain appropriate learning environments for Special Education including pull out and support spaces
- All schools contain appropriate learning environments are provided for English Learners (EL's) including pull out and support spaces
- Classroom capacities may vary based on room sizes
- To the extent possible, a maker / innovation lab space will be provided in elementary schools
- LABBB Collaborative spaces will remain, with anticipated continued population growth
- Community rooms at Chenery and Wellington will remain
- Belmont After School Enrichment Collaborative (BASEL) will remain at all elementary schools and middle school

**Class Sizes Guidelines**

Grade	Belmont Class Size Guidelines	MSBA Class Size Guidelines
K	18-22	18
1	19-23	23
2	19-23	23
3	20-24	23
4	20-24	23

**Maker / Innovation Lab Space** - Ideally each elementary school would have a maker / innovation lab space. In the short term, space is not available for this program space. Currently none of the elementary schools have a maker / innovation lab space.

**English Learners (EL's)** – Current enrollment (October 2017): 319 students in PreK-8 with anticipation of continued growth. Level 1 and 2 students are often best served in small group settings or pull-out spaces, outside the classroom. Often these rooms have been space-mined out of inappropriate spaces and closets. Students at all levels (1 – 5) are assisted with both push-in and pull out services.

Appropriately provided numbers of, properly sized and appointed rooms are both short and long term goals.

**Special Education (SPED)** – although much of the delivery of services in accomplished with specialists “pushing in” to classrooms, some students do require “pull out” services. Often these have been space-mined out of inappropriate spaces and closets.

Appropriately provided numbers of, properly sized and appointed rooms are both short and long term goals.

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# 3.3.1 - INTRODUCTION

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### SCHOOLS ANALYSIS FOR CAPACITY AND PROGRAM

The following is a capacity analysis by school including rationale for recommendations. Note that this analysis **does not attempt** to create a similar number of grade level classrooms (sections) within individual schools.

#### **Burbank Elementary School**, current population: 374 students (BPS 11/17)

- K classrooms - range in size from 924 – 984 sf ea. vs. current MSBA Guidelines of 1,200 sf = approximately 20% under current MSBA Guidelines. Recommendation: target 15 students per K classroom.
- General education classrooms - range in size from 836 – 1200 sf ea. vs. current MSBA Guidelines of 900 - 1,000 sf, within guidelines with (1) CR 10% below current MSBA Guidelines. Recommendation: target 23 students per classroom.
- Currently 11 classrooms - Assume 9 grade level classrooms, with one reassigned to a maker space and one reassigned to Special Education.
- Library is oversized and may be able to provide additional space for SPED and EL pullout / support
- Cafeteria is sufficient size for the current population
- Gymnasium is sufficient size for the current population
- Burbank Capacity:
  - 9 CR @ 23 = 207
  - 4 K @ 15 = 60
  - Total 267

Note: this results in a 2 section school in a K-4 grade configuration; or 3 sections in a K-3 grade configuration.

#### **Butler Elementary School**, current population: 388 students (BPS 11/17)

- K classrooms - range in size from 840 – 1,080 sf ea. vs. current MSBA Guidelines of 1,200 sf, one room is approximately 30% under current MSBA Guidelines. Recommendation: target 13 students for the undersized classroom and 17 for (2) K classrooms.
- General education classrooms - range in size from 690 (1) – 926 sf ea. vs. current MSBA Guidelines of 900 - 1,000 sf, most rooms are within guidelines with (1) CR 30% below current MSBA Guidelines. Recommendation: target 23 students per classroom.
- Currently 12 classrooms - Assume 10 grade level classrooms, with one small classroom reassigned to a maker space and one reassigned to Special Education.
- Library is slightly undersized for the current population



- Cafeteria is sufficient size for the current population
- Gymnasium is somewhat undersized for the current population
- Butler Capacity:
  - 10 CR @ 23 = 230
  - 1 K @ 13 = 13
  - 2K @ 17 = 34
  - Total 277

Note: this results in a 2 ½ section school in a K-4 grade configuration; or 3+ sections in a K-3 grade configuration.

**Wellington Elementary School**, current population: 626 students (BPS 11/17)

- PreK Classrooms - 1,050 sf ea. vs. current MSBA Guidelines of 1,200 sf, Recommendation: target 13 students (integrated PreK)
- K classrooms - 1,050 sf ea. vs. current MSBA Guidelines of 1,200 sf, approximately 12% under current MSBA Guidelines. Recommendation: target 16 students per classroom
- General education classrooms - 864 sf ea. vs. current MSBA Guidelines of 900 - 1,000 sf, approximately 10% under current MSBA Guidelines. Recommendation: target 21 students per classroom.
- Currently 20 classrooms - Assume 19 grade level classrooms, with one reassigned to a maker space.
- Library is approximately 20% undersized for the population
- Cafeteria is approximately 20% undersized for the population
- Gymnasium is somewhat undersized for the population
- Wellington Capacity:
  - 4 PreK @ 13 = 52 (full day)
  - 5 K @ 16 = 80
  - 19 CR @ 21 = 399
  - Total 531

Note: this results in a slightly less than 5 section school in a K-4 grade configuration; or 6 sections in a K-3 grade configuration.

**Winn Brook Elementary School**, current population: 490 students (BPS 11/17)

- K classrooms - range in size from 1,120 – 1,250 sf ea. vs. current MSBA Guidelines of 1,200 sf, Recommendation: target 18 for K classrooms.
- General education classrooms - range in size from 890 – 950 sf ea. vs. current MSBA Guidelines of 900 - 1,000 sf. Recommendation: target 23 students per classroom.

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- Currently 17 classrooms - Assume 15 grade level classrooms, with one reassigned to a maker space and one reassigned to Special Education.
- Library is approximately 25% oversized and could provide additional space for SPED and EL pullout / support
- Cafeteria is approximately 30% undersized for the current population
- Gymnasium is somewhat undersized for the current population
- Winn Brook Capacity:
  - 4 K @ 18 = 72
  - 15 CR @ 23 = 345
  - Total 417

Note: this results in a slightly less than 4 section school in a K-4 grade configuration; or slightly less than 5 sections in a K-3 grade configuration.

**Chenery Middle School, current population: 1,422 students (BPS 11/17)**

- Typical classrooms at 840 sf vs. current MSBA Guidelines of 850 sf to 950 sf, Recommendation: target 23 students per classroom
- Science labs – 1,030 – 1,080 sf vs. current MSBA Guidelines of 1,200 sf, Recommendation: target 21 students per classroom
- Grade 5 classrooms 14
- Grade 6 classroom 9
- Grade 6 science rooms 3
- Grade 7 classrooms 9
- Grade 7 science rooms 3
- Grade 8 classrooms 9
- Grade 8 science rooms 3
- Total 50

**Chenery Capacity:**

50 x .95 utilization rate = 47.5, say 48 x 23 students / room = 1,104

**Total Right Sized Capacity PreK-8**

- Burbank 267
- Butler 277
- Wellington 531
- Winn Brook 417
- Chenery 1,104
- Total 2,596 vs. 3,240 anticipated = delta 644

644 / 23 per class = 28 classrooms

OPTIONS DISCUSSION

Right Sizing of Schools is set as a goal for the long-term of Belmont Public Schools. The term "right sizing" of schools is used to describe matching the number of classrooms and resulting student capacities with the capacity of the core spaces and non-core academic spaces, such as: Gym, cafeteria, library, music and art, as well as properly provide for special education EL and other student service needs. Right sizing may have slightly different implications at each school.

Note: options discussed below do not take into account after school program, (BASEL) needs.

Option 1 (K - 4, 5 - 8, 9 - 12)

Maintains the status quo of buildings and grade configurations. This option does not satisfy the population needs for grades PreK-8. Building additions would be need at all schools except Wellington to serve the anticipated populations.

Option 2 (K - 4, 5 - 7, 8 - 12)

The high school project would configure as an 8 - 12 secondary school. The right sizing of Chenery would reduce the grades served to grades 5 - 7. All elementary schools would remain PreK - 4 or K - 4. An increase of approximately 308 student seats would be needed for the K - 4 elementary level. As noted previously, this analysis is referring to the number of students without regard to the number of grade level classrooms/strands within individual schools or school size. Once a long term approach is agreed to, an analysis of numbers of classrooms at each school will be reviewed.

**In addition to the number of classrooms needed is the issue of number of sections per school. Having a balance of sections may result in the need for more classrooms.**

At that stage, it is likely that more than 308 student seats would result in proposed projects. This option can take a number of paths with changes at multiple schools:

**Component Options** that could be considered: these component options can be mixed and matched to achieve the needed capacity. It should be

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noted that some options include a need to “increase the core”. This could mean cafeterias, gym, administration, art, music etc. At some schools this may be difficult.

- A. Removal of PreK from Wellington (+84 students), reassign PreK to an alternate location
- B. 6 classroom addition to Butler plus the need to increase the core (+138 students)
- C. 6 classroom addition to Burbank plus the need to increase the core (+138 students)
- D. Large addition or replacement at Winn Brook including core (+308 students), Article 97 maybe required

### Option 2 (& 3) (by school) (K – 4, 5 – 7, 8 – 12)

- Burbank - right size existing to 270 students + component option C from above
- Butler - right sized existing school to 280 students + component option B from above
- Wellington – right size existing school to 530 students + component option A from above; It should be noted that although a relatively new building, many spaces were designed smaller than current MSBA Guidelines including: PreK & K classrooms; general classrooms; cafeteria, library and gym. Although already on a very tight site, the small core spaces limit the ability to support additional population. Even removal of the PreK classrooms and conversion to grade level classrooms might overstress core and support spaces.
- Winn Brook – right size existing school to 420 students + component option D from above
- Chenery – designed as a middle school, would remain a middle school but serve grades 6 – 8.

### Option 4 (& 5) (by school) (K – 3, 4 – 6, 7 – 12)

The high school project would configure as a 7 - 12 secondary school. This allows for the five buildings to be “right sized”. In doing so, the total classroom count could accommodate the entire PreK – 6 population. Another exercise will be conducted to review the number of grade level sections possible at each school.

- Burbank - right size existing school to 270 students
- Butler - right size existing school to 280 students



- Wellington – right size existing school to 530 students. It should be noted that although a relatively new building, many spaces were designed smaller than current MSBA Guidelines including. See notes on Wellington from Option 2
- Winn Brook – right size existing school to 420 students.
- Chenery – designed as a middle school, Chenery has academic and support spaces that may not be needed in an upper elementary school. Science labs and tech-ed spaces can be repurposed for grades 4 – 6. In addition, the classroom use utilization rate would change from .95 to close to 1.0 yielding additional population capacity. A 100% classroom utilization rate would yield a 1,127 student capacity.

This option will also require a review of number of classrooms by school and a balance of sections per school.

**Option 6 (K – 5, 6 – 8, 9 – 12)**

The high school project would configure as a 9 - 12 secondary school. The right sizing of Chenery would put the 5<sup>th</sup> grades back into the elementary schools. Right sizing of each of elementary schools results in the need for 28 additional grade level general education classrooms plus special education and the full complement of core and support spaces. A new elementary school would be needed to accommodate this need.

**The smaller schools: Burbank and Butler would likely have difficulty absorbing the 5<sup>th</sup> grade. They would result in 2 section schools which may not be desirable.**

Although some classrooms may be able to be added to some schools, see component options above, it would still require a new (be it smaller) elementary school building.

Note that the older school buildings: Burbank, Butler and Winn Brook require varying levels of renovation and refreshing of existing facilities regardless if they reconfigure grades or not, due to their age and current condition.

- Burbank - right sized existing school to 270 students
- Butler - right size existing school to 280 students
- Wellington – right size existing school to 530 students. It should be noted that although a relatively new building, many spaces were designed smaller than current MSBA Guidelines. See notes on Wellington from Option 2
- Winn Brook – right size existing school to 420 students.

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## 3.3.1 - INTRODUCTION

### G. DISTRICT PDP RESPONSE / Document #3

1.0 | Planning Study

| SMMA

- **New, large elementary school to serve 660 students**, approximately 98,000 gsf
- Chenery – designed as a middle school, would remain a middle school but serve grades 6 – 8.

Draft

G. DISTRICT PDP RESPONSE / Document #4

DOCUMENT # 4

OPTION 2.1 CLARIFICATION OF SCOPE



LOCAL ACTIONS & APPROVALS

3.3.5

PREFERRED SOLUTION

3.3.4

FINAL EVALUATION OF ALTERNATIVES

3.3.3

EVALUATION OF EXISTING CONDITIONS

3.3.2

INTRODUCTION

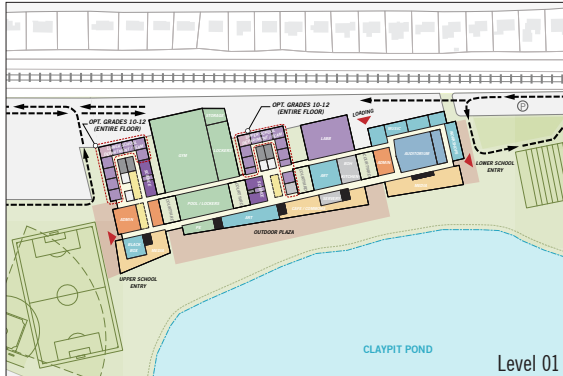
3.3.1

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## G. DISTRICT PDP RESPONSE / Document #4

### II. MAJOR RENOVATION / MINOR ADDITION / C.2.1

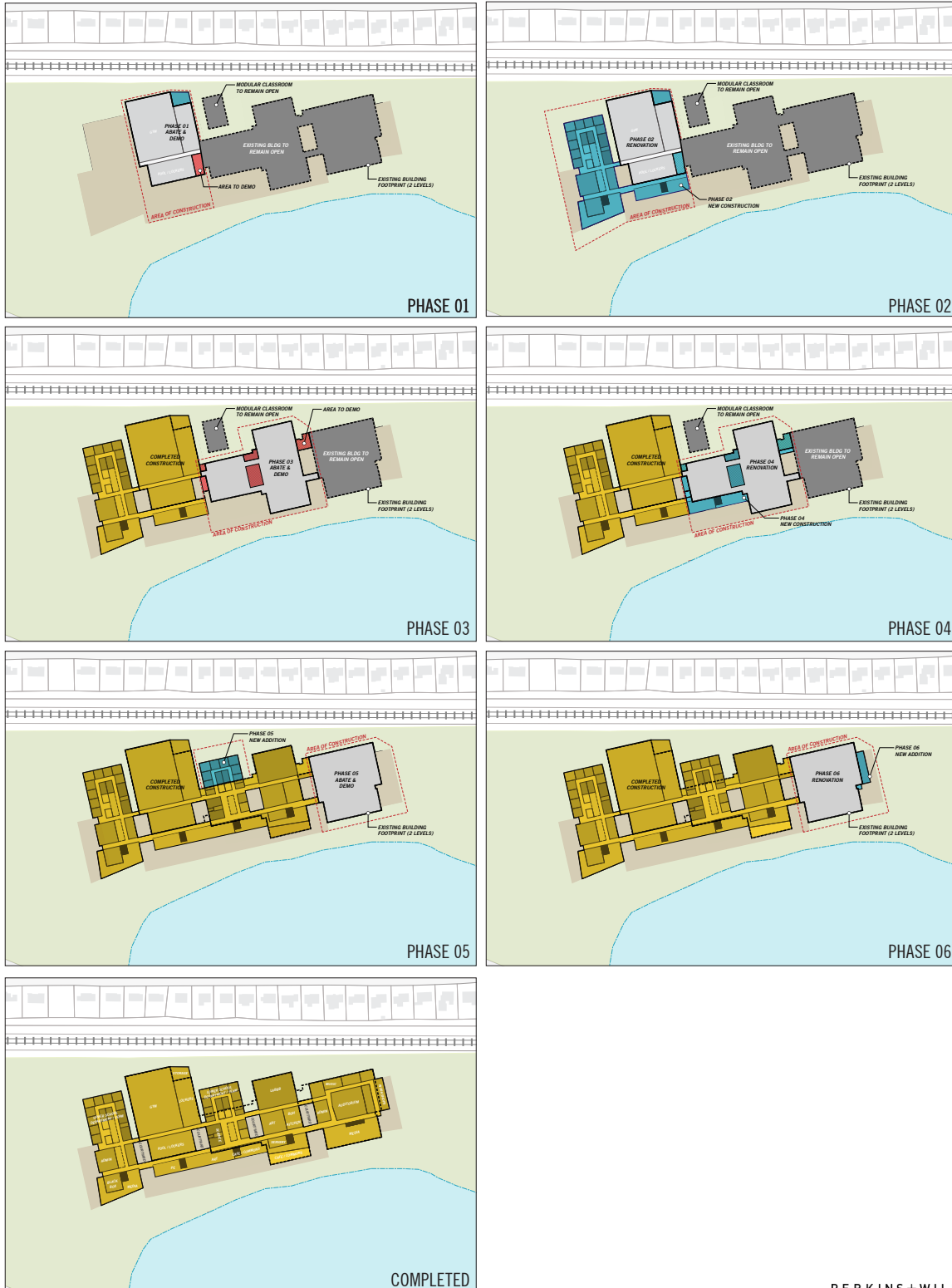


G. DISTRICT PDP RESPONSE / Document #4

II. MAJOR RENOVATION / MINOR ADDITION / C.2.1

- Demolition
- Renovation
- Addition
- Complete

BUILDING PHASE DIAGRAMS 48 MONTHS CONSTRUCTION DURATION



PERKINS+WILL



## 3.3.1 - INTRODUCTION

### G. DISTRICT PDP RESPONSE / Document #4



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*Partnering for better results*

January 29<sup>th</sup>, 2018

*Re: Belmont High School Renovation Costs*

Brooke Trivas  
Practice Leader, Principal  
**Perkins + Will**  
225 Franklin Street,  
Suite 1100  
Boston, Ma. 02110

Dear Brooke,

In response to your query about the renovation costs for Option 2.1 at the Belmont HS project I offer the following information:

Firstly I will deal with renovation costs generally and then touch on some of the specific constraints and cost drivers associated with Option 2.1.

**General Renovation costs:**

The question about renovations costs and how they compare with all new construction is one that is raised by most school projects that we are involved with when comparing options early in the design stage and specifically the question “why does renovation cost more or the same as new?” will get asked. To many this would seem to be counter-intuitive and to answer this question one must look at not just the direct costs of the renovation but also the indirect costs. Generally speaking the direct costs of a renovation project will be less on a SF basis than a new construction project (in Belmont we have been reporting Option 2.1 direct renovation costs in the \$250 per SF range versus \$320 per SF for all new construction). However when looking at Belmont High School and other such projects, the indirect costs are factored in such as the longer construction duration associated with renovation which will increase General Conditions and General Requirements, phasing costs associated with temporary construction measures, temporary utilities, and multiple phase mobilizations etc. then we typically see the total renovation costs trend towards the cost of a new school.

Part of this discussion is also whether or not the \$250 per SF renovation costs number reported is reasonable. The way we approach building up a renovation cost estimate with preliminary design information is to think about what you end up saving in a renovation project and how this affects cost. The elements saved are typically the foundations, the superstructure, the exterior closure and the interior partitions – most renovation projects will replace the roof, replace all interior finishes, interior specialties and will require a full replacement of the Mechanical, electrical, plumbing, FP and electrical systems. If we start with the assumption that there no off-setting costs associated with elements that are being saved this should result in a typical savings of +/- \$150 per SF when compared to a new project. However current seismic and energy codes will require modifications to the existing structure and the foundations as well as replacement of the exterior windows, doors and the thermal properties of the existing envelope will typically need to be addressed. In addition the existing interior partitions, even if no modifications to room layouts are pursued, will need modified to address seismic concerns, facilitate door opening modifications for MAAB upgrades etc. So typically once these additional off-setting costs are factored in and the costs to perform the selected interior demolition are also added then the \$150 per SF cost saving ends up being more like \$100 per SF which would put a typical renovation cost in the \$220 per SF range (direct costs with no markups applied).

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20 downer avenue; suite 1C . hingham, ma . 02043 . 781.740.8007 . www.pmc-ma.com



Partnering for better results

**Option 2.1 Specific Cost Drivers:**

There are, however, other constraints specific to Option 2.1 that add additional costs and further reduce the variance between new costs and renovation costs. The main driver here is the fact that significant portions of the new addition are stacked on top of the existing building and since the existing structure does not have the capacity to support these additional loads it will require the need to thread new load bearing elements through the additional structure requiring openings in the existing structure, reinforcing of the existing frame and new foundations to support additional structural elements. Also all the existing fireproofing contains asbestos which will require the fireproofing being removed and replaced with new fireproofing. There are interior relocations considered to be reconfigured either due to added program spaces due to the increased population or due to the new structural elements introduced which further reduces the savings one would expect by maintaining the interior partitions. Once these additional costs are factored in this pushes the renovation direct costs closer to \$250 per SF and then once the indirect expenses discussed above are included the gap between renovation costs and new construction costs then becomes much closer.

We hope this memo helps to clarify the costs associated with the Major Renovation/ Minor Addition Option 2.1.

Please let us know if you have any further questions.

Regards,

Peter Bradley

President

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### 3.3.1 - INTRODUCTION

#### G. DISTRICT PDP RESPONSE / Addenda #1

##### MSBA PDP REVIEW COMMENTS AND DISTRICT REPLY

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	Analysis of school district student school assignment practices and available space in other schools in the district	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Tuition agreement with adjacent school districts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Rental or acquisition of existing buildings that could be made available for school use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Code Upgrade option that includes repair of systems and/or scope required for purposes of code compliance; with no modification of existing spaces or their function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Renovation(s) and/or addition(s) of varying degrees to the existing building(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Construction of new building and the evaluation of potential locations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	List of 3 distinct alternatives (including at least 1 renovation and/or addition option) are recommended for further development and evaluation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

##### MSBA REVIEW COMMENTS

"5) Option 2.1 is the only addition/renovation option recommended for further evaluation that maintains more than field house and pool functions of the existing school, although it is unclear how much is retained other than the auditorium. The submittal notes that the 'entire building structure- including caissons, foundations, concrete floor, roof slabs, and concrete beams- would remain and be reused'. This implies that exterior envelope and all interior partitions would be demolished, as well as all systems in the building. Based on the submitted options, the MSBA has concerns that keeping the spaces ineligible for MSBA funding such as the pool and field house may be limiting the District's choice of options (please clarify). For the following PSR submittal, the MSBA asks that the District / design team include an add/reno option for evaluation for the selected grade configuration that includes the minimum renovation and addition required to meet current building code and comply with the necessary educational program meeting MSBA space guidelines; i.e., bringing any "existing-to-remain" portions of the building up to code, modifying partition locations only as needed, re-assigning space locations to meet the program, and any building addition required to provide MSBA space guideline area.

Documents in the following submittal should include floor plans that clearly delineate new, renovated and existing-to-remain areas."

##### DISTRICT REPLY TO MSBA REVIEW COMMENTS

Option 2.1a is a response to the request by MSBA to provide to the Town of Belmont a 'light touch renovation, addition' option. The MSBA suggested that existing spaces should be re-purposed to the fullest extent possible irrespective of being undersized from the approved educational program.

2.1a herein represents this work (site plan and floor plans) developed in order to understand the utilization of existing spaces and addition against the approved proposed interior and exterior programs. It should be noted that most spaces remain in their existing location without the alteration of demising interior walls and square footage, with the exception of science. As a result of this 'light touch renovation', it should be acknowledged that the following rooms, noted in the chart on the following page are undersized relative to the Approved Education program as developed by the Town of Belmont.

The Belmont High School Building Committee with the School Committee and Board of Selectmen reviewed all aspects of the 2.1a related to educational program project duration and impact to athletic program and determined that this renovation addition option did not meet the education vision and education program as defined by the town of Belmont.



# 3.3.1 - INTRODUCTION

## G. DISTRICT PDP RESPONSE / Addenda #1

### OPTION 2.1 A LIGHT TOUCH MAJOR RENOVATION MINOR ADDITION

Construction Cost: \$223,821,117

Project Cost: \$279,776,396

Project duration: 60 months

The site plan indicates a loss of the soccer field which is essential to the Belmont High School athletic programs.



#### PROS

- High school will meet building codes and ADA compliance.
- High School will have new building systems including: HVAC, Plumbing, Electrical, Technology, and AV.
- Hazardous Materials will be Abated.
- Improvements to vehicular, pedestrian and bike circulation.
- New two story addition to accommodate programs not in the renovated areas of the existing facility.
- Reduced project costs due to lack of program compliance.

#### CONS

- Multiple construction phasing will result in academic disruption, additional costs, and longer schedule.
- Multiple phasing will impact athletic field use.
- Partial educational compliance, multiple major spaces will be undersized (see chart).
- Two story new addition location removes a soccer field from the exterior program.
- Administration will not be located adjacent to major entries.
- Educational Vision for teaming, interdisciplinary learning, break-out areas etc...are not achieved.
- Belmont's sustainability vision cannot be realized.



# G. DISTRICT PDP RESPONSE / Addenda #1

## OPTION 2.1 A LIGHT TOUCH MAJOR RENOVATION MINOR ADDITION

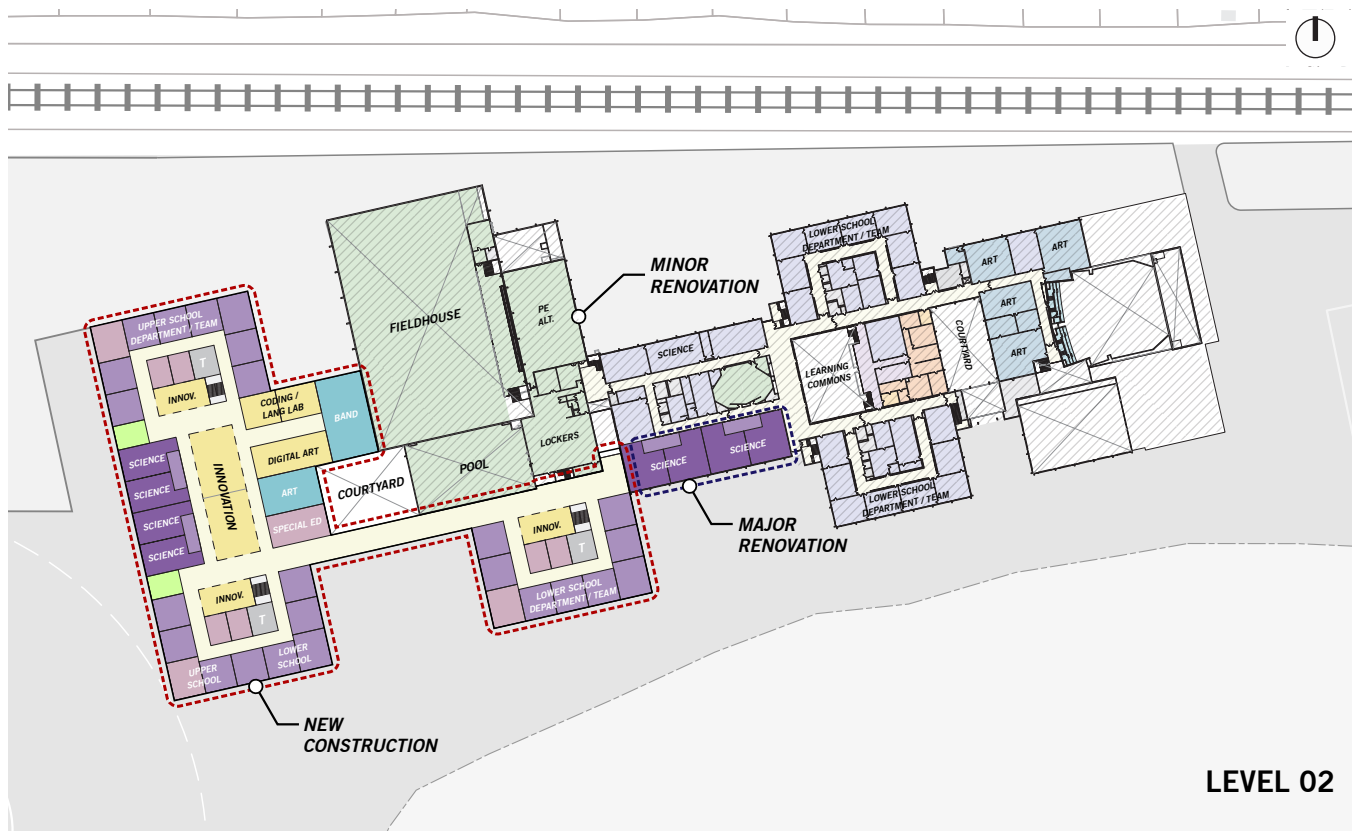
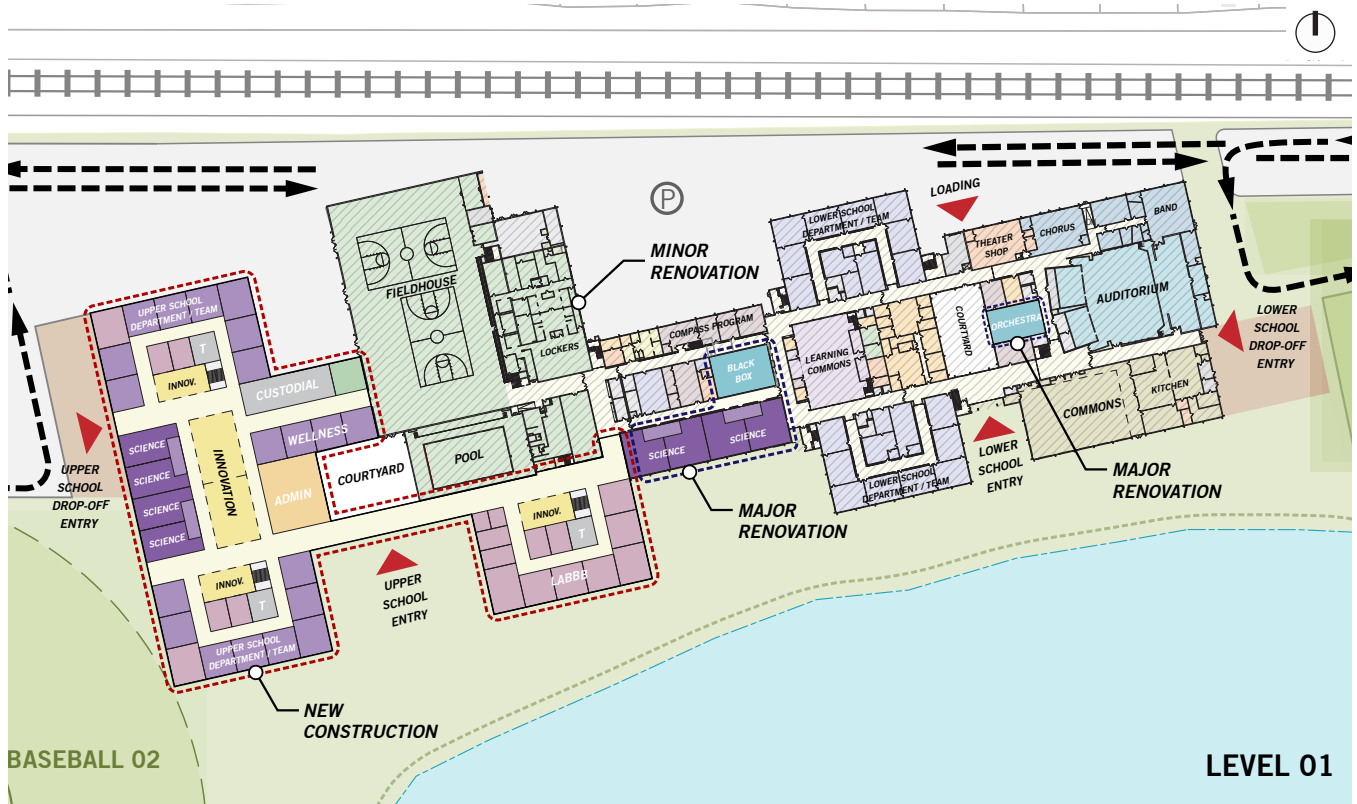


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# 3.3.1 - INTRODUCTION

## G. DISTRICT PDP RESPONSE / Addenda #1

### OPTION 2.1 A COST ESTIMATE

The following cost estimate conducted by the designer is reviewed and approved by the OPM.



**Belmont High School**  
Design Options - GRADES 7-12  
Belmont, MA

09-Feb-18

**PSR Estimate**

#### MAIN CONSTRUCTION COST SUMMARY

	Gross Floor Area	\$/sf	Estimated Construction Cost
<b>OPTION C2.1A MAJOR RENOVATION + MINOR ADDITION</b>			
MINOR RENOVATIONS TO EXISTING SCHOOL	239,530	\$235.00	\$56,289,550
MAJOR RENOVATIONS TO EXISTING SCHOOL	17,590	\$297.04	\$5,224,934
ADDITIONS	164,620	\$320.53	\$52,765,649
REMOVE HAZARDOUS MATERIALS			\$7,100,000
TRAFFIC MITIGATION at CONCORD AVE			\$2,000,000
SITework			\$14,209,864
<b>SUB-TOTAL</b>	<b>421,740</b>	<b>\$326.24</b>	<b>\$137,589,997</b>
DESIGN AND PRICING CONTINGENCY	15%		\$20,638,500
ESCALATION	12%		\$18,987,420
<b>SUB-TOTAL</b>	<b>421,740</b>	<b>\$420.20</b>	<b>\$177,215,917</b>
GENERAL CONDITIONS (60 MTHS SCHEDULE)			\$12,000,000
GENERAL REQUIREMENTS	5.00%		\$8,860,796
BONDS	0.75%		\$1,329,119
INSURANCE	1.10%		\$1,949,375
PERMIT			Waived
CM FEE	3%		\$5,316,478
CM/GMP CONTINGENCY	2%		\$3,544,318
PHASING PREMIUM	7.0%		\$12,405,114
Temporary Classrooms			\$1,200,000
<b>TOTAL OF ALL CONSTRUCTION</b>	<b>421,740</b>	<b>\$530.71</b>	<b><u>\$223,821,117</u></b>

# G. DISTRICT PDP RESPONSE / Addenda #1

## OPTION 2.1 A COST ESTIMATE



**Belmont High School**  
Design Options - GRADES 7-12  
Belmont, MA

09-Feb-18

### PSR Estimate

This PSR cost estimate was produced from drawings, narratives and other documentation prepared by Perkins + Wills Architects Inc. and their design team received January 12, 2018. Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, construction manager's overhead, fee and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be public bidding under Chapter 149a of the Massachusetts General Laws to pre-qualified construction managers, and pre-qualified sub-contractors, open specifications for materials and manufactures.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

### ITEMS NOT CONSIDERED IN THIS ESTIMATE

Items not included in this estimate are:

- Relocation of Town wide fiber system
- Land acquisition, feasibility, and financing costs
- All professional fees and insurance
- Site or existing conditions surveys investigations costs, including to determine subsoil conditions
- All Furnishings, Fixtures and Equipment
- Items identified in the design as Not In Contract (NIC)
- Items identified in the design as by others
- Owner supplied and/or installed items as indicated in the estimate
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks, (except as noted in this estimate)
- Construction contingency (GMP Contingency is included)
- Contaminated soils removal

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## 3.3.1 - INTRODUCTION

### H. MSBA PSR REVIEW / Comments

#### ATTACHMENT A

#### MODULE 3 – PREFERRED SCHEMATIC REPORT REVIEW COMMENTS

**District:** *Town of Belmont*

**School:** *Belmont High School*

**Owner's Project Manager:** *Daedalus Projects, Inc.*

**Designer Firm:** *Perkins+Will*

**Submittal Due Date:** *February 21, 2018*

**Submittal Received Date:** *February 20, 2018*

**Review Date:** *February 21-March 26, 2018*

**Reviewed by:** *K. Brown, J. Jumpe*

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#### MSBA REVIEW COMMENTS

The following comments<sup>1</sup> on the Preferred Schematic Report submittal are issued pursuant to a review of the project submittal document for the proposed project presented as a part of the Feasibility Study submission in accordance with the MSBA Module 3 Guidelines.

*MSBA notes the following regarding the Preferred Solution:*

- *Reference ongoing discussions with the District, design team and MSBA at the March 21, 2018 Facilities Assessment Subcommittee ("FAS") meeting and following discussions with MSBA staff regarding the benefit to the District of additional time to further develop its preferred option prior to the MSBA Board of Director vote.*
- *Provide any updates regarding discussions with the Belmont High School steering committee that may affect the development of the proposed design and associated cost and schedule; specifically, will the revised design package submitted to MSBA on April 12, 2018 incorporate all final input from the committee that may affect the building layout, cost, and schedule.*
- *Please confirm the District's intent to target a Net Zero level of energy efficiency, and confirm that the cost estimates and budgets provided for the options in this submittal include all costs associated with the proposed sustainable systems. Provide any cost analysis or cost/benefit analysis regarding these systems associated with this targeted energy goal.*
- *As mentioned at the FAS an area of concern for the MSBA and its Board of Directors is what is deemed as eligible soft costs associated with scope beyond MSBA guidelines and higher construction costs. Please note that during review of the District's forthcoming Schematic Design Submittal because of the ineligible scope associated with the renovated pool, field house, and offsite traffic mitigation MSBA will be reviewing costs associated with project management and design services and may deem portions of these costs ineligible for*

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<sup>1</sup> The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA's guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project's planning process or plans and specifications.

**H. MSBA PSR REVIEW / Comments**

*reimbursement. The proposed area of the District’s preferred addition/renovation option is 83,757 square feet (“sf”) or 23% greater than the area included in the MSBA space guidelines.*

- *The District’s preferred addition/renovation option has a project cost that is \$13.3m higher than the new construction option.*
- *As noted at the FAS meeting because the preferred solution is essentially a new school attached to the existing field house and pool the MSBA is expecting that all forthcoming submittals are based on a grossing factor of no more than 1.50 exclusive of areas associated the existing field house and pool.*
- *At \$544/sf, the construction cost of the preferred addition/renovation option is \$92/sf or 20% over the average of \$452/sf of seven recently approved MSBA new high school projects.*
- *The MSBA compared the cost estimate for the District’s preferred solution with seven recently approved high school projects and notes that direct costs per square foot were 15% higher for Shell and Services (HVAC, electrical, etc.), and greater than 40% higher for Foundations and Construction Markup than the average of the seven high school projects recently approved. The MSBA encourages the District and its consultants to further review the proposed project to confirm that the underlying factors leading to the higher costs provide sufficient benefit to warrant the added costs and where possible adjust the proposed design to reduce costs. The MSBA also noted costs that were 19% greater than the average of the seven high schools for Special Construction of which most is for hazardous material abatement. The MSBA looks to the District and its consultants to ensure the project scope and budget documentation is of sufficient detail to capture the anticipated costs associated with hazardous material abatement, some of which will be eligible for reimbursement and some that will be ineligible for reimbursement. Please acknowledge.*
- *Some of this area in excess of guidelines and cost in the addition/renovation option is associated with maintaining the existing field house and pool. The submittal notes this was a primary reason for the support of the preferred solution and that the District acknowledges that associated costs are ineligible for reimbursement by MSBA. Proposed areas beyond that included in the MSBA guidelines and proposed construction costs greater than construction costs with other recently approved high school projects increase the District’s share of the project cost.*
- *MSBA encourages the District and its consultants to look for ways to reduce excessive area and costs in the subsequent Project Scope and Budget phase of the Feasibility Study.*
- *Please acknowledge the District’s understanding of the proposed scope, costs and estimated impact to the District’s share of the proposed project costs.*

**3.3 PREFERRED SCHEMATIC REPORT**

Overview of Preferred Schematic Submittal	Complete	Provided; Refer to comments following each section	Not Provided; Refer to comments following each section	Receipt of District’s Response; To be filled out by MSBA Staff
OPM Certification of Completeness and Conformity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Table of Contents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.1 Introduction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 3.3.1 - INTRODUCTION

#### H. MSBA PSR REVIEW / Comments

Overview of Preferred Schematic Submittal	Complete	Provided; <i>Refer to comments following each section</i>	Not Provided; <i>Refer to comments following each section</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
3.3.2 Evaluation of Existing Conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.3 Final Evaluation of Alternatives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4 Preferred Solution	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.5 Local Actions and Approval Certification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 3.3.1 INTRODUCTION

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Overview of the process undertaken since submittal of the Preliminary Design Program that concludes with submittal of the Preferred Schematic Report, including any new information and changes to previously submitted information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Summary of updated project schedule, including				
	a) Projected MSBA Board of Directors Meeting for approval of Project Scope and Budget Agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Projected Town/City vote for Project Scope and Budget Agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Anticipated start of construction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Target move in date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Summary of the final evaluation of existing conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Summary of final evaluation of alternatives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Summary of District's preferred solution	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	A copy of the MSBA Preliminary Design Program project review and corresponding District response	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

1) The Introduction notes the District selected the 7-12 grade configuration option as the preferred option, including renovation of the existing pool, field house and gym. Note that for the purposes of clarity in this review, the 1970 field house located within the existing high school facility will be referred to as the "existing field house", and the separate existing historic field house building will be referred to as the "1910/1932 White Memorial field house" (no response required).



**H. MSBA PSR REVIEW / Comments**

*The submittal includes a detailed analysis by Symmes Maini & McKee Associates, Inc, working directly with the District, to review a district-wide capacity analysis of the various schools in the district and how the 7-12, 8-12 and 9-12 grade options for this project will affect the remaining middle school and elementary schools in Belmont. The selection by the District to reconfigure the high school to a 7-12 upper and lower high school was based on this analysis due to current and projected overcrowding at all grade levels in the district (no response required).*

*3) The existing conditions summary notes an existing challenge of onsite traffic flow, parking and backed up traffic on the adjoining local streets during pick-up and drop-off periods. Describe any design strategies to mitigate the added traffic resulting from the addition of grades 7 and 8, and how the additional traffic was considered in the decision to select the 7-12 option.*

*4,5) The submittal notes that the District’s unanimous support of Option C.2.4 was primarily due to preservation of the existing pool and field house, and for siting advantages over the other options (no response required).*

*6) The District provided a February 2, 2018 response to the MSBA PDP submittal review. MSBA notes the following statements from the District’s response (Confirm and acknowledge each item):*

- The District will provide a copy of the timelines regarding the Project Notification Form and approvals by MA Historical Commission in the forthcoming Schematic Design submittal for any modifications of the Clay Pit Pond landscaped area and proposed demolition of the 1910/1932 White Memorial field house.*
- All costs associated with the demolition of the 1910/1932 White Memorial field house, any scope of work associated with the adjacent existing skating rink, and costs associated with constructing a parking area and amenities adjacent to the existing skating rink must be itemized as ineligible for MSBA reimbursement in the following Schematic Design submittal.*
- The preferred option under consideration does not include the construction of any structure or critical facility within the Zone AE (in the vicinity of the existing Clay Pit Pond), and the Zone AE area would remain open space and available for flood storage as required.*
- The project team does not anticipate any development restrictions or additional project costs associated with the existing MBTA Fitchburg rail line along the northern site border.*
- Any scope of work associated with the future Belmont community path parallel to the rail line and existing multi-generational Clay Pit Pond walking path & amenities (both on-site), and the potential future pedestrian connecting underpass at Alexander St. / MBTA Fitchburg rail line (off-site) will be procured, designed, funded and implemented by the Town of Belmont separate from the scope of work for the high school project.*
- The phase 1 environmental report notes the potential presence of an abandoned underground storage tank in the vicinity of the existing skating rink, and that the existing site was used as a landfill prior to development by the town for a school. Geo-technical and geo-environmental investigations are ongoing and will be completed in the Schematic Design phase of the feasibility study. MSBA noted that all costs associated with abatement of contaminated soil from any source and abatement of underground storage tanks must be itemized as ineligible for MSBA reimbursement.*

*No further review comments for this section.*

### 3.3.1 - INTRODUCTION

#### H. MSBA PSR REVIEW / Comments

#### 3.3.2 EVALUATION OF EXISTING CONDITIONS

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	A narrative of any changes resulting from new information that informs the conclusions of the evaluation of the existing conditions and its impact on the final evaluation of alternatives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	If changes are substantive, provide an updated Evaluation of Existing Conditions and identify as final. Identify additional testing that is recommended during future phases of the proposed project and indicate when the investigations and analysis will be completed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

*1) The updated existing conditions report (data and voice communications systems) notes that the second floor main distribution frame room is the centralized management point for all data communications for the high school, the school district and the town. Describe whether this district/town function will continue in the proposed new facility, and how these MDF space(s) are accounted for in the space summary spreadsheet.*

*No further review comments for this section.*

#### 3.3.3 FINAL EVALUATION OF ALTERNATIVES

Include at least three potential alternatives, with at least one renovation and/or addition option. Include the following for each alternative where appropriate:

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	An analysis of each prospective site including:				
	a) Natural site limitations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Building footprint(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Athletic fields	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Parking areas and drives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Bus and parent drop-off areas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Site access and surrounding site features.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Evaluation of the potential impact that construction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## H. MSBA PSR REVIEW / Comments

	Provide the following Items	Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
	of each option will have on students and measures recommended to mitigate impact				
3	Conceptual architectural and site drawings that satisfy the requirements of the education program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	An outline of the major building structural systems	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	The source, capacities, and method of obtaining all utilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	A narrative of the major building systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	A proposed total project budget and a construction cost estimate using the Unifomat II Elemental Classification format (to as much detail as the drawings and descriptions permit, but no less than Level 2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Permitting requirements and associated approval schedule	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Proposed project design and construction schedule including consideration of phasing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Completed Table 1 – MSBA Summary of Preliminary Design Pricing spreadsheet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### MSBA Review Comments:

3) *As noted above, the District has narrowed the scope of the study to the 7-12 grade configuration options (designated in the submittal as grade configuration "C") based on the district-wide capacity analysis of the various schools in the district. The submitted feasibility study includes a base repair option with a project cost of \$111.5m, three addition/renovation options ranging in project costs of \$302.1- \$307.3m, and a new building option with a project cost of \$293.8m.*

*The submittal includes the following in the final evaluation of options:*

- *Option C.1 (base repair) is 257,120 total sf; no new construction*
- *Option C.2.1 (add/reno) is 451,800 total sf; 47.0% new construction, 53.0% renovation*
- *Option C.2.3 (add/reno) is 451,800 total sf; 85.6% new construction, 14.4% renovation*
- *Option C.2.4 (add/reno) is 451,800 total sf - 86.2% new construction, 13.8% renovation*
- *Option C.3.1 (new construction) is 422,925 total sf; all new*

*The three addition/renovation options are indicated as being the same overall building size, and vary in proportion of renovated vs new area. All are 4-stories, and exceed MSBA spaces guidelines by 84,649 gross sf using a 1.5 grossing factor:*

- *Option C.2.1 (\$302.1m project cost) includes additions to meet the educational programmed area, and renovations to the existing spaces to remain in place. The existing field house, gym,*

### 3.3.1 - INTRODUCTION

#### H. MSBA PSR REVIEW / Comments

*lockers, pool and auditorium are renovated. The kitchen, cafeteria, media center, and some educational spaces are relocated. The new upper 2-stories are located on top of the existing 2-story structure. Multi-height spaces are limited.*

- *Option C.2.3 (\$307.3m project cost) includes renovation of the existing field house, gym, lockers and pool spaces. All other spaces are replaced with new construction. The design includes a new auditorium and black box theater. A relatively narrow glass-covered 4-story atrium lobby space extends the full length of the building with upper level crossing bridges and single-loaded corridor/balconies for circulation.*
- *Option C.2.4 (\$307.2m project cost) is a plan variation to Option C.2.3, differing in the configuration of the central atrium lobby space and connecting circulation. One of the three central lobby areas is covered with a green roof over the third floor; the other two are covered with a glass roof structure over the fourth floor.*

*The new construction Option C.3.1 is also 4 stories in height. It does not include the existing field house and pool provided in the three add/reno options above, and exceeds MSBA space guidelines by 55,774 gsf. Because the proposed new building is located adjacent to the existing building with no overlapping area, the construction sequence does not require multiple construction phases of areas occupied by students.*

*Provide a response to each of the following comments:*

*The (existing building) 2-story Base Repair Option C.1 is noted as too small to meet the described educational program for a 7-12 facility. However; as a 9-12 / 1,470 student grade configuration, the existing building is only 6,000 gsf smaller or 2% less than current MSBA space standards. Describe any discussions and the evaluation process relating to the potential for a base repair option for the existing building as 9-12 facility, as a comparison to the 7-12 options.*

*MSBA notes that a space summary was provided only for the preferred option C.2.4. The three add/reno options are shown as having the same total sf, although the extent of internal circulation and multi-height spaces vary greatly for each design. Note that, because of the separation of classroom wings in the preferred option and resulting increase in circulation area, the preferred option floor plan shows five stairs that connect all four floors, two stairs that connect two floors, and one stair that connects three floors. Verify that the sf indicated for each option and resulting construction costs are accurate and that no option will exceed the maximum allowable grossing factor of 1.5. Confirm that the space summary provided reflects the preferred solution.*

*Option 2.C.1 is roughly \$5m less project cost and has the same programmed areas compared to the other two add/reno options (although it is \$8m more than the new building option). It has half the new construction area, four times the existing renovated area, and requires a significantly lower percent of demolition of the existing building compared to the other add/reno options. This option appears to have a more efficient circulation layout, resulting in a lower grossing factor. Given these advantages, describe why this option is not preferred over the other add/reno options.*

*As noted elsewhere in this review, the District's preferred option C.2.4 is currently 83,757 gsf over MSBA space guidelines, and approximately 32,000 gsf over guidelines exclusive of the existing field house and pool areas. Confirm that the District understands the impact this additional square footage has on the total project budget, and the District's share of the project cost. Based on the Town's*

**H. MSBA PSR REVIEW / Comments**

*responses and in subsequent phases of the study, the MSBA will review the proposed project for conformance with the MSBA guidelines and programmatic needs that may vary from the guidelines.*

*The proposed new building option is 55,774 gsf over MSBA space guidelines for a 2,215 student, 7-12 school using a grossing factor of 1.5. This excess area represents approximately \$31m in construction costs using the proposed \$556/sf construction cost for this option (including this excess area, this new building option is still \$13.3m lower in project costs than the District’s preferred option). Given the MSBA’s goal to support educationally-appropriate, flexible, sustainable, and cost-effective public school facilities, and expressed local concern for the proposed cost of this project noted in the submittal, describe the benefits of the preferred solution and why the MSBA should support an addition/renovation project that is higher in cost than a more efficient, new building that more closely aligns with MSBA space standards.*

*6) MSBA notes that the \$111.5m “Base Repair” Option C.1 includes replacing the existing HVAC system with a ground loop geo-exchange system to attempt zero net energy, similar to the addition/renovation and new building options in the evaluation. Although this system is not itemized in the cost estimates, based on other similar projects, 400 wells of 450’ depth could cost roughly \$7-8m in construction costs. Describe the extent of the discussion and analysis used to compare the benefits, liabilities of construction and operating cost of the geo-thermal system to a more typical energy efficient system (also refer to comment #10 below). Please confirm that the proposed cost estimates provided include these costs as well as all of the sustainable design features needed to achieve net zero facility for all of the options and if it is included within the \$544/sf for the District’s preferred solution.*

*7) Provided; refer to the summary comments on page 1 of this review regarding the proposed total project budget and construction cost for the proposed options.*

*8) The submittal notes that “the Town of Belmont has exercised its rights under the Dover Amendment for all of its previous school projects and will continue this practice for the High School Project.” In the response to this review, describe any Town zoning or planning requirements that require exemption using the Dover Amendment, and any proposed scheduling milestones for the preferred solution regarding these approvals. This information should be included in future project schedules.*

*10) Confirm that the cost estimates and budgets provided for each option in the Preliminary Design Pricing spreadsheet include all costs associated with the targeted Net Zero level of energy efficiency, most notably (but not limited to) the geothermal system, as well as all the proposed sustainable systems.*

*The area indicated for the preferred option in the Preliminary Design Pricing Table is 892 gross square feet greater than the area indicated in the space summary. Please confirm which value should inform the basis of the District’s Preferred Solution.*

*No further review comments for this section.*



**H. MSBA PSR REVIEW / Comments**

**3.3.4 PREFERRED SOLUTION**

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Educational Program				
	a) Summary of key components and how the preferred solution fulfills the educational program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Design responses including desired features and/or layout considerations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Proposed variances to, and benefits of, any changes to the current grade configuration (if any) and a related transition plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Preferred Solution Space Summary				
	a) Updated MSBA Space Summary spreadsheet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Itemization and explanation of variations from the initial space summary (and MSBA review) included in the Preliminary Design Program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Preliminary NE-CHPS or LEED-S scorecard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Conceptual floor plans of the preferred solution, in color that are clearly labeled to identify educational spaces	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Clearly labeled site plans of the preferred solution including, but not limited to:				
	a) Structures and boundaries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Site access and circulation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Parking and paving	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Zoning setbacks and limitations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Easements and environmental buffers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Emergency vehicle access	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) Safety and security features	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	h) Utilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	i) Athletic fields and outdoor educational spaces (existing and proposed)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	j) Site orientation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**H. MSBA PSR REVIEW / Comments**

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
6	An overview of the Total Project Budget and local funding including the following:				
	a) Estimated total construction cost	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Estimated total project cost	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Estimated funding capacity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) List of other municipal projects currently planned or in progress	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) District's not-to-exceed Total Project Budget	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Brief description of the local process for authorization and funding of the proposed project	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) Estimated impact to local property tax, if applicable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	h) Completed MSBA Budget Statement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Updated Project Schedule including the following projected dates:				
	a) Massachusetts Historical Commission Project Notification Form	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	b) MSBA Board of Directors meeting for approval to proceed into Schematic Design	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) MSBA Board of Directors meeting for approval of project scope and budget agreement and project funding agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Town/City vote for project scope and budget agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Design Development submittal date	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	f) MSBA Design Development Submittal Review (include required 21-day duration)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	g) 60% Construction Documents submittal date	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	h) MSBA 60% Construction Documents Submittal Review (include required 21-day duration)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	i) 90% Construction Documents submittal date	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	j) MSBA 90% Construction Documents Submittal Review (include required 21-day duration)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	k) Anticipated bid date/GMP execution date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	l) Construction start	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 FINAL EVALUATION OF ALTERNATIVES 3.3.3  
 PREFERRED SOLUTION 3.3.4  
 LOCAL ACTIONS & APPROVALS 3.3.5

### 3.3.1 - INTRODUCTION

#### H. MSBA PSR REVIEW / Comments

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
m)	Move-in date	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
n)	Substantial completion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

1a) Note the following comments relating to the Educational Program:

- *The Educational Program confirms the Belmont School Committee approval of the administrations recommendation to reconfigure Belmont HS to a 7-12 school (no response required).*
- *Provide a more detailed description of the District responses given for the following MSBA PDP review comments:*
  - *Focus of the plan is on the “special” curriculum. Revisit with the focus of explaining how the core academics (English, math, science, social studies) work.*
  - *Further explain the proposed digital graphic design/computer animation program.*
  - *Further explain the health program, nursing suite, and counseling areas with the mentioned understanding/focus of whole child and social/emotional well-being in mind.*
- *Describe how the proposed project rooms differ in design and use from regular general classroom, and why a general classroom can't be scheduled for project-based learning activities.*
- *Describe how the proposed innovation labs and maker spaces differ in design and use from a science lab, and why a science lab can't be scheduled for use as an innovation lab / maker space.*
- *How often and for what purpose would the proposed project rooms, innovation labs and maker spaces be used? Provide specific scheduling information and anticipated utilization.*
- *Describe why the project includes the interdisciplinary spaces listed above if the school is organized (and functions) by department, and how the facility organization can support the interdisciplinary program suggested in the Vision for Teaching and Learning section in the future, if applicable.*
- *The Educational Program indicates three lunch periods; two for grades 7-8 and two for grades 9-12. Are all grades mixed in one of the three periods?*
- *The Educational Program notes that, because of overcrowding at the current Chenery Middle School, not all middle students have a locker close to their home room. Since this is identified as a concern in the existing building, describe how the District intends to address this concern in the proposed building. Confirm use and distribution of lockers in the high school portion of the school as some other districts have found them to go unused.*
- *Given the extent of digital arts in the program, describe the need for a photographic dark room and two kilns (consider consolidating or sharing kilns and other underutilized spaces to the extent possible). Provide specific scheduling information and anticipated utilization for*

**H. MSBA PSR REVIEW / Comments**

*these spaces, and describe anticipated chemical and hazardous materials storage and related safety protocols.*

- *Provide the anticipated number and grades of students in the METCO program. The proposed program includes a separate METCO classroom. Please describe the need for a separate classroom as this runs counter to the METCO philosophy of making these students a fully integrated part of the school community and receiving services (individually designed) from the same professionals and in the same groupings as any other student.*
- *Are the current and proposed media center / learning commons staffed by professional full-time librarians, and are the two learning commons separately and fully staffed or does staff split their time on these spaces? Who reviews, and curates, materials, software and website content? How will the Chenery Middle School library be staffed after grades 7 and 8 relocate to the high school?*
- *Describe the extent that middle school students mix with the older high school students; describe shared spaces and separate spaces, and how the District determined this approach. Provide any information regarding community feedback regarding this decision.*

*2a) Refer to Attachment B for MSBA space summary review comments. As noted above, the area indicated in the space summary is 892 gross square feet less than the area indicated for the preferred option in the Preliminary Design Pricing Table. Please confirm which value should inform the basis of the District’s Preferred Solution.*

*3) The submittal references using the LEED V4 2010 ASHRAE 90.1 baseline for energy efficiency. Note that MSBA energy standards are based on the current MA building code which uses 2015 IECC, and the 2013 ASHRAE 90.1 energy standards. Confirm that the project will use the correct baseline standards to model proposed energy efficiency.*

*The District has indicated intent to achieve the 2% additional reimbursement through the MSBA Green School Program. The submittal indicates a total goal of 54 points using USGBC LEED-V4, including 8 points in the Energy & Atmosphere “Optimize Energy Performance” category. Note that 54 points in LEED-V4 reaches the minimum required for all MSBA core projects. However, in order to receive the additional 2% reimbursement in the current MSBA green policy, the District and design team must also exceed the MA state energy code by at least 20% using the current 2015 International Energy Conservation Code. Eight points in this category exceeds the energy code by approximately 14%.*

*If the District intends that MSBA provide a grant that includes the 2% additional reimbursement in the following project Scope and Budget phase of the study, the District must provide a revised scorecard indicating that intent (either in response to this review or in the following submittal). Refer to MSBA Project Advisory #41 “Update to the MSBA’s Sustainable Building Design Policy” for more information. Acknowledge and confirm the District’s intent and that the proposed project will be designed to meet or exceed the criteria set forth in project Advisory #41.*

*Confirm the District’s intent to target a Net Zero level of energy efficiency, and that the cost estimates and budgets provided for the preferred option include all costs associated with the proposed sustainable systems.*

## 3.3.1 - INTRODUCTION

### H. MSBA PSR REVIEW / Comments

5b) MSBA understands that the site circulation configuration at preferred schematic phase is still under development; however, note the following issues for further consideration in the schematic design phase:

- The proposed site plan does not indicate accessible parking locations and a continuous accessible route to the building entrances, and the nearest parking areas appear to be remote to both entrances.
- The site plan (both offsite and onsite) does not currently indicate alternative transportation walkways such as sidewalks for pedestrians and bicycles, or bicycle storage areas.
- Pedestrian routes from the parking areas to the building entrances appear to require crossing through the drop-off loops.
- Confirm that the loading area will be provided with adequate delivery truck and refuse truck space and turn-around areas, refuse & recycling dumpster locations, raised loading areas, adequate equipment and material access routes from the loading area to the kitchen and custodial storage areas, support staff and kitchen staff parking, etc. Food deliveries appear to require passage through public/student corridors to the kitchen.

Review offsite and onsite sidewalks, walkways, bicycle storage, crossing situations, accessible parking locations and the loading area for the following submittal. Confirm these functional design requirements will be reviewed with facilities management staff.

5c) The Educational Program notes eight school buses for the proposed school. Describe the distribution of buses for the lower & upper school entrances and confirm each bus loop is adequate length for the appropriate number of buses.

6c) The Budget Overview notes that the proposed project will be funded in part by a town voter approved debt exclusion (no response required).

6d) The submittal notes that the skating/hockey rink project is among the several planned municipal projects in Belmont. This project, which is on the high school campus, is noted as occurring either immediately before or after construction of the high school. Confirm that scope of work for the Belmont High School project (construction costs and project costs) does not include work of any kind on the existing skating rink building, including surrounding amenities, associated site-work, parking, and demolition of the 1910/1932 White Memorial field house.

6e) The submittal notes that the District's anticipated budget of the high school project is \$300-\$315m (the design team currently estimates the project cost to be \$307,161,440), and that the final not-to-exceed budget will be established as a part the following submittal. Refer to Module 4 "Appendix 4C Schematic Design Submittal Notification Template" for information describing the MSBA process to ensure that the following submittal conforms to the District's established budget. Please confirm.

7a, 7e-j, 7m) For the following submittal, provide a project schedule that includes all milestone dates indicated in Modules 3 and 4.

No further review comments for this section.

### 3.3.5 LOCAL ACTIONS AND APPROVALS

**H. MSBA PSR REVIEW / Comments**

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Certified copies of the School Building Committee meeting notes showing specific submittal approval vote language and voting results, and a list of associated School Building Committee meeting dates, agenda, attendees and description of the presentation materials.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Signed Local Actions and Approvals Certification(s):				
	a) Submittal approval certificate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Grade reconfiguration and/or redistricting approval certificate (if applicable)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Provide the following to document approval and public notification of school configuration changes associated with the proposed project:				
	a) A description of the local process required to authorize a change to the existing grade configuration or redistricting in the district	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) A list of associated public meeting dates, agenda, attendees and description of the presentation materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Certified copies of the governing body (e.g. School Building Committee) meeting notes showing specific grade reconfiguration and/or redistricting, vote language, and voting results if required locally	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) A certification from the Superintendent stating the District's intent to implement a grade configuration or consolidate schools, as applicable. The certification must be signed by the Chief Executive Officer, Superintendent of Schools, and Chair of the School Committee.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

*2,3) All Local Action and Approval items and grade reconfiguration documents were provided in response to the February 26, 2018 MSBA cursory review (no response required).*

*No further review comments for this section.*

*The MSBA issues project advisories from time to time, as informational updates for Districts, Owner's Project Managers, and Designers in an effort to facilitate the efficient and effective administration of proposed projects currently pending review by the MSBA. The advisories can be found on the MSBA's website. In response to these review comments, please confirm that the District's consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable.*

**End**



## 3.3.1 - INTRODUCTION

### H. MSBA PSR REVIEW / Space Summary

#### ATTACHMENT B MODULE 3 – PREFERRED SCHEMATIC SPACE SUMMARY REVIEW

**District:** *Town of Belmont*

**School:** *Belmont High School*

**Owner's Project Manager:** *Daedalus Projects, Inc.*

**Designer Firm:** *Perkins+Will*

**Submittal Due Date:** *February 21, 2018*

**Submittal Received Date:** *February 21, 2018*

**Review Date:** *February 21-March 26, 2018*

**Reviewed by:** *A. Waldron, KBrown*

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The Massachusetts School Building Authority (the “MSBA”) has completed its review of the proposed space summary of the preferred alternative as produced by Perkins + Will and its consultants. This review involved evaluating the extent to which the Belmont High School’s proposed space summary conforms to the MSBA guidelines and regulations.

The MSBA considers it critical that the Districts and their Designers aggressively pursue design strategies to achieve compliance with the MSBA guidelines for all proposed projects in the new program and strive to meet the gross square footage allowed per student and the core classroom space standards, as outlined in the guidelines. The MSBA also considers its stance on core classroom space critical to its mission of supporting the construction of successful school projects throughout the Commonwealth that meet current and future educational demands. The MSBA does not want to see this critical component of education suffer at the expense of larger or grander spaces that are not directly involved in the education of students.

While the MSBA recognizes the benefits and the challenges associated with saving or renovating existing spaces, please note that any spaces in new construction or substantially renovated spaces must be compliant with MSBA space standards for both allotted area and room quantity unless otherwise approved in writing by the MSBA.

The area included in the preferred option in the Preliminary Design Pricing Table is different than the area indicated in the space summary. Please confirm which value should inform the basis of the District’s Preferred Solution. The review comments below use the information provided in the space summary and are based on the submitted addition and/or renovation construction project option with an agreed upon design enrollment of 2,215 students in grades 7-12.

**The MSBA review comments are as follows:**

- **Core Academic** – The District is proposing a total of 112,750 net square feet (nsf) which exceeds the MSBA guidelines by 7,640 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *MSBA notes the following:*



## H. MSBA PSR REVIEW / Space Summary

- *The proposed program includes 10 additional classrooms, one extra science lab, and two 1,000 nsf ELL rooms over guidelines. The MSBA notes that the utilization rate below is 80% whereas the MSBA guidelines target 85% inclusive of Art, Vocations and Technology classrooms. The MSBA encourages the District and its consultants to seek additional efficiencies in the proposed program.*
  - *The submittal indicates roughly half the standard MSBA nsf for science lab prep rooms and the chemical storage room; verify that the proposed area is sufficient to meet the educational needs (refer to the MSBA high school science lab guidelines for additional information).*
  - *The MSBA will review the proposed project for conformance with the MSBA guidelines and programmatic needs that may vary from the guidelines in the subsequent Project Scope and Budget phase of the study, and may consider some of the area in this category as ineligible for MSBA reimbursement.*
- **Special Education** – The District is proposing a total of 26,510 net square feet (nsf) which exceeds the MSBA guidelines by 4,360 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The project includes 7,690 nsf of LABBB Collaborative spaces (without which, the Special Education category would be 3,300 nsf under guidelines). Note that the Special Education program is subject to approval by the Department of Elementary and Secondary Education (DESE). The District should provide this information for this submittal with the Schematic Design Submittal. Formal approval of the District’s proposed Special Education program by the DESE is a prerequisite for executing a Project Funding Agreement with the MSBA.*
- Art and Music/ Voc-Tech** – The District is proposing a combined total of 33,710 nsf which is 1,815 nsf below the MSBA guidelines. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA accepts this variation to the guidelines.*
- Health and Physical Education** – The District is proposing a total of 54,942 nsf which exceeds the MSBA guidelines by 26,338 nsf. The area in this category has decreased by 595 nsf since the Preliminary Design Program submittal. *The MSBA notes the following:*
- *In order for the MSBA to consider reimbursement of any area beyond that included in the guidelines detailed scheduling information that demonstrates additional teaching stations are required beyond the five stations included in the MSBA guidelines (four included in the 12,000 nsf gymnasium and one 3,000 nsf P.E. alternative physical education).*
  - *The MSBA does not object to including this area in the proposed project, however area beyond that required to deliver the P.E. curriculum will be considered ineligible for MSBA reimbursement. Refer to the MSBA policy memorandum regarding auditorium and gym spaces beyond those included in the guidelines included with the Preliminary Design Review Comments.*

## 3.3.1 - INTRODUCTION

### H. MSBA PSR REVIEW / Space Summary

- **Media Center** – The District is proposing a total of 13,744 nsf which meets the MSBA guidelines. The area in this category has not changed since the Preliminary Design Program submittal. *No further action required.*
- **Auditorium/ Drama** - The District is proposing a total of 14,200 nsf which exceeds the MSBA guidelines by 3,800 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *This overage is due to the addition of a 3,000 nsf black box and a stage that is 800 nsf larger than guidelines. As noted in the previous review comments, all area in excess of the guidelines in this category will be considered ineligible for reimbursement.*
- **Dining and Food Service** – The District is proposing a total of 16,698 nsf which meets the MSBA guidelines. The area in this category has not changed since the Preliminary Design Program submittal. *No further action required.*
- **Medical** – The District is proposing a total of 2,140 nsf which exceeds the MSBA guidelines by 430 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA encourages the District and its consultant to seek opportunities to improve efficiencies to align with MSBA guidelines. The MSBA does not object to the additional area being included in the proposed project, however area beyond that included in the guidelines will be deemed ineligible.*
- **Administration and Guidance** – The District is proposing a total of 10,062 nsf which exceeds the MSBA guidelines by 2,521 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA encourages the District and its consultant to seek opportunities to improve efficiencies to align with MSBA guidelines. The MSBA does not object to the additional area being included in the proposed project, however area beyond that included in the guidelines will be deemed ineligible.*
- **Custodial and Maintenance** – The District is proposing a total of 3,437 nsf which exceeds the MSBA guidelines by 150 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA encourages the District and its consultant to seek opportunities to improve efficiencies to align with MSBA guidelines. The MSBA does not object to the additional area being included in the proposed project, however area beyond that included in the guidelines will be deemed ineligible..*
- **Other** - The District is proposing a total of 12,412 nsf which exceeds the MSBA guidelines by 12,412 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA offers the following:*
  - *District technology spaces (750 nsf), District Food Service Director and District Nurse administrative offices (300 nsf). These District spaces will be considered ineligible for MSBA reimbursement.*

## H. MSBA PSR REVIEW / Space Summary

- **Media Center** – The District is proposing a total of 13,744 nsf which meets the MSBA guidelines. The area in this category has not changed since the Preliminary Design Program submittal. *No further action required.*
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- **Dining and Food Service** – The District is proposing a total of 16,698 nsf which meets the MSBA guidelines. The area in this category has not changed since the Preliminary Design Program submittal. *No further action required.*
- **Medical** – The District is proposing a total of 2,140 nsf which exceeds the MSBA guidelines by 430 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA encourages the District and its consultant to seek opportunities to improve efficiencies to align with MSBA guidelines. The MSBA does not object to the additional area being included in the proposed project, however area beyond that included in the guidelines will be deemed ineligible.*
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  - *District technology spaces (750 nsf), District Food Service Director and District Nurse administrative offices (300 nsf). These District spaces will be considered ineligible for MSBA reimbursement.*

## 3.3.1 - INTRODUCTION

### I. DISTRICT PSR RESPONSE / Comments

#### ATTACHMENT A MODULE 3 – PREFERRED SCHEMATIC REPORT REVIEW COMMENTS

**District:** *Town of Belmont*

**School:** *Belmont High School*

**Owner's Project Manager:** *Daedalus Projects, Inc.*

**Designer Firm:** *Perkins+Will*

**Submittal Due Date:** *February 21, 2018*

**Submittal Received Date:** *February 20, 2018*

**Review Date:** *February 21-March 26, 2018*

**Reviewed by:** *K. Brown, J. Jumpe*

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#### MSBA REVIEW COMMENTS

The following comments<sup>1</sup> on the Preferred Schematic Report submittal are issued pursuant to a review of the project submittal document for the proposed project presented as a part of the Feasibility Study submission in accordance with the MSBA Module 3 Guidelines.

*MSBA notes the following regarding the Preferred Solution:*

- *Reference ongoing discussions with the District, design team and MSBA at the March 21, 2018 Facilities Assessment Subcommittee ("FAS") meeting and following discussions with MSBA staff regarding the benefit to the District of additional time to further develop its preferred option prior to the MSBA Board of Director vote.*
- *Provide any updates regarding discussions with the Belmont High School steering committee that may affect the development of the proposed design and associated cost and schedule; specifically, will the revised design package submitted to MSBA on April 12, 2018 incorporate all final input from the committee that may affect the building layout, cost, and schedule. **The Belmont High School Building Committee met on April 11, 2018 and voted unanimously to support the revised submission. The committee will continue to review adjustments or changes made throughout the design process.***
- *Please confirm the District's intent to target a Net Zero level of energy efficiency, and confirm that the cost estimates and budgets provided for the options in this submittal include all costs associated with the proposed sustainable systems. Provide any cost analysis or cost/benefit analysis regarding these systems associated with this targeted energy goal. **The District continues to target a Net Zero level of energy efficiency. The cost estimates include the associated costs for this.***
- *As mentioned at the FAS an area of concern for the MSBA and its Board of Directors is what is deemed as eligible soft costs associated with scope beyond MSBA guidelines and higher*

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<sup>1</sup> The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA's guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project's planning process or plans and specifications.

## I. DISTRICT PSR RESPONSE / Comments

construction costs. Please note that during review of the District’s forthcoming Schematic Design Submittal because of the ineligible scope associated with the renovated pool, field house, and offsite traffic mitigation MSBA will be reviewing costs associated with project management and design services and may deem portions of these costs ineligible for reimbursement. The proposed area of the District’s preferred addition/renovation option is 83,757 square feet (“sf”) or 23% greater than the area included in the MSBA space guidelines. **Acknowledged, we request a further discussion with the MSBA of areas deemed ineligible for reimbursement.**

- The District’s preferred addition/renovation option has a project cost that is \$13.3m higher than the new construction option.
- As noted at the FAS meeting because the preferred solution is essentially a new school attached to the existing field house and pool the MSBA is expecting that all forthcoming submittals are based on a grossing factor of no more than 1.50 exclusive of areas associated the existing field house and pool. **As discussed in a telephone conversation with MSBA staff, the entire building will meet the grossing factor of 1.5. The new construction portion will also meet the 1.5 grossing factor by including a credit of 31,604 s.f. for the P.E. spaces.**
- At \$544/sf, the construction cost of the preferred addition/renovation option is \$92/sf or 20% over the average of \$452/sf of seven recently approved MSBA new high school projects.
- The MSBA compared the cost estimate for the District’s preferred solution with seven recently approved high school projects and notes that direct costs per square foot were 15% higher for Shell and Services (HVAC, electrical, etc.), and greater than 40% higher for Foundations and Construction Markup than the average of the seven high school projects recently approved. The MSBA encourages the District and its consultants to further review the proposed project to confirm that the underlying factors leading to the higher costs provide sufficient benefit to warrant the added costs and where possible adjust the proposed design to reduce costs. The MSBA also noted costs that were 19% greater than the average of the seven high schools for Special Construction of which most is for hazardous material abatement. The MSBA looks to the District and its consultants to ensure the project scope and budget documentation is of sufficient detail to capture the anticipated costs associated with hazardous material abatement, some of which will be eligible for reimbursement and some that will be ineligible for reimbursement. Please acknowledge. **Acknowledged. Spray fire proofing insulation materials containing asbestos were applied during the original construction of the building which is very expensive to abate. The soil boring testing results require a deep pile foundation system and heavy framed slab-on-grade. The mechanical costs include Zero Net Energy (ZNE) features that are expected to significantly reduce operating costs and these systems will be further evaluated in SD. High escalation rates for the anticipated GMP dates, and the current busy construction market also increase projected costs above current market numbers.**
- Some of this area in excess of guidelines and cost in the addition/renovation option is associated with maintaining the existing field house and pool. The submittal notes this was a primary reason for the support of the preferred solution and that the District acknowledges that associated costs are ineligible for reimbursement by MSBA. Proposed areas beyond that included in the MSBA guidelines and proposed construction costs greater than construction costs with other recently approved high school projects increase the District’s share of the project cost.



### 3.3.1 - INTRODUCTION

#### I. DISTRICT PSR RESPONSE / Comments

- *MSBA encourages the District and its consultants to look for ways to reduce excessive area and costs in the subsequent Project Scope and Budget phase of the Feasibility Study. Acknowledged, the District and its consultants are continuing to review ways to reduce program and accessory areas as well as any and all cost reduction measures.*
- *Please acknowledge the District’s understanding of the proposed scope, costs and estimated impact to the District’s share of the proposed project costs. Acknowledged, the District and its consultants are continuing to review ways to reduce program and accessory areas as well as any and all cost reduction measures.*

#### 3.3 PREFERRED SCHEMATIC REPORT

Overview of Preferred Schematic Submittal	Complete	Provided; <i>Refer to comments following each section</i>	Not Provided; <i>Refer to comments following each section</i>	Receipt of District’s Response; <i>To be filled out by MSBA Staff</i>
OPM Certification of Completeness and Conformity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Table of Contents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.1 Introduction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.2 Evaluation of Existing Conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.3 Final Evaluation of Alternatives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4 Preferred Solution	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.5 Local Actions and Approval Certification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 3.3.1 INTRODUCTION

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District’s response required</i>	Not Provided; <i>District’s response required</i>	Receipt of District’s Response; <i>To be filled out by MSBA Staff</i>
1	Overview of the process undertaken since submittal of the Preliminary Design Program that concludes with submittal of the Preferred Schematic Report, including any new information and changes to previously submitted information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Summary of updated project schedule, including				
	a) Projected MSBA Board of Directors Meeting for approval of Project Scope and Budget Agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Projected Town/City vote for Project Scope and Budget Agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## I. DISTRICT PSR RESPONSE / Comments

	c) Anticipated start of construction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Target move in date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Summary of the final evaluation of existing conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Summary of final evaluation of alternatives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Summary of District’s preferred solution	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	A copy of the MSBA Preliminary Design Program project review and corresponding District response	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### MSBA Review Comments:

- 1) *The Introduction notes the District selected the 7-12 grade configuration option as the preferred option, including renovation of the existing pool, field house and gym. Note that for the purposes of clarity in this review, the 1970 field house located within the existing high school facility will be referred to as the “existing field house”, and the separate existing historic field house building will be referred to as the “1910/1932 White Memorial field house” (no response required).*
  
- 2) *The submittal includes a detailed analysis by Symmes Maini & McKee Associates, Inc, working directly with the District, to review a district-wide capacity analysis of the various schools in the district and how the 7-12, 8-12 and 9-12 grade options for this project will affect the remaining middle school and elementary schools in Belmont. The selection by the District to reconfigure the high school to a 7-12 upper and lower high school was based on this analysis due to current and projected overcrowding at all grade levels in the district (no response required).*
  
- 3) *The existing conditions summary notes an existing challenge of onsite traffic flow, parking and backed up traffic on the adjoining local streets during pick-up and drop-off periods. Describe any design strategies to mitigate the added traffic resulting from the addition of grades 7 and 8, and how the additional traffic was considered in the decision to select the 7-12 option. **The current high school site creates off-site queues and intersection impacts that have grown over time with the general increase in driving to schools observed in Belmont, regionally, and nationally, as more students have access to their own car and parents are more inclined to giving their children rides instead of walking, biking or taking the bus. However, the high school’s off-site impacts are mostly the result of three site design factors:***
  - **First, a one-way driveway concentrates all entering traffic at the Hittinger & Underwood intersection, forcing all entering cars and buses to use only those smaller residential streets during morning drop-off when overall commute traffic is near its peak. This problem is compounded by allowing some exiting traffic to go back out into the Hittinger & Underwood intersection. Meanwhile, the majority of exiting traffic is concentrated at the Concord Ave. exit and can only turn right, which puts left-turn and U-turn burden on the next available intersection at Goden Street for all cars destined for points east and south, which is the typical commute direction.**
  - **Second, the main parking lot has an entry and exit under 100-feet from the Hittinger & Underwood intersection, creating multiple conflict and decision points within a very short distance. This forces drivers to cautiously yield to other entering traffic, exiting traffic, entering**

## 3.3.1 - INTRODUCTION

### I. DISTRICT PSR RESPONSE / Comments

bicycles, and students on foot at two crosswalks within a very short distance, contributing to delays.

- Third, while ample queue storage exists between the front door drop-off and the nearest intersection (Hittinger & Underwood), this is not the case with parking lot queues. Any delays created in the main lot can create a parking queue that readily spills the short distance (100-foot) onto the entry driveway, which is already a conflicted location, as noted above.

In summary, these three aspects of the existing site conditions cause extensive queuing on Hittinger & Underwood, which impacts their respective intersections with Brighton and Concord quite some distance away. To remedy this situation and accommodate the planned enrollment growth, the proposed site configuration resolves each of these three conditions. Firstly, the main driveway is recommended to be two-way, which enables trips to and from Concord as well as Hittinger. Nearly half the existing volume entering at Hittinger & Underwood is expected in the future, with approximately half of entrances and exits now occurring at Concord. Furthermore, the Concord exit is planned to allow lefts out of the site, eliminating any U-turn threat by providing direct eastbound access and encouraging the use of streets besides Goden to proceed southbound. Secondly, the driveway has no internal intersections for at least 300-feet into the site (from either Hittinger or Concord), eliminating the multiple conflict points which are causing most of the delay and queuing on Hittinger and Underwood. Not only is each end of the driveway separated from nearby intersections, conflicts are further minimized by reducing the multiple conflict points with walking and biking students by separating walk & bike desire lines from driving desire lines (walkers and bikers will primarily enter and exit a block west of the eastern driveway or a block east of the western driveway). Finally, if there is any queuing caused by any parking delays on-site, all parking is separated from the driveway's intersections by over 300-feet with no redundant conflict points in-between, helping store any potential queues internal to the site.

With respect to future student population growth, a conservative estimation of future enrollment growth in grades 9-12 projects about 200 new driving trips during drop-off or pick-up. However, the project hopes that rates of walking, biking and transit will increase with better programs to manage driving demand, including priced parking permits, reduced bus service fees, and new signalized crossings of Concord Ave. If implemented, these measures would offset any growth in enrollment. Meanwhile, the addition of 7<sup>th</sup> and 8<sup>th</sup> grades to the site is not expected to grow traffic significantly due to the known access patterns of students in these grades, which includes significantly higher rates of bus ridership, no on-site parking, and greater rates of walking and biking. This produces another 300 new driving trips, resulting in a maximum increase of 500 cars during drop-off or pick-up. The above circulation improvements will easily accommodate this growth without impact to surrounding streets.

*4,5) The submittal notes that the District's unanimous support of Option C.2.4 was primarily due to preservation of the existing pool and field house, and for siting advantages over the other options (no response required).*

*6) The District provided a February 2, 2018 response to the MSBA PDP submittal review. MSBA notes the following statements from the District's response (Confirm and acknowledge each item):*

## I. DISTRICT PSR RESPONSE / Comments

- *The District will provide a copy of the timelines regarding the Project Notification Form and approvals by MA Historical Commission in the forthcoming Schematic Design submittal for any modifications of the Clay Pit Pond landscaped area and proposed demolition of the 1910/1932 White Memorial field house. **Acknowledged, the schedule submitted with the Schematic Design Submittal will include all milestone dates.***
- *All costs associated with the demolition of the 1910/1932 White Memorial field house, any scope of work associated with the adjacent existing skating rink, and costs associated with constructing a parking area and amenities adjacent to the existing skating rink must be itemized as ineligible for MSBA reimbursement in the following Schematic Design submittal. **Demolition of the White Field house is necessary in order to replicate existing school related sports fields on the property, it should be noted that due to the site constraints, the Tennis Courts are not being replaced. The parking area adjacent to the skating rink will be used for teacher and student parking on school days, it will also serve the needs of the skating rink during non-school hours. Renovations to the skating rink are not a part of this project.***
- *The preferred option under consideration does not include the construction of any structure or critical facility within the Zone AE (in the vicinity of the existing Clay Pit Pond), and the Zone AE area would remain open space and available for flood storage as required. **Acknowledged.***
- *The project team does not anticipate any development restrictions or additional project costs associated with the existing MBTA Fitchburg rail line along the northern site border. **Acknowledged.***
- *Any scope of work associated with the future Belmont community path parallel to the rail line and existing multi-generational Clay Pit Pond walking path & amenities (both on-site), and the potential future pedestrian connecting underpass at Alexander St. / MBTA Fitchburg rail line (off-site) will be procured, designed, funded and implemented by the Town of Belmont separate from the scope of work for the high school project. **Acknowledged.***
- *The phase 1 environmental report notes the potential presence of an abandoned underground storage tank in the vicinity of the existing skating rink, and that the existing site was used as a landfill prior to development by the town for a school. Geo-technical and geo-environmental investigations are ongoing and will be completed in the Schematic Design phase of the feasibility study. MSBA noted that all costs associated with abatement of contaminated soil from any source and abatement of underground storage tanks must be itemized as ineligible for MSBA reimbursement. **Acknowledged.***

*No further review comments for this section.*

### 3.3.1 - INTRODUCTION

#### I. DISTRICT PSR RESPONSE / Comments

#### 3.3.2 EVALUATION OF EXISTING CONDITIONS

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	A narrative of any changes resulting from new information that informs the conclusions of the evaluation of the existing conditions and its impact on the final evaluation of alternatives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	If changes are substantive, provide an updated Evaluation of Existing Conditions and identify as final. Identify additional testing that is recommended during future phases of the proposed project and indicate when the investigations and analysis will be completed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### MSBA Review Comments:

1) The updated existing conditions report (data and voice communications systems) notes that the second floor main distribution frame room is the centralized management point for all data communications for the high school, the school district and the town. Describe whether this district/town function will continue in the proposed new facility, and how these MDF space(s) are accounted for in the space summary spreadsheet. **This area is the main data distribution hub for the High School, it also serves as the connection point for the High School to the entire School District system. The Town network system incorporates redundant systems for continuity of operations, this connection serves as one of those redundant points, it is not the management point for the entire system.**

No further review comments for this section.

#### 3.3.3 FINAL EVALUATION OF ALTERNATIVES

Include at least three potential alternatives, with at least one renovation and/or addition option. Include the following for each alternative where appropriate:

Provide the following Items		Complete; No response required	Provided; District's response required	Not Provided; District's response required	Receipt of District's Response; To be filled out by MSBA Staff
1	An analysis of each prospective site including:				
	a) Natural site limitations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Building footprint(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Athletic fields	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Parking areas and drives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## I. DISTRICT PSR RESPONSE / Comments

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
	e) Bus and parent drop-off areas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Site access and surrounding site features.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Evaluation of the potential impact that construction of each option will have on students and measures recommended to mitigate impact	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Conceptual architectural and site drawings that satisfy the requirements of the education program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	An outline of the major building structural systems	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	The source, capacities, and method of obtaining all utilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	A narrative of the major building systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	A proposed total project budget and a construction cost estimate using the Unifomat II Elemental Classification format (to as much detail as the drawings and descriptions permit, but no less than Level 2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Permitting requirements and associated approval schedule	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Proposed project design and construction schedule including consideration of phasing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Completed Table 1 – MSBA Summary of Preliminary Design Pricing spreadsheet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### MSBA Review Comments:

3) As noted above, the District has narrowed the scope of the study to the 7-12 grade configuration options (designated in the submittal as grade configuration “C”) based on the district-wide capacity analysis of the various schools in the district. The submitted feasibility study includes a base repair option with a project cost of \$111.5m, three addition/renovation options ranging in project costs of \$302.1- \$307.3m, and a new building option with a project cost of \$293.8m.

The submittal includes the following in the final evaluation of options:

- Option C.1 (base repair) is 257,120 total sf; no new construction
- Option C.2.1 (add/reno) is 451,800 total sf; 47.0% new construction, 53.0% renovation
- Option C.2.3 (add/reno) is 451,800 total sf; 85.6% new construction, 14.4% renovation
- Option C.2.4 (add/reno) is 451,800 total sf - 86.2% new construction, 13.8% renovation
- Option C.3.1 (new construction) is 422,925 total sf; all new

## 3.3.1 - INTRODUCTION

### I. DISTRICT PSR RESPONSE / Comments

*The three addition/renovation options are indicated as being the same overall building size, and vary in proportion of renovated vs new area. All are 4-stories, and exceed MSBA spaces guidelines by 84,649 gross sf using a 1.5 grossing factor:*

- *Option C.2.1 (\$302.1m project cost) includes additions to meet the educational programmed area, and renovations to the existing spaces to remain in place. The existing field house, gym, lockers, pool and auditorium are renovated. The kitchen, cafeteria, media center, and some educational spaces are relocated. The new upper 2-stories are located on top of the existing 2-story structure. Multi-height spaces are limited.*
- *Option C.2.3 (\$307.3m project cost) includes renovation of the existing field house, gym, lockers and pool spaces. All other spaces are replaced with new construction. The design includes a new auditorium and black box theater. A relatively narrow glass-covered 4-story atrium lobby space extends the full length of the building with upper level crossing bridges and single-loaded corridor/balconies for circulation.*
- *Option C.2.4 (\$307.2m project cost) is a plan variation to Option C.2.3, differing in the configuration of the central atrium lobby space and connecting circulation. One of the three central lobby areas is covered with a green roof over the third floor; the other two are covered with a glass roof structure over the fourth floor.*

*The new construction Option C.3.1 is also 4 stories in height. It does not include the existing field house and pool provided in the three add/reno options above, and exceeds MSBA space guidelines by 55,774 gsf. Because the proposed new building is located adjacent to the existing building with no overlapping area, the construction sequence does not require multiple construction phases of areas occupied by students.*

*Provide a response to each of the following comments:*

*The (existing building) 2-story Base Repair Option C.1 is noted as too small to meet the described educational program for a 7-12 facility. However; as a 9-12 / 1,470 student grade configuration, the existing building is only 6,000 gsf smaller or 2% less than current MSBA space standards. Describe any discussions and the evaluation process relating to the potential for a base repair option for the existing building as 9-12 facility, as a comparison to the 7-12 options.*

*MSBA notes that a space summary was provided only for the preferred option C.2.4. The three add/reno options are shown as having the same total sf, although the extent of internal circulation and multi-height spaces vary greatly for each design. Note that, because of the separation of classroom wings in the preferred option and resulting increase in circulation area, the preferred option floor plan shows five stairs that connect all four floors, two stairs that connect two floors, and one stair that connects three floors. Verify that the sf indicated for each option and resulting construction costs are accurate and that no option will exceed the maximum allowable grossing factor of 1.5. Confirm that the space summary provided reflects the preferred solution. **Each alternative option was designed to the net program as defined by the Town of Belmont using the MSBA Educational Space Summary Template. Each project was also designed to not exceed the project allowable grossing factor of 1.5. These two variables allowed the Belmont Building Committee to evaluate multiple options based on their educational values, site strategies and architectural characteristics.***



## I. DISTRICT PSR RESPONSE / Comments

*Option 2.C.1 is roughly \$5m less project cost and has the same programmed areas compared to the other two add/reno options (although it is \$8m more than the new building option). It has half the new construction area, four times the existing renovated area, and requires a significantly lower percent of demolition of the existing building compared to the other add/reno options. This option appears to have a more efficient circulation layout, resulting in a lower grossing factor. Given these advantages, describe why this option is not preferred over the other add/reno options. This option was carefully reviewed by the Community, Building Committee, School Committee, Selectman and other town constituents. The drawbacks of this option fall into two primary categories: academic and logistical impacts. It was determined that Option C2.1 would require multiple construction phases resulting in significant academic disruption and a longer construction duration. Multiple phases will impact exterior athletic use, parking, and traffic, and circulation. In addition, the complex multi-phased renovation project would require the students to move multiple times during their High School experience. The quality of the academic environment in this compressed site would be compromised due to disruption from noise, abatement, dust, odors and additional construction traffic. The educational impacts are as follows; administration was not located near the front door to reinforce security measures, major shared public spaces are on opposite ends of the facility making lock-down and after hours use difficult and circulation/pre-function inefficient. The exterior athletic program would be severely reduced though the elimination of a major multi-use field. This option C2.1 requires horizontal expansion which increases the already long path of travel through the facility making travel time between classes too long. The sprawling layout does not facilitate interdisciplinary activities between department for 21<sup>st</sup> Century Learning. The Town of Belmont has made a serious commitment to the goals and objectives of Net-Zero and this option would compromise these goals because the existing brick skin is not easily retrofitted to a high performing thermal vapor barrier. In addition, the horizontal layout of the facility gives it a highly inefficient skin to volume ratio. It is unclear if the existing bar joist roof structure could support the weight of the photo voltaic system. The team studied the issues around resilience and determined that the site is anticipated to continue to flood during storm events putting the future investment in the building and student health at risk.*

- As noted elsewhere in this review, the District's preferred option C.2.4 is currently 83,757 gsf over MSBA space guidelines, and approximately 32,000 gsf over guidelines exclusive of the existing field house and pool areas. Confirm that the District understands the impact this additional square footage has on the total project budget, and the District's share of the project cost. Based on the Town's responses and in subsequent phases of the study, the MSBA will review the proposed project for conformance with the MSBA guidelines and programmatic needs that may vary from the guidelines. Acknowledged, the District and its consultants are continuing to review ways to reduce program and accessory areas as well as any and all cost reduction measures.*

*The proposed new building option is 55,774 gsf over MSBA space guidelines for a 2,215 student, 7-12 school using a grossing factor of 1.5. This excess area represents approximately \$31m in construction costs using the proposed \$556/sf construction cost for this option (including this excess area, this new building option is still \$13.3m lower in project costs than the District's preferred option). Given the MSBA's goal to support educationally-appropriate, flexible, sustainable, and cost-effective public school facilities, and expressed local concern for the proposed cost of this project noted in the*

## 3.3.1 - INTRODUCTION

### I. DISTRICT PSR RESPONSE / Comments

*submittal, describe the benefits of the preferred solution and why the MSBA should support an addition/renovation project that is higher in cost than a more efficient, new building that more closely aligns with MSBA space standards. The Belmont High School Building Committee (BHSBC), Design Team, OPM, Selectman, School Committee, along with the Belmont residents in attendance, discussed in detail the pros and cons of the alternatives presented to them over a series of public meetings as noted and outlined in the schedule provided to the MSBA. A major component of the discussions, revolved around site planning, circulation, traffic, parking, pedestrian and bike circulation, access and views to the pond, as well as the impact to the residential neighbors located on Concord Avenue and Channing Road. It was determined that the preferred solution (C2.4) had the least impact to the neighbors on Channing Road and Concord Avenue. The conversation focused on the scale, height and massing of all of the building solutions (renovation only, renovation/addition and new construction). The Preferred solution was set back from both Channing Road and Concord Avenue and presented the least impact to the neighborhood while embracing the pond to capitalize on the public space and views from the academic spaces. Further analysis determined that there would be no shadows cast by the massing of the preferred option to the neighbors. In addition, the building siting of the preferred solution created a greater buffer/ set back from the train located on the North side of the site (except where the existing gymnasium is located) this new building siting would contribute to a reduction of noise and reverberation into the academic areas by the train. The new construction prompted a great deal of discussion from the Community due to the perceived negative impact the scale and height had on the residences located along Concord Avenue. The scale of the four-story massing along Concord Avenue was an untenable solution to the Community and created one of the primary concerns regarding the New Construction alternative.*

*In addition to the siting and massing of the options, there were clear deviations of the educational program from the C2.4 and B3.1 alternatives. C2.4 had distinct advantage to the community due to the continuance and reuse of the existing field house, small gym, locker rooms, and pool. There were many conversations with the community and committee around the need for these programs at the Belmont High School. More information regarding the need for these critical spaces can be found in the PDP, PSR, PSR Revised 1 and Response to the MSBA PSR letter. The new construction eliminated these essential spaces for teaching and learning and health and wellness. The preferred option included the essential educational program spaces that supported the goals and aspirations of the Belmont Community. It was a clear consensus after a cost benefit analysis was taken that the additional square footages were essential to the Belmont High School Program and there was an understanding that there would be a correlation of additional costs for this Preferred Option.*

*6) MSBA notes that the \$111.5m “Base Repair” Option C.1 includes replacing the existing HVAC system with a ground loop geo-exchange system to attempt zero net energy, similar to the addition/renovation and new building options in the evaluation. Although this system is not itemized in the cost estimates, based on other similar projects, 400 wells of 450’ depth could cost roughly \$7-8m in construction costs. Describe the extent of the discussion and analysis used to compare the benefits, liabilities of construction and operating cost of the geo-thermal system to a more typical energy efficient system (also refer to comment #10 below). Please confirm that the proposed cost estimates provided include these costs as well as all of the sustainable design features needed to achieve net zero facility for all of the options and if it is included within the \$544/sf for the District’s preferred solution. The cost for the geo-exchange system and the PV array as well as supporting terminal systems were included in the base cost for all Renovation/Addition options except for the Base Repair only option. The cost benefit analysis and detailed energy modeling to evaluate the narrative of these*

**I. DISTRICT PSR RESPONSE / Comments**

systems is ongoing and will be included in the Schematic Design Submission. Test wells and whole building energy modeling are ongoing and will be evaluated during SD and DD.

7) *Provided; refer to the summary comments on page 1 of this review regarding the proposed total project budget and construction cost for the proposed options.*

8) *The submittal notes that “the Town of Belmont has exercised its rights under the Dover Amendment for all of its previous school projects and will continue this practice for the High School Project.” In the response to this review, describe any Town zoning or planning requirements that require exemption using the Dover Amendment, and any proposed scheduling milestones for the preferred solution regarding these approvals. This information should be included in future project schedules. The District has met with and will continue to meet with the Belmont regulatory officials including the Zoning Enforcement Office and Planning Board Director. Public meeting and hearings have been scheduled with the Planning Board and the dates are noted in the attached schedule.*

10) *Confirm that the cost estimates and budgets provided for each option in the Preliminary Design Pricing spreadsheet include all costs associated with the targeted Net Zero level of energy efficiency, most notably (but not limited to) the geothermal system, as well as all the proposed sustainable systems. The cost for the geo-exchange system and the PV array are as well as supporting terminal systems were include in the base cost for all Renovation/Addition options except for the Base Repair only option. The cost benefit analysis and detailed energy modeling to evaluate the narrative of these systems is ongoing and will be included in the Schematic Design Submission. Test wells and whole building energy modeling are ongoing and will be evaluated during Schematic Design and Design Development.*

*The area indicated for the preferred option in the Preliminary Design Pricing Table is 892 gross square feet greater than the area indicated in the space summary. Please confirm which value should inform the basis of the District’s Preferred Solution. The values used in the Preliminary Design Pricing Table should be used, however, MSBA should look to the current MSBA Educational Space Summary included in the PSR Revision 1.*

*No further review comments for this section.*

**3.3.4 PREFERRED SOLUTION**

Provide the following Items		Complete; No response required	Provided; District’s response required	Not Provided; District’s response required	Receipt of District’s Response; To be filled out by MSBA Staff
1	Educational Program				

### 3.3.1 - INTRODUCTION

#### I. DISTRICT PSR RESPONSE / Comments

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
	a) Summary of key components and how the preferred solution fulfills the educational program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Design responses including desired features and/or layout considerations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Proposed variances to, and benefits of, any changes to the current grade configuration (if any) and a related transition plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Preferred Solution Space Summary				
	a) Updated MSBA Space Summary spreadsheet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Itemization and explanation of variations from the initial space summary (and MSBA review) included in the Preliminary Design Program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Preliminary NE-CHPS or LEED-S scorecard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Conceptual floor plans of the preferred solution, in color that are clearly labeled to identify educational spaces	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Clearly labeled site plans of the preferred solution including, but not limited to:				
	a) Structures and boundaries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Site access and circulation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Parking and paving	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Zoning setbacks and limitations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Easements and environmental buffers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Emergency vehicle access	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) Safety and security features	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	h) Utilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	i) Athletic fields and outdoor educational spaces (existing and proposed)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	j) Site orientation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	An overview of the Total Project Budget and local funding including the following:				
	a) Estimated total construction cost	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Estimated total project cost	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**I. DISTRICT PSR RESPONSE / Comments**

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
	c) Estimated funding capacity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) List of other municipal projects currently planned or in progress	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) District's not-to-exceed Total Project Budget	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Brief description of the local process for authorization and funding of the proposed project	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) Estimated impact to local property tax, if applicable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	h) Completed MSBA Budget Statement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Updated Project Schedule including the following projected dates:				
	a) Massachusetts Historical Commission Project Notification Form	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	b) MSBA Board of Directors meeting for approval to proceed into Schematic Design	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) MSBA Board of Directors meeting for approval of project scope and budget agreement and project funding agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Town/City vote for project scope and budget agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Design Development submittal date	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	f) MSBA Design Development Submittal Review (include required 21-day duration)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	g) 60% Construction Documents submittal date	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	h) MSBA 60% Construction Documents Submittal Review (include required 21-day duration)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	i) 90% Construction Documents submittal date	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	j) MSBA 90% Construction Documents Submittal Review (include required 21-day duration)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	k) Anticipated bid date/GMP execution date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	l) Construction start	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	m) Move-in date	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
n) Substantial completion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**MSBA Review Comments:**

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### I. DISTRICT PSR RESPONSE / Comments

1a) Note the following comments relating to the Educational Program:

- The Educational Program confirms the Belmont School Committee approval of the administrations recommendation to reconfigure Belmont HS to a 7-12 school (no response required).
  - Provide a more detailed description of the District responses given for the following MSBA PDP review comments:
- Focus of the plan is on the “special” curriculum. Revisit with the focus of explaining how the core academics (English, math, science, social studies) work. The 7/8 grade core academic model is a traditional middle school team model. Science, Social Studies, English and Math are all core classes. World language is within the 7/8 side but not scheduled “on Team”. All electives are off Team. Special education is embedded in and around each Team and grade. The District is planning a hybrid model for grade 9 where this cohort of students is positioned in a manner that allows for deeper personal relationships to be formed and where all students are “known” to at least one adult. The District will maintain the 9<sup>th</sup> grade students’ ability to access higher level classes and programming. The 10-12 students will be served by Departments that are located strategically allowing educators to continue to explore cross disciplinary work and projects. This work has been ongoing at Belmont High School and the goal and desire is to use the building, the space and its adjacencies as a tool in the teaching, learning and collaborating of both teachers and students.
- Further explain the proposed digital graphic design/computer animation program. This program will include instruction in graphic design, computer animation and related topics. It will include a digital lab with large monitors for both the student and staff, software that will allow easy screen sharing and lighting that will prevent screen glare. Emphasis will be on the processes involved in creation of animation stressing teamwork, storyboarding, creating character, stage design and sound design.

The classes will consist of demonstrations, viewing of related works, hands-on experimentation, and critique. Programs in digital art/graphic design are a part of the National Standards for Art Education (“Contemporary Art Forms”), and the past two BPS Curriculum Review cycles have indicated this as a current area of deficiency. Level 1 courses are designed to provide students with broad skills in this medium and involve a high level of creativity in terms of art-making while also addressing the organizational and commercial applications of Graphic Design. In 2018-19 the District will run two sections of Digital Art/Graphic Design 1, and two sections of Animation 1. Both courses are fully enrolled in the first year of implementation. A Level 2 Digital Art course will be offered in 2019-20.



## I. DISTRICT PSR RESPONSE / Comments



- Further explain the health program, nursing suite, and counseling areas with the mentioned understanding/focus of whole child and social/emotional well-being in mind. The guidance areas for 7/8 will be embedded in the grade / Team areas. The guidance counselor moves to the grade with the students and will change offices after each year to follow the grade cohort of students. The guidance staff in grades 9-12 will remain in a traditional department-based model. The mental health spaces will be provided to current employees who provide psychological testing and services.*

The Social Emotional initiative is one that is embedded in every aspect of the school – not just through mental health providers. Teachers, aides, administrators and all staff are trained in skills to engage and interact with children in a way that builds relationships and a feeling of safety for students. This is done through curriculum, teaching practices and intentional and strategic work to focus on school culture.

The medical suite will be a dual space that serves 7/8 on one side and 9-12 on the other. The middle space allows for efficient staffing and use of common medical areas, equipment and supplies.

- Describe how the proposed project rooms differ in design and use from regular general classroom, and why a general classroom can't be scheduled for project-based learning activities. While Project Based Learning (PBL) can and will take place in classrooms, there are certain specialized projects which require a larger workspace than a typical desk, and require specialized equipment such as laser cutters, fume hoods, and 3D printers. In addition, there will be projects that are developed over a period of several days or even weeks, so space is required for them. In the 7/8 grade spaces the project rooms will function as open learning spaces for student group work, small group instruction, presentation spaces and learning by doing.*

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### I. DISTRICT PSR RESPONSE / Comments

- *Describe how the proposed innovation labs and maker spaces differ in design and use from a science lab, and why a science lab can't be scheduled for use as an innovation lab / maker space.* The Innovation Labs will be used for specialized design, engineering and construction, such as robotics. Science labs will be used for science. The maker spaces in the 7/8 wing will be used as project rooms (see above questions #2) The 9-12 maker spaces will be used for robotics, coding, physics and engineering classes, as well as hands on learning for art and drama. Students in grades 7-12 will have access to these spaces during elective and non- elective blocks. The science labs at the high school level are themed by the type of science programming and will be shared by the science staff. No teacher will have his/her own room, resulting in high utilization rates. Set up, lab preparation, projects and materials will be specific to the lesson of any given unit and period of time. This would make it difficult to dismantle science materials for the use by a non-science teacher / program for a different function.
- *How often and for what purpose would the proposed project rooms, innovation labs and maker spaces be used? Provide specific scheduling information and anticipated utilization.* The Belmont public schools are committed to supporting building essential college and career skills for all our students. 9-12 innovation spaces are used for specific course and program use. These spaces will also serve 7/8 students as elective courses. These 9-12 spaces will be used by an instructor that will be an integral part of scheduling of courses within the BHS program of studies. The 7/8 spaces will be used as project rooms that will also be part of the media function. These spaces will be highly used in a scheduled and ad-hoc manner and scheduled by the Team of teachers to support their classwork, Team work, and interdisciplinary work. Spaces in the 7/8 model will be scheduled for a majority of the day and used informally and /or as necessary for the remainder of the day.

Specifically, the district is focused on creating opportunities for students to learn and practice collaboration, creativity, critical thinking, and communication skills. Best practices for teaching these skills in each of the curricular areas are through direct instruction, frequent student practice, and in the moment feedback. Each subject area teacher will utilize the innovation spaces to support this skills-based work through the application of content knowledge. This work focuses on opportunities for students to grapple with ideas as they design, create, synthesize, and make meaning of content that is both meaningful and relevant to curious and engaged students. The District continually creates more opportunities for students to show mastery of skills and content through real world problem solving, inquiry-based investigation or creation of a product to meet a design challenge. Some examples of the way teachers will be using innovation spaces on a daily basis run the gamut from space for small groups to work through a problem to space for large, interdisciplinary learning opportunities. Here are some examples of work currently done with students:

- Economic Summit where students learn and practice communication, critical thinking and creative problem-solving skills by engaging in a real-world application of content through an interactive simulation. During the simulation, 75+ students negotiate trade

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deals while managing trade barriers, tariffs and financial limitations to execute a pre-determined list of imports

- Inquiry circles where students practice critical thinking, collaboration and communication skills by investigating a driving question and creating a product to answer it in a small group
  - Video production where: Foreign Language students use authentic resources to demonstrate their communication skills by creating a presentation; ELA and Social Studies students use their knowledge of ancient history to demonstrate their critical thinking, creativity, and collaboration skills by creating a historical skit which connects the literature standards of Greek and Roman myths to historical content
  - Presentations where students practice their communication skills (English and foreign language) to demonstrate content knowledge
  - Interdisciplinary and thematic art projects where 50 + students practice their creativity, critical thinking and collaboration skills by working in groups to explore how art can be a driver for social change and then create their own art work to drive change in our community
  - Trials where: English students learn about specific aspects of our legal system and put characters from literature on trial, engaging with the themes of the novel in an authentic way; Social Studies students reenact historical trials to apply content knowledge and practice communication and critical thinking skills
  - Debates and Socratic Seminars where large groups of students debate and discuss issues related to content standards and practice communication and critical thinking skills
  - Social Entrepreneurship UN conference where students create a social business project to solve a global challenge, team up to collaborate on writing a social business plan and then pitch their business to an audience who chooses which business to invest in.
- *Describe why the project includes the interdisciplinary spaces listed above if the school is organized (and functions) by department, and how the facility organization can support the interdisciplinary program suggested in the Vision for Teaching and Learning section in the future, if applicable. On the 7/8 side, the District plans to further the existing interdisciplinary work as stated above. This is the current model. The 9-12 departments are piloting cross curricular work and have been pushing for flexible space for this purpose. Teacher planning areas are close to one another providing central gathering areas for teachers to discuss curriculum, instruction and cross over as an outcome of our vision work. The 9-12 area will start departmentalized and the new spaces and adjacencies will yield educator collaboration*

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### I. DISTRICT PSR RESPONSE / Comments

and cross curricular work. This will allow staff to create a definition of project-based learning that is more about proving a “guiding question” to students and allowing them to research, analyze, and show their learning in different ways in different disciplines.

- *The Educational Program indicates three lunch periods; two for grades 7-8 and two for grades 9-12. Are all grades mixed in one of the three periods? Two lunches for 7/8 and up to three for 9-12 students will be provided. Kitchen and serving space continues to be reviewed with the Food Service Director.*
- *The Educational Program notes that, because of overcrowding at the current Chenery Middle School, not all middle students have a locker close to their home room. Since this is identified as a concern in the existing building, describe how the District intends to address this concern in the proposed building. Because of the cluster configuration at the 7-8 grades, it is anticipated that two tier, 15” wide lockers will be used which can be located in corridors proximate to the cluster in which the child attends.*
- *Confirm use and distribution of lockers in the high school portion of the school as some other districts have found them to go unused. 9-12 students have been surveyed about lockers. We found that 50% of our students state they would like to have lockers for the following needs: coats, book bags, storing items of value such as musical instruments, sports equipment, texts and school supplies. Lockers will therefore be provided for 50% of the High School population.*
- *Given the extent of digital arts in the program, describe the need for a photographic dark room and two kilns (consider consolidating or sharing kilns and other underutilized spaces to the extent possible). Provide specific scheduling information and anticipated utilization for these spaces and describe anticipated chemical and hazardous materials storage and related safety protocols. The District has begun to consolidate its program offerings at BHS in light of the addition of Digital Art to the curriculum. For many years four levels of Ceramics and two levels of Sculpture have been run. Beginning in 2018-19, these two programs (Ceramics & Sculpture) have been combined into one course of study called “3D Art”. This course combines aspects of both ceramics and sculpture and will increase kiln usage on a regular basis.*

The District currently employs the use of four kilns for Grades 7-12 (two at Chenery Middle School and two at Belmont High School). There is no anticipated drop-off in the amount of kiln use needed for Grades 7-8 or 9-12. In 2018-19 the district will run five sections of courses at BHS that will require regular kiln use. In addition, 7<sup>th</sup> and 8<sup>th</sup> Grade art classes will also require routine access to kilns. The District does not anticipate the addition and growth of the digital art program to pull many students away from the 3D Art (ceramics) program. The Digital Art/Graphic Design and Animation programs appeal to a different type of art student than would typically enroll in a Ceramics class. The technology-based art programs are designed to serve students who are not currently enrolled in visual art programs at BHS.

**I. DISTRICT PSR RESPONSE / Comments**

The traditional photography program at BHS has been *overenrolled*. In 2018-19 over six fully enrolled sections of Photography (three levels) are provided, and there will be dozens of students who will unfortunately not be granted a seat in these classes due to enrollment constraints. All of this is with the addition of Digital Art coursework. Traditional photography, while seemingly out of date to casual photographers who snap photos with smartphones, is incredibly vibrant and expressive art form in our society. The skills and techniques that go into it, from safe handling of chemicals, careful attention to every detail in lighting, and the patience and precision required to develop prints are aspects the District believes will always have a place in its curriculum.

- *Provide the anticipated number and grades of students in the METCO program. The proposed program includes a separate METCO classroom. Please describe the need for a separate classroom as this runs counter to the METCO philosophy of making these students a fully integrated part of the school community and receiving services (individually designed) from the same professionals and in the same groupings as any other student. There are currently 43 High School level and 16 grade 7-8 METCO students. The designated METCO classroom has been eliminated and replaced with a group instruction room that will provide a before and after school area for student support (open to all students). The total METCO enrollment for Belmont Public Schools is 102 students. METCO students across the district are included, scheduled, and engaged with all other students. At the high school level, students have a “free period” and students choose to gather in various parts of the building including: the cafeteria during and not during lunch, the student center / library, the hallways and or in teaches rooms. METCO students as well as non-METCO students also utilize a small space to gather to study, get tutoring and to relax given their long day of getting to school, going through a full school day and after school and getting home. The breakdown by grade is the following*

Kindergarten - 8 students	Grade 1 – 1 student	Grade 2 – 6 students	Grade 3 – 7 students	Grade 4 – 7 students	Grade 5 – 10 students
Grade 6 – 4 students	Grade 7- 9 students	Grade 8 – 7 students	Grade 9 – 11 students	Grade 10 – 10 students	Grade 11 – 12 students
Grade 12 – 10 students		Total 102			

- *Are the current and proposed media center / learning commons staffed by professional full-time librarians, and are the two learning commons separately and fully staffed or does staff split their time on these spaces? Who reviews, and curates, materials, software and website content? How will the Chenery Middle School library be staffed after grades 7 and 8 relocate to the high school? Media spaces at the 7/8 level will be staffed by the media specialist and the team teachers (and teacher assistants who work with students). Any and all media equipment, materials, software and technology will be supervised primarily by the*

## 3.3.1 - INTRODUCTION

### I. DISTRICT PSR RESPONSE / Comments

media specialist and secondarily by the Team teachers/ staff. The Chenery Middle School media specialist will be moved to the new building. The 4,5,6 Upper Elementary School will utilize rotating library staff who work with elementary children.

- *Describe the extent that middle school students mix with the older high school students; describe shared spaces and separate spaces, and how the District determined this approach. Provide any information regarding community feedback regarding this decision. The school is anticipated to operate as two distinct “schools within a school,” one for Grades 7-8 and one for grades 9-12. There will be separate entrances and administrations for the two schools. All students will share the pool, fieldhouse, nursing, music, technology, and commons areas. The two schools will have separate bell schedules. The High School students will have an open campus approach, as they do now, while the 7-8 students will not. The community has overwhelmingly supported this approach. The School Committee voted unanimously to support the 7-12 grade configuration. The extent of mixing will be primarily during the time when 7/8 students go out to elective classes. Joint courses will be provided where appropriate. During the 7 full day Visioning sessions with educators and community members (including students) discussions took place regarding the clear need for careful separation of 7/8 and 9-12 students while allowing opportunities to take advantage of the unique connections that can be achieved with teacher to teacher planning across grades and scheduling and utilizing specialized spaces for students to use. This is the special aspect of the 7-12 program, if not for this combination of grades, 7/8 students may not have access to some of these great teaching spaces and programs. Also, the 7-12 building is a great opportunity to have educators collaborate across grade levels and across disciplines as they reside in the same building.*

*2a) Refer to Attachment B for MSBA space summary review comments. As noted above, the area indicated in the space summary is 892 gross square feet less than the area indicated for the preferred option in the Preliminary Design Pricing Table. Please confirm which value should inform the basis of the District’s Preferred Solution. Please refer to the PSR revision 1 for an updated Educational Space Program which clarifies all educational spaces.*

*3) The submittal references using the LEED V4 2010 ASHRAE 90.1 baseline for energy efficiency. Note that MSBA energy standards are based on the current MA building code which uses 2015 IECC, and the 2013 ASHRAE 90.1 energy standards. Confirm that the project will use the correct baseline standards to model proposed energy efficiency. Confirmed with the Design Team Engineers that we will be using the 2013 ASHRAE 90.2 Energy Standards.*

*The District has indicated intent to achieve the 2% additional reimbursement through the MSBA Green School Program. The submittal indicates a total goal of 54 points using USGBC LEED-V4, including 8 points in the Energy & Atmosphere “Optimize Energy Performance” category. Note that 54 points in LEED-V4 reaches the minimum required for all MSBA core projects. However, in order*



## I. DISTRICT PSR RESPONSE / Comments

to receive the additional 2% reimbursement in the current MSBA green policy, the District and design team must also exceed the MA state energy code by at least 20% using the current 2015 International Energy Conservation Code. Eight points in this category exceeds the energy code by approximately 14%.

If the District intends that MSBA provide a grant that includes the 2% additional reimbursement in the following project Scope and Budget phase of the study, the District must provide a revised scorecard indicating that intent (either in response to this review or in the following submittal). Refer to MSBA Project Advisory #41 "Update to the MSBA's Sustainable Building Design Policy" for more information. Acknowledge and confirm the District's intent and that the proposed project will be designed to meet or exceed the criteria set forth in project Advisory #41. **The Belmont High School project intends to secure the 2% additional reimbursement by exceeding the State Energy Code by at least 20%. The LEED ENA "optimized energy performance" will reflect the required state energy code performance. The revised and required LEED Scorecard will be submitted in the Schematic Design Submittal.**

Confirm the District's intent to target a Net Zero level of energy efficiency, and that the cost estimates and budgets provided for the preferred option include all costs associated with the proposed sustainable systems. **The District continues to target a Net Zero level of energy efficiency, the cost estimates include the associated costs for this.**

5b) MSBA understands that the site circulation configuration at preferred schematic phase is still under development; however, note the following issues for further consideration in the schematic design phase:

- The proposed site plan does not indicate accessible parking locations and a continuous accessible route to the building entrances, and the nearest parking areas appear to be remote to both entrances. **Accessible parking and routes will conform with ADA and MAAB requirements.**
- The site plan (both offsite and onsite) does not currently indicate alternative transportation walkways such as sidewalks for pedestrians and bicycles, or bicycle storage areas. **These items will be shown on future submissions.**
- Pedestrian routes from the parking areas to the building entrances appear to require crossing through the drop-off loops. **Pedestrian routes will be reviewed and revised as necessary.**

Confirm that the loading area will be provided with adequate delivery truck and refuse truck space and turn-around areas, refuse & recycling dumpster locations, raised loading areas, adequate equipment and material access routes from the loading area to the kitchen and custodial storage areas, support staff and kitchen staff parking, etc. Food deliveries appear to require passage through public/student corridors to the kitchen. **The above noted design elements will be reviewed with facilities management staff.**

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Review offsite and onsite sidewalks, walkways, bicycle storage, crossing situations, accessible parking locations and the loading area for the following submittal. Confirm these functional design requirements will be reviewed with facilities management staff. **Acknowledged, the above noted design elements will be reviewed with facilities management staff.**

### 3.3.1 - INTRODUCTION

#### I. DISTRICT PSR RESPONSE / Comments

5c) The Educational Program notes eight school buses for the proposed school. Describe the distribution of buses for the lower & upper school entrances and confirm each bus loop is adequate length for the appropriate number of buses. **It is anticipated that the district will require 9 busses at the time of project completion. The bus drop off and pick up will be at the middle school entrance. High School student use of busses is very limited. The middle school drive loop will accommodate 15 busses.**

6c) The Budget Overview notes that the proposed project will be funded in part by a town voter approved debt exclusion (no response required).

6d) The submittal notes that the skating/hockey rink project is among the several planned municipal projects in Belmont. This project, which is on the high school campus, is noted as occurring either immediately before or after construction of the high school. Confirm that scope of work for the Belmont High School project (construction costs and project costs) does not include work of any kind on the existing skating rink building, including surrounding amenities, associated site-work, parking, and demolition of the 1910/1932 White Memorial field house. **Demolition of the White Field house is necessary in order to replicate all existing school related sports fields on the property, the parking area adjacent to the skating rink is needed for teacher and student parking, it will also serve the needs of the skating rink during non-school hours. Renovations to the skating rink are not a part of this project.**

6e) The submittal notes that the District’s anticipated budget of the high school project is \$300-\$315m (the design team currently estimates the project cost to be \$307,161,440), and that the final not-to-exceed budget will be established as a part the following submittal. Refer to Module 4 “Appendix 4C Schematic Design Submittal Notification Template” for information describing the MSBA process to ensure that the following submittal conforms to the District’s established budget. Please confirm. **The Schematic Design Submittal Notification Template will be used.**

7a, 7e-j, 7m) For the following submittal, provide a project schedule that includes all milestone dates indicated in Modules 3 and 4. **See project schedule attached.**

No further review comments for this section.

#### 3.3.5 LOCAL ACTIONS AND APPROVALS

Provide the following Items		Complete; No response required	Provided; District’s response required	Not Provided; District’s response required	Receipt of District’s Response; To be filled out by MSBA Staff
1	Certified copies of the School Building Committee meeting notes showing specific submittal approval vote language and voting results, and a list of associated School Building Committee meeting dates, agenda, attendees and description of the presentation materials.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Signed Local Actions and Approvals Certification(s):				

**I. DISTRICT PSR RESPONSE / Comments**

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
	a) Submittal approval certificate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Grade reconfiguration and/or redistricting approval certificate (if applicable)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Provide the following to document approval and public notification of school configuration changes associated with the proposed project:				
	a) A description of the local process required to authorize a change to the existing grade configuration or redistricting in the district	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) A list of associated public meeting dates, agenda, attendees and description of the presentation materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Certified copies of the governing body (e.g. School Building Committee) meeting notes showing specific grade reconfiguration and/or redistricting, vote language, and voting results if required locally	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) A certification from the Superintendent stating the District's intent to implement a grade configuration or consolidate schools, as applicable. The certification must be signed by the Chief Executive Officer, Superintendent of Schools, and Chair of the School Committee.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MSBA Review Comments:**

*2,3) All Local Action and Approval items and grade reconfiguration documents were provided in response to the February 26, 2018 MSBA cursory review (no response required).*

*No further review comments for this section.*

*The MSBA issues project advisories from time to time, as informational updates for Districts, Owner's Project Managers, and Designers in an effort to facilitate the efficient and effective administration of proposed projects currently pending review by the MSBA. The advisories can be found on the MSBA's website. In response to these review comments, please confirm that the District's consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable.*

**End**

## 3.3.1 - INTRODUCTION

### I. DISTRICT PSR RESPONSE / Space Summary

#### ATTACHMENT B MODULE 3 – PREFERRED SCHEMATIC SPACE SUMMARY REVIEW

**District:** *Town of Belmont*  
**School:** *Belmont High School*  
**Owner's Project Manager:** *Daedalus Projects, Inc.*  
**Designer Firm:** *Perkins+Will*  
**Submittal Due Date:** *February 21, 2018*  
**Submittal Received Date:** *February 21, 2018*  
**Review Date:** *February 21-March 26, 2018*  
**Reviewed by:** *A. Waldron, KBrown*

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The Massachusetts School Building Authority (the “MSBA”) has completed its review of the proposed space summary of the preferred alternative as produced by Perkins + Will and its consultants. This review involved evaluating the extent to which the Belmont High School’s proposed space summary conforms to the MSBA guidelines and regulations.

The MSBA considers it critical that the Districts and their Designers aggressively pursue design strategies to achieve compliance with the MSBA guidelines for all proposed projects in the new program and strive to meet the gross square footage allowed per student and the core classroom space standards, as outlined in the guidelines. The MSBA also considers its stance on core classroom space critical to its mission of supporting the construction of successful school projects throughout the Commonwealth that meet current and future educational demands. The MSBA does not want to see this critical component of education suffer at the expense of larger or grander spaces that are not directly involved in the education of students.

While the MSBA recognizes the benefits and the challenges associated with saving or renovating existing spaces, please note that any spaces in new construction or substantially renovated spaces must be compliant with MSBA space standards for both allotted area and room quantity unless otherwise approved in writing by the MSBA.

The area included in the preferred option in the Preliminary Design Pricing Table is different than the area indicated in the space summary. Please confirm which value should inform the basis of the District’s Preferred Solution. The review comments below use the information provided in the space summary and are based on the submitted addition and/or renovation construction project option with an agreed upon design enrollment of 2,215 students in grades 7-12. **PSR REVISION 1 includes a revised space summary that is correlated with the cost estimate. Refer to the document in the PSR REVISION 1 submission for all clarifications to the educational program.**

**The MSBA review comments are as follows:**

- **Core Academic** – The District is proposing a total of 112,750 net square feet (nsf) which exceeds the MSBA guidelines by 7,640 nsf. The area in this category

## I. DISTRICT PSR RESPONSE / Space Summary

has not changed since the Preliminary Design Program submittal. *MSBA notes the following:*

- *The proposed program includes 10 additional classrooms, one extra science lab, and two 1,000 nsf ELL rooms over guidelines. The MSBA notes that the utilization rate below is 80% whereas the MSBA guidelines target 85% inclusive of Art, Vocations and Technology classrooms. The MSBA encourages the District and its consultants to seek additional efficiencies in the proposed program. **The District and its consultants will continue to review the proposed schedules to ensure a 85% utilization rate.***
- *The submittal indicates roughly half the standard MSBA nsf for science lab prep rooms and the chemical storage room; verify that the proposed area is sufficient to meet the educational needs (refer to the MSBA high school science lab guidelines for additional information). **The PSR REVISION 1 uses the High School Science Classroom Standard of 1,440 sf and Middle School Science Classroom Standard of 1,200. The Prep Rooms associated with the High School Science Classrooms are adjusted to 400 sf per two Science Classrooms. The Middle School Prep Rooms will remain at 200 sf per two Science Classrooms***
- *The MSBA will review the proposed project for conformance with the MSBA guidelines and programmatic needs that may vary from the guidelines in the subsequent Project Scope and Budget phase of the study, and may consider some of the area in this category as ineligible for MSBA reimbursement.*
- **Special Education** – The District is proposing a total of 26,510 net square feet (nsf) which exceeds the MSBA guidelines by 4,360 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The project includes 7,690 nsf of LABBB Collaborative spaces (without which, the Special Education category would be 3,300 nsf under guidelines). Note that the Special Education program is subject to approval by the Department of Elementary and Secondary Education (DESE). The District should provide this information for this submittal with the Schematic Design Submittal. Formal approval of the District’s proposed Special Education program by the DESE is a prerequisite for executing a Project Funding Agreement with the MSBA. **The DESE submittal will be provided with the Schematic Design Submittal***

**Art and Music/ Voc-Tech** – The District is proposing a combined total of 33,710 nsf which is 1,815 nsf below the MSBA guidelines. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA accepts this variation to the guidelines.*

**Health and Physical Education** – The District is proposing a total of 54,942 nsf which exceeds the MSBA guidelines by 26,338 nsf. The area in this category has decreased by 595 nsf since the Preliminary Design Program submittal. *The MSBA notes the following:*

## 3.3.1 - INTRODUCTION

### I. DISTRICT PSR RESPONSE / Space Summary

- *In order for the MSBA to consider reimbursement of any area beyond that included in the guidelines detailed scheduling information that demonstrates additional teaching stations are required beyond the five stations included in the MSBA guidelines (four included in the 12,000 nsf gymnasium and one 3,000 nsf P.E. alternative physical education). The Belmont Public Schools started with the assumption that the high school schedule and middle school schedule would remain the same as it is presently working today. This would result in a complex balance of supporting the student body of 2,215 who will be sharing spaces for elective courses like physical education and wellness. The increase teaching stations for physical education would be a key component of our ability to provide programmatic equity and operationally, provide a “class” for students to attend during their elective block. The District has increased staff in this department at both levels over the last two years with the goal of reducing the amount of “frees” at the high school and study halls for 7/8 grades students. The District will have over 8.0 FTEs of wellness and PE teacher positions with the possible need for more staff due to future enrollment projections. These teaching spaces will be well utilized throughout the day by students and educators.*
- *The MSBA does not object to including this area in the proposed project, however area beyond that required to deliver the P.E. curriculum will be considered ineligible for MSBA reimbursement. Refer to the MSBA policy memorandum regarding auditorium and gym spaces beyond those included in the guidelines included with the Preliminary Design Review Comments.*
- **Media Center** – The District is proposing a total of 13,744 nsf which meets the MSBA guidelines. The area in this category has not changed since the Preliminary Design Program submittal. *No further action required.*
- **Auditorium/ Drama** - The District is proposing a total of 14,200 nsf which exceeds the MSBA guidelines by 3,800 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *This overage is due to the addition of a 3,000 nsf black box and a stage that is 800 nsf larger than guidelines. As noted in the previous review comments, all area in excess of the guidelines in this category will be considered ineligible for reimbursement.*
- **Dining and Food Service** – The District is proposing a total of 16,698 nsf which meets the MSBA guidelines. The area in this category has not changed since the Preliminary Design Program submittal. *No further action required.*
- **Medical** – The District is proposing a total of 2,140 nsf which exceeds the MSBA guidelines by 430 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA encourages the District and its consultant to seek opportunities to improve efficiencies to align with MSBA guidelines. The MSBA does not object to the additional area being included in*



## I. DISTRICT PSR RESPONSE / Space Summary

*the proposed project, however area beyond that included in the guidelines will be deemed ineligible.*

- **Administration and Guidance** – The District is proposing a total of 10,062 nsf which exceeds the MSBA guidelines by 2,521 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA encourages the District and its consultant to seek opportunities to improve efficiencies to align with MSBA guidelines. The MSBA does not object to the additional area being included in the proposed project, however area beyond that included in the guidelines will be deemed ineligible.*
  
- **Custodial and Maintenance** – The District is proposing a total of 3,437 nsf which exceeds the MSBA guidelines by 150 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA encourages the District and its consultant to seek opportunities to improve efficiencies to align with MSBA guidelines. The MSBA does not object to the additional area being included in the proposed project, however area beyond that included in the guidelines will be deemed ineligible..*
  
- **Other** - The District is proposing a total of 12,412 nsf which exceeds the MSBA guidelines by 12,412 nsf. The area in this category has not changed since the Preliminary Design Program submittal. *The MSBA offers the following:*
  - *District technology spaces (750 nsf), District Food Service Director and District Nurse administrative offices (300 nsf). These District spaces will be considered ineligible for MSBA reimbursement.*
  - *BEA office; 150 nsf. Although it is not identified in the submittal, the BEA office (“Belmont Education Association”) will be considered ineligible for MSBA reimbursement.*
  - *School Store; 125 nsf. This space will be considered ineligible for MSBA reimbursement unless the designer is able to accommodate this space as an “Other Occupied Room” within the Non-Programmed Category of spaces while maintaining a grossing factor of 1.5 or less.*
  - *Unidentified 900 nsf space. Describe the function of this space, how it is staffed, and which spaces within the Other category this space is associated (if any). We request that you refer to the PSR REVISION 1 for an updated Space Program which clarifies all unidentified spaces in the Belmont High School Facility.*
  
- *METCO Classroom, 850 nsf. Refer to Attachment A for additional information. Given the intent of the METCO program and the overall utilization of the proposed program please describe the need for this additional classroom. There are currently 43 METCO students at the High School level and 16 in Grades 7-8. The METCO classroom has been eliminated and replaced with a group instruction room that will provide a before and after school area for student support (open to all students). The total METCO enrollment for Belmont Public Schools is 102 students. METCO students across the district are included,*

### 3.3.1 - INTRODUCTION

#### I. DISTRICT PSR RESPONSE / Space Summary

scheduled, and engaged with all other students. At the high school level, students have a “free period” and students choose to gather in various parts of the building including: the cafeteria, the student center / library, the hallways and or in teacher’s rooms. METCO and non-METCO students currently utilize a small space to gather to study, get tutoring and to relax given their long day of getting to school, going through a full school day and after school and getting home. The breakdown by grade is the following

Kindergarten - 8 students	Grade 1 – 1 student	Grade 2 – 6 students	Grade 3 – 7 students	Grade 4 – 7 students	Grade 5 – 10 students
Grade 6 – 4 students	Grade 7- 9 students	Grade 8 – 7 students	Grade 9 – 11 students	Grade 10 – 10 students	Grade 11 – 12 students
Grade 12 – 10 students		Total 102			

- METCO Office 150 nsf, In subsequent submittals continue to carry this within the “Other” category. This space will be considered eligible for MSBA reimbursement.
  - Resource Officer; 120 nsf. This space will be considered eligible for MSBA reimbursement.
  - Existing pool and associated locker rooms (renovated); 9,067 nsf. As previously noted, all costs associated with the pool and support spaces and systems must be itemized in each cost estimate moving forward in the MSBA process and will be considered ineligible for reimbursement.
- **Total Building Net Floor Area** – The District is proposing a total of 300,605 nsf which exceeds the MSBA guidelines by 55,838 nsf. The area has decreased by 595 nsf since the Preliminary Design Program submittal. Refer to the comments in each space category above. MSBA will continue to evaluate eligibility of area in the subsequent Project Scope and Budget submittal.
  - **Total Building Gross Floor Area** – The District is proposing a total of 450,908 gsf which exceeds the MSBA guidelines by 83,757 gsf using the maximum allowable grossing factor of 1.5. The area has decreased by 892 gsf since the Preliminary Design Program submittal. In the following space summary submittal, provide the “existing to remain” gross square footage and the new gross square footage separately from the total. Eligibility of gross square feet will be determined by the eligible net square feet determined in the Project Scope and Budget phase multiplied by a grossing factor of up to 1.5 (in no case shall the grossing factor for new construction exceed a grossing factor of 1.5). As discussed in a telephone conversation with the MSBA staff, the entire building will meet the grossing factor of 1.5. The new construction portion will also meet the 1.5 grossing factor by including a credit of 31,604 s.f. for the P.E. spaces.

## I. DISTRICT PSR RESPONSE / Space Summary

Note that upon moving forward into subsequent phases of the proposed project, the Designer will be required to provide, with each submission, a signed, updated space summary that reflects the design and demonstrates that the design remains, except as agreed to in writing by the MSBA, in accordance with the guidelines, rules, regulations and policies of the MSBA. Should the updated space summary demonstrate changes to the previous space summary include a narrative description of the change(s) and the reason for the proposed changes to the project.

LOCAL ACTIONS & APPROVALS	3.3.5
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EVALUATION OF EXISTING CONDITIONS	3.3.2
INTRODUCTION	3.3.1

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## I. DISTRICT PSR RESPONSE / Email Comments

**From:** Jess Deleconio <[Jess.Deleconio@MassSchoolBuildings.org](mailto:Jess.Deleconio@MassSchoolBuildings.org)>  
**Date:** April 23, 2018 at 12:49:44 PM EDT  
**To:** "[jphelan@belmont.k12.ma.us](mailto:jphelan@belmont.k12.ma.us)" <[jphelan@belmont.k12.ma.us](mailto:jphelan@belmont.k12.ma.us)>  
**Cc:** "[adash@belmont-ma.gov](mailto:adash@belmont-ma.gov)" <[adash@belmont-ma.gov](mailto:adash@belmont-ma.gov)>, "[pgarvin@belmont-ma.gov](mailto:pgarvin@belmont-ma.gov)" <[pgarvin@belmont-ma.gov](mailto:pgarvin@belmont-ma.gov)>, "[pmarshall@belmont-ma.gov](mailto:pmarshall@belmont-ma.gov)" <[pmarshall@belmont-ma.gov](mailto:pmarshall@belmont-ma.gov)>, "[fcarman@belmont-ma.gov](mailto:fcarman@belmont-ma.gov)" <[fcarman@belmont-ma.gov](mailto:fcarman@belmont-ma.gov)>, "[lfiore@belmont.k12.ma.us](mailto:lfiore@belmont.k12.ma.us)" <[lfiore@belmont.k12.ma.us](mailto:lfiore@belmont.k12.ma.us)>, "Lovallo, William ([wlovallo@lemessurier.com](mailto:wlovallo@lemessurier.com))" <[wlovallo@lemessurier.com](mailto:wlovallo@lemessurier.com)>, "[rmarks@dpi-boston.com](mailto:rmarks@dpi-boston.com)" <[rmarks@dpi-boston.com](mailto:rmarks@dpi-boston.com)>, "[tgatzunis@dpi-boston.com](mailto:tgatzunis@dpi-boston.com)" <[tgatzunis@dpi-boston.com](mailto:tgatzunis@dpi-boston.com)>, "[SNolan@dpi-boston.com](mailto:SNolan@dpi-boston.com)" <[SNolan@dpi-boston.com](mailto:SNolan@dpi-boston.com)>, "Brooke Trivas ([brooke.trivas@perkinswill.com](mailto:brooke.trivas@perkinswill.com))" <[brooke.trivas@perkinswill.com](mailto:brooke.trivas@perkinswill.com)>, Karl Brown <[Karl.Brown@MassSchoolBuildings.org](mailto:Karl.Brown@MassSchoolBuildings.org)>  
**Subject:** MSBA/Belmont HS: April 12, 2018 PSR Response

Good afternoon, Superintendent Phelan:

The Massachusetts School Building Authority (the "MSBA") acknowledges receipt of the draft Belmont High School Project Preferred Schematic Report ("PSR"), received on April 12th, 2018. Below please find the MSBA's response:

- Please include original signed Local Actions & Approvals forms from the District with the final submittal
- Provide an updated/revised educational program with the final PSR submittal (due May 9, 2018) incorporating all changes to date

District response to the original PSR review comments -

- MSBA reiterates that demolition of the historic Field House building & associated new parking at the skating rink is non-reimbursable scope of work
- District confirms selection of the preferred option, titled "C.2.4" in the original PSR and now updated as a revised version titled "C.2.4R1"
- District confirms that all costs associated with the Net Zero Energy systems are included the cost estimates, and will continue to be evaluated for cost/benefit in the following Project Scope and Budget submittal
- District is currently proposing 1 additional gym station
- OPM will review building area and cost figures in the updated Preliminary Design Pricing comparison chart for the final PSR submittal
- The District and design team have reduced the proposed building area by 1,936 net square feet and 5,808 gross square feet since the original PSR submittal
- MSBA reiterates the requirement to comply with the maximum 1.5 grossing factor

Design revisions –

- The plan is more compact with less circulation space
- The multi-height spaces are reduced in size
- There appears to be more differentiation between the 7-8 and 9-12 grades
- The District and design team are continuing to look for ways to reduce building area and cost per square feet.

The MSBA looks forward to the District's May 9, 2018 FAS presentation, and receiving the updated PSR on May 9, 2018. If you have any questions, please do not hesitate to reach out to me or Karl Brown.

Regards,

**Jess Deleconio**  
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# **3.3.2 EVALUATION OF EXISTING CONDITIONS**

INTRODUCTION A

PDP SUMMARY UPDATE B

TRAFFIC REPORT C

## 3.3.2 - EVALUATION OF EXISTING CONDITIONS

### A. INTRODUCTION

Additional traffic analysis was performed since the PDP submission, as new information was necessary in analyzing the Options.

In the absence of new additional information about the existing conditions of the high school property, a brief summary is presented below of the design team's findings, with the traffic report following. Please refer to the (PDP) Preliminary Design Program report for a detailed and thorough analysis of the existing conditions.

### B. PDP SUMMARY UPDATE

#### BUILDING CODE

The Belmont High School having been constructed in 1970, with minimal renovations since, has numerous areas where compliance with the current building code (780 CMR 9th Edition, Massachusetts State Building Code) is not achieved. Notable areas of noncompliance include the lack of a sprinkler system, insufficient protection of exit stair enclosures, and inaccessible areas and building features that do not comply with 521 CMR, Architectural Access Board Rules and Regulations. Based on lack of system and envelope upgrades, there are also substantial areas of improvement for compliance with the current energy usage requirements for the 2015 International Energy Conservation Code.

#### ACCESS CODE

Compliance with the accessibility provisions of 521 CMR and the Americans with Disabilities Act is deficient in many areas throughout the existing high school including the following key elements:

- A majority of the toilet rooms are not accessible. Signed accessible toilet rooms are not fully compliant (e.g. door clearances, toilet paper dispenser locations, etc.).
- The elevator is not accessible based on the size of the cab and locations of controls/signage
- The courtyard has no accessible access or means of egress
- The theater is not provided with accessible seating. An accessible route is also not provided from the theater seating to the stage.
- The tiered lecture hall is not provided with accessible seating
- Gymnasium bleacher seating on the mezzanine is not accessible
- Locker rooms are not accessible
- Numerous instances of non-accessible door hardware with knobs
- Many cross-corridor door opening widths are less than the required 32" minimum
- Stairs are generally not compliant as they have abrupt nosings, and non-compliant handrails due to shape, no extensions, etc.



## B. PDP SUMMARY UPDATE

### CIVIL

**Storm Drainage:** Record drawings from the Belmont High School 1968 plans indicate that the stormwater from the site appears to be collected by three separate drainage systems and flow to Claypit pond. There appear to be no stormwater quality measures implemented on the site and no known detention, retention, or infiltration systems.

**Site Utilities:** The existing building is served by a network of existing utilities including water, sewer, gas, and electrical as documented in the 1968 record drawings.

The sewer system for the school is currently serviced by five sewer services connecting to the 24-inch sewer main in the school driveway. An existing 6-inch water service connects to the 8-inch water main that loops through the site north of the building. The existing 3.5-inch gas service connects to the 6-inch gas main in Concord Avenue. The existing electrical service is underground and comes from an electrical substation building east of the school, adjacent to the softball field.

**Pavement:** Pavement was assessed during the 2017 site visit. Images from google street view suggests that the parking lot was resurfaced in 2013. The asphalt pavement the parking lot, front drive, and walkways adjacent to the school were observed to be in fair condition with some cracking and degradation. The pavement in the driveway to the rear of the school was in poor condition. Curbing on the site is granite, and bituminous concrete in the southwest parking lot. Bituminous concrete curbing appears to be in fair condition. Granite curbing appears to be in good condition. It is possible that the existing curb material is suitable for reuse.

### LANDSCAPE

Warner Larson Landscape Architects visited the site on August 28, 2017 to observe existing site conditions and prepared a Landscape Existing Conditions Report which was submitted on October 10, 2017 for inclusion in the PDP. In addition to information collected during our site visit, we subsequently reviewed other existing conditions documentation provided by Perkins + Will and other sources. That report excluded utilities and drainage which were reviewed separately by Nitsch Engineering.

There have been no substantive changes or updates to the Landscape Existing Conditions Report submitted on October 10,

2017 that might impact the final evaluation of alternatives. The reader should refer to the Landscape Existing Conditions Report included in the PDP submission to reference any specifics regarding the existing conditions analysis.

### ARCHITECTURAL

The existing Belmont High School was designed and built in its entirety from 1969 to 1970 as a new public high school facility for the town of Belmont located near Clay Pit Pond. Currently, the facility is still owned and run as a high school. The building has been fairly maintained over the past 47 years, but the building enclosure systems and finishes are at the end of their useful life for both exterior and interior.

Much of the interior within the High School have generally not been updated (with exception to the Media Center), leading to worn ceilings, walls, and floors with moderate to minimal damage. At the same time, exterior precast Concrete Lintels, Precast Concrete Columns and Concrete Platforms show signs of deterioration/crumbling around entire exterior perimeter.

### STRUCTURAL

Based on visual observations by the Engineers, the school structure is currently performing well. Signs of water leaks were observed at a few locations. Water infiltration through the slab-on-grade in the Field House was noted. Some cracks in the interior masonry walls and through the floor finishes were observed at some locations, as well as in the masonry façade. There was no evidence of foundation settlement, nor was there evidence of undue vibrations due to footfall on the floor slab.

### FOOD SERVICE

The existing kitchen and serving facilities were built at least forty years ago and have exceed their design capacity and useful life expectancy. A new facility sized for the future student body will offer a space better able to serve the population by providing greater cooking capacity, increased circulation in the servery, and diverse serving station options more in line with current trends. Additionally the design will observe all health department related codes to bring the facility up to compliance.

All storage and cooking equipment should be evaluated and considered for replacement. New gas and electrical equipment shall be selected that meets the performance demands and provides the highest level of energy efficiency available.

## 3.3.2 - EVALUATION OF EXISTING CONDITIONS

### B. PDP SUMMARY UPDATE

#### HVAC

The heating system for the building includes steam boilers and steam piping that are original to the building construction (47+ years old). The original No. 4 oil burners were replaced in 2011-2012 with dual fuel burners capable of burning No. 2 fuel oil and natural gas. Natural gas is typically used. The boilers have been re-tubed several times to keep them in working order. The steam piping is at the end of its expected life. Steam traps require regular servicing.

Steam is piped to rooftop units, some unit ventilators and a steam convertor in the boiler room. The steam convertor provides heating hot water to most of the classroom unit ventilators and to cabinet heaters. Steam and hot water piping are distributed through a pipe tunnel/trench from the boiler room through the first two segments of the building. Access to this confined space is extremely limited. Replacement of this piping will most likely involve rerouting above ceilings and in corridors.

The unit ventilators in classrooms are also original equipment. These units have mechanical damper linkages and pneumatic controls, which requires continuous maintenance.

Automatic temperature controls are pneumatic and are also original installation with the exception of the air compressors. Maintenance requires specialized technicians that have knowledge of pneumatic systems, which is in large part an obsolete technology.

Rooftop air handling units were replaced in 2004 and 2008. The older units are within 2 to 5 years of their normal life expectancy.

There is no central cooling system in the building. Some rooftop units have self-contained DX cooling, including interior classrooms, the library, administration, and some other areas.

The pool is heated and ventilated by two air handling units. There is no dehumidification system. An exhaust system was added to exhaust low near the pool deck to help limit the buildup of chloramines and also provides negative pressurization for the pool. The system is ducted through the exterior wall to an exhaust fan that is mounted on grade. A pool water UV filter system was added in 2014.

There have been some improvements and upgrades to the mechanical systems in recent years including new dual fuel burners for the boilers and replacement of the rooftop units and roof exhaust fans plus other small-er improvements. However,

other systems and equipment that are original, such as the boilers, steam and hot water piping, unit ventilators, and automatic temperature controls have all exceeded their typical expected useful life and are in need of replacement.

The building structure has sprayed-on fire proofing that contains asbestos, which makes it difficult to do any work in the building that requires routing systems above the ceilings.

#### FIRE PROTECTION

The existing building is not equipped with an automatic fire suppression system.

#### PLUMBING

In general, the plumbing systems and fixtures appear to be original to the building. These systems, while continuing to function, have served their useful life. Most of the systems could continue to be used with maintenance and replacement of failed components as they age.

All plumbing fixtures are in working condition. Attempts have been made to make bathroom fixtures accessible; however, most fixtures do not meet current accessibility codes. In general, the fixtures appear to have served their useful life. Water conservancy is governed by provisions of the Plumbing Code. The code does not mandate that plumbing fixtures be upgraded. However, where new fixtures are to be installed, as will be the case with any renovations to the existing high school, new fixtures need to be of the water conserving types with lead free faucets and be supplied with lead free water piping systems.

Domestic hot water is supplied by larger steam-fired heaters and scattered electric water heaters throughout the various wings of the building. The larger water heaters have served their useful life and should be replaced.

Sanitary and roof drainage piping systems are made of cast iron. Where visible, the piping systems appear to be in fair condition. There are areas where new piping has been installed.

Rainwater from flat roof areas are collected in roof drains that appear to be in good condition and were clear of debris. Internal storm water piping was not visible.

The natural gas service to the school is fairly new and in good condition. This system could stay and be re-used in a renovation. A separate gas service was brought over to the cafeteria kitchen and is capped in place outside the building. This could also be

## B. PDP SUMMARY UPDATE

re-used.

The Boy's and Girl's locker rooms and shower areas are older and in fair condition. The shower area layouts do not meet current ADA requirements.

The cafeteria kitchen plumbing equipment is older and in need of replacement. The interior grease trap does not appear to be used or maintained.

The science labs have sinks that do not empty into an acid neutralization system as they should. The waste from these labs currently leaves the building and ties into the town sewer system without being treated. This condition needs to be corrected.

### ELECTRICAL

The majority of electrical systems are in excess of 40 years of age and have reached the end of their service life.

Main electric service and distribution, there is little or no physical or electrical capacity to add onto existing system/equipment. Repairs and/or additions to existing service and distribution equipment will require significant rework of existing facilities to suit new equipment and meet code. Working clearances and systems foreign to electrical installations create code violations and safety hazards for school and service personnel.

Existing lighting throughout the building consist of luminaires original to the building. Lamp sources are primarily fluorescent with the exception of the field house and pool where LED luminaires have been installed. The age of the fixtures present serviceability and maintenance issues, energy inefficiencies as well as poor quality light levels and visual comfort.

Lighting controls consist of local switching. There is no use of occupancy/vacancy or day lighting controls. Energy codes require automatic controls for interior and exterior lighting.

A new fire alarm system was recently installed. The system provides complete voice audio/visual, manual pull stations and 100 percent smoke detector coverage.

Emergency power system consists of an exterior 180kW diesel-fired generator manufactured by Kohler. The generator primarily serves the building's emergency lighting system and would not have capacity to serve additional loads. The existing distribution system does not meet current code requirements for separation of life safety and non-life safety systems.

The majority of spaces throughout the building have receptacles that are original to the building, device quantities are minimal.

### AUDIOVISUAL

During our site visit to Belmont High School on August 28, 2017, the existing audiovisual systems were reviewed. The technology being used in the school is outdated and does not support current standards. For this reason, these systems have reached the end of their serviceable lives. Additionally, there did not appear to be standardization in the system components used from room to room that would simplify work for technical staff.

New audiovisual presentation systems, consisting of video displays/projection and sound systems for audio playback (and voice reinforcement in larger spaces) are recommended for the Auditorium, Music Classrooms, Cafeteria, Classrooms, Lecture Hall, and Book Rooms. New sound systems are recommended for the Gymnasium, Natatorium, and Field House. Additionally, a video wall in the Entry Hall can be used to display electronic artwork, and can also be used to display other images and announcements.

### TECHNOLOGY

**Structured Cabling Systems:** There is a district-wide fiber backbone connecting all facilities. The fiber network handles general data as well as Phone (VoIP) and security for the school district and the Town. Any future project must take into consideration the requirement for continued connectivity between and among facilities. The high school MDF is located off the Tech Office on the second floor. The fiber enters the building underground on The Theater/parking lot side of the building and is routed internally to the MDF. Horizontal cabling from the MDF and IDFs to endpoint is Category 5. The Cat5 and cabling represents a bottleneck on the existing network and therefore has reached the end of its serviceable life. Any future project should include the installation of horizontal cabling based on current standards at the time of design, 20GbE backbone and dedicated MDF/IDF rooms with proper power and environmental treatments.

**Data and Voce Communication System:** The wireless hardware is Alcatel-Lucent. The controller is at the high school with a backup controller at Chenery Middle School. Most APs within the school are mounted based on availability of data outlets because of the difficulty in adding cabling due to building/ceiling conditions. The second floor MDF is the centralized management point for all data communications for the high school, the school

## 3.3.2 - EVALUATION OF EXISTING CONDITIONS

### B. PDP SUMMARY UPDATE

district and the town. IDF's are equipped with Alcatel-Lucent OS6450 Switches, stacked. Any future project should provide updated networking hardware for the MDF and IDF's based on current technology, with special attention paid to maintaining the functionality of the school-district and town wide network and services. VoIP is server-based NEC Univerge SV8300. The server is located in the high school MDF. The system is 10-12 years old. Any future project should expand upon the NEC VoIP platform, upgrade to the newest technology, and consolidate systems as much as possible.

**Distributed Communication System:** The Intercom system is a Simplex 5100 Series Building Communication System. The master clock system is a Simplex 2350 Master Time System. The intercom main equipment is located in the Main Office. The master clock system is located in the TELCO demark, mounted on the voice termination wallboard. Any future project should provide a new system based on current technology.

#### GEOTECHNICAL

The report provided by McPhail Associates in PDP indicates the use of previous borings and foundation recommendations from the construction of the existing Belmont High School, and that additional testing should be done during the PSR phase to identify specific pile types required. Provide any updated information in the subsequent Preferred Schematic Report ("PSR") submittal.

The Phase 1 Assessment identified two Recognized Environmental Conditions (one associated with the site's historical use as a landfill, the other with the presence of an abandoned Underground Storage Tank near the hockey rink). However, this Phase 1 report does not state definitively whether (or not) additional Phase 2 geo-environmental investigations are recommended. In response to the comments, clarify and describe any future potential site investigations in this regard. Additionally, MSBA notes that all costs associated with abatement of contaminated soil from any source, and abatement of underground storage tanks must be itemized in the cost estimates for the following Schematic Design submittal as ineligible for MSBA reimbursement.

During Schematic Design, investigations will be conducted to determine subsurface conditions in areas of future site development (building foundations, utilities, site improvements), and in areas that will be impacted by demolition and removal of

existing structures and utilities. The goal of these investigations will be to obtain site-specific data on both geotechnical and environmental conditions that would impact project design, construction, and cost. Explorations will be performed to provide representative data as required by the Massachusetts Building Code and Massachusetts Contingency Plan (MCP). Specifically, we anticipate:

- test borings will be drilled within the future building footprint to inform foundation design;
- explorations will be conducted within future utility alignments and roadways for their design;
- soil samples retrieved from explorations will be tested, as appropriate, to determine engineering properties and/or chemical constituents;
- representative analytical soil testing will be performed in areas where soils will be generated by project construction and require off-site disposal; and
- as appropriate, explorations, sampling, and testing will be conducted to determine the nature and extent of contamination and to provide data to maintain MCP regulatory compliance.

The area near the hockey rink will be investigated to determine the presence, condition, and configuration of the underground storage tank presumed to be present. If an underground storage tank exists and it is not in consumptive use or found to be impaired, it will be removed in accordance with applicable regulations. It is understood that all costs associated with abatement of contaminated soil from any source and abatement of underground storage tanks must be itemized in the Schematic Design submittal cost estimates as ineligible for MSBA reimbursement.

The subsurface exploration activities are expected to begin in the Spring/Summer of 2018.

#### HAZARDOUS MATERIAL

Universal Environmental Consultants (UEC) conducted a thorough and detailed hazardous materials identification analysis at the High School, Belmont, MA, which include the following services as part of the feasibility study of the school:

- Asbestos Containing Materials inspection and sampling;

## B. PDP SUMMARY UPDATE

- Polychlorinated Biphenyls Electrical Equipment and Light Fixtures inspection;
- PCB's Caulking inspection;
- Mercury in Rubber Flooring inspection and sampling;
- Airborne Mold inspection and sampling;
- Radon Sampling;
- Underground Storage Oil Tanks inspection.

Please refer to the PDP for the full report.

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### C. TRAFFIC REPORT

In order to better inform the site planning of immediate Belmont High School project site and adjacent and immediate traffic patterns the Traffic Consultant/ Nelson Nygaard conducted further analysis which is contained in the PSR. The planning issues around the safest and most efficient travel patterns as it relates to vehicular, pedestrian, bike, bus circulation, traffic etc...were further analysis. The further traffic studies and subsequent site plans were presented to the steering committee, regulatory personal, and at a community forum to garner the feedback and input from diverging constituents.

Town of Belmont

# Belmont High School Traffic Study – Existing Conditions and Recommendations Report

January 2018





# C. TRAFFIC REPORT

## BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS AND BUILD RECOMMENDATIONS TOWN OF BELMONT

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#### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS AND BUILD RECOMMENDATIONS TOWN OF BELMONT

## EXISTING CONDITIONS

### Introduction

Belmont High School is a 224,000-square-foot facility, built in 1970, serving about 1,350 high school students located in central-eastern Belmont. The school site is bordered by the MBTA commuter rail tracks on the north and Claypit Pond and Concord Avenue on the south. Enrollment ranges from about 300 to 350 students in each grades 9-12. There are about 140 full-time staff employed at the school. In addition to academic facilities, the campus contains a variety of athletic facilities, including a football field and running track, three baseball diamonds, two soccer fields, ten tennis courts, an ice rink, and surface parking areas for students, teachers, and staff.

Several current transportation and parking issues inhibit the ability of students, parents, teachers, and staff to access the school safely and efficiently. These issues include high demand for parking during school hours, long traffic queues in all directions during peak pickup/drop-off periods, dangers for people crossing by foot and by bike across routes with high speeds, and vehicular traffic queues, and unwanted parking spillover from vehicles not accommodated on-site onto neighboring residential streets. Anticipated school population growth could compound these issues if not effectively mitigated. Belmont High School is expected to grow from its current enrollment of 1,300 students to about 1,450 students by 2024. In addition, Belmont Public Schools has considered enrolling seventh- and eighth-grade students at Belmont High School to ease population pressures at other schools in the district. The following report documents and analyzes the existing transportation and parking issues at Belmont High School and its immediate environs, in order to set a baseline for potential future solutions and/or mitigation measures.

This report contains observations and analyses of the following:

- School operations
- Vehicular access
- Parking inventory and utilization
- Walking, biking and transit facilities and observations
- Safety analysis
- Existing traffic performance analysis

### School Operations

School is in session each day between 7:35 am and 2:25 pm except for Wednesdays, which conclude at 1:25 pm.<sup>1</sup> The High School's schedule is divided into flexible 25-minute blocks, called "MODs," and students are generally expected to be on campus between 8:00 a.m. and 2:00 p.m. The school is an open campus. However, most students arrive at 7:35 a.m. and depart at 2:25 p.m. Seniors are permitted, by school policy, to leave campus during this time if they have met the required academic criteria for the privilege. Juniors also have access to this policy, however only on their second semester.

All students must register their vehicle with the main office by fully completing a parking agreement. A parking sticker is then issued and should be displayed attached to the rear windshield on the passenger's side of the vehicle. Parking in the student spaces is on a first-come, first-serve basis through the

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<sup>1</sup> <http://www.belmont.k12.ma.us/bps/bhs/News-Events-Schedules>

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### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS AND BUILD RECOMMENDATIONS TOWN OF BELMONT

December break. After December break, only seniors who have won parking passes in a school-wide lottery are allowed to park on campus. Students driving vehicles to school must park them in the student parking lot located at the east end of campus near the tennis courts. The field house parking lot, located immediately north of the School building, is for faculty use only during the school day.

According to conversations with the Belmont Police Department, the High School after-school activities most responsible for parking spillover on residential streets near campus are varsity football and varsity soccer games during the fall, in which there are eight and nine home games per season, respectively.

Students may purchase a bus pass subject to the availability of space and distance from school. School bus service is available to any student paying the fee, but few High School students use the service, most of them 9<sup>th</sup> graders who are not eligible for driver's licenses. Belmont schools have staggered schedules, and as a result, high school students are picked up and dropped off earliest, followed by middle school and elementary school students.

The annual fee for busing is \$575 per student.<sup>2</sup> An initial transportation fee is \$287.50 per pupil, payable by check or online.<sup>3</sup> All students who live less than 2.0 miles from their assigned school are required to pay the busing fee. All students requiring bus service, regardless of grade or distance from school, must register for busing online. School bus routes, as of 2017, are shown in Figure 1.

**Figure 1 School Bus Route Information<sup>4</sup>**

Route	Start Time	First Stop	Last Stop
1 – AM only	6:45 AM	927 Concord Avenue	375 Acorn Park Drive
2 – AM only	6:45 AM	422 Trapelo Road	School & Elm
2 – PM only	2:50 PM (1:50 PM Wednesdays only)	Marlboro & Unity	Trapelo & Hull
3 – PM only	2:40 PM (1:50 PM Wednesdays only)	Trapelo & Waverley	Brookside & Lorimer
4 – AM only	6:45 AM	1 Fletcher Road	Pleasant & Stella
6 – AM only	6:45 AM	Lorimer & Vernon	Waverley & Shean

Source: Belmont Schools

Following established Belmont Police Department practice, there are no crossing guards dedicated to the High School, under the expectation that high school students can navigate the Concord Avenue crossings independently. One crossing guard is dedicated to Burbank Elementary School at Concord Avenue & Baker Street.

In 2015, the Town of Belmont commissioned an Enrollment Study from Symmes Maini & McKee Associates. The study outlined enrollment projections through 2024 and anticipated 1,298 students by the 2017-2018 school year (Figure 2). Recent enrollment of about 1,350 in the current school year indicates that the High School is exceeding these enrollment targets by between two and three years, a trend that may cause traffic impacts from school population growth to similarly outpace earlier estimates.

<sup>2</sup> Fee waivers are available for families with financial need.

<sup>3</sup> <http://www.belmont.k12.ma.us/bps/bus-faq>

<sup>4</sup> <http://www.belmont.k12.ma.us/bps/Portals/0/docs/publications/Bus-Routes-2017-2018.pdf>

## 3.3.2 - EVALUATION OF EXISTING CONDITIONS

### C. TRAFFIC REPORT

#### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS AND BUILD RECOMMENDATIONS TOWN OF BELMONT

Figure 2 School Enrollment Projections, 2014- 2024

Year	Total Enrollment
2014-2015	1,235
2015-2016	1,263
2016-2017	1,286
2017-2018	1,298
2018-2019	1,330
2019-2020	1,341
2020-2021	1,382
2021-2022	1,409
2022-2023	1,413
2023-2024	1,437

Source: Belmont Public Schools, Belmont Enrollment Study, p. 42

### Existing Vehicular Access and Traffic Operations

Belmont High School's vehicular access/egress pattern is designed such that all traffic entering the campus has a single point of access, at the intersection of Hittinger & Underwood Streets, and two points of egress, either at the High School's driveway at Concord Avenue, on the west side of the Claypit Pond, or via Hittinger & Underwood Streets.

Vehicle queues were observed during the morning traffic peak on October 2, 2017, between about 6:50 a.m. to 7:50 a.m., in the following locations:

- Brighton Street in the southbound direction, between the MBTA tracks and Hittinger Street., for vehicles turning right onto Hittinger Street
- Concord Avenue in the westbound direction, between the High School's egress driveway and Goden Street, for vehicles turning around the block to access destinations east of the High School (no left turn is permitted from the driveway onto Concord Avenue.)
- Concord Avenue in the eastbound direction, between Emerson Street and Underwood Street, for vehicles turning left onto Underwood Street

To get an up-to-date understanding of traffic volumes and congestion points in the vicinity of Belmont High School, turn movement counts (TMC's) were performed at the following six intersections:

- Blanchard Road at Hittinger Street (Two-way stop control)
- Concord Avenue at Underwood Street (Uncontrolled)
- Concord Avenue at High School Driveway/Orchard Street (Two-way stop control)
- Concord Avenue at Goden Street (Two-way stop control)
- Concord Avenue at Leonard Street / Common Street (Uncontrolled)
- Concord Avenue at Blanchard Road / Griswold Street (Signalized)

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### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS AND BUILD RECOMMENDATIONS TOWN OF BELMONT

TMCs collected at these intersections recorded traffic movements during AM and PM peaks for motor vehicles, bicycles, and pedestrians. TMC's were counted on Thursday, September 28, 2017, from 6:30 to 8:30 a.m. and 1:30 p.m. to 3:30 p.m. with 15-minute reporting intervals, to coincide with peak pickup and dropoff periods at the High School's typical bell schedule. AADT's were counted between September 27 and 28, 2017, for a 48-hour period with hourly reporting intervals. These counts were conducted at Concord Avenue, west of Underwood Street, and Brighton Street, north of Hittinger Street.

Traffic counts revealed that there is a roughly even split between vehicles entering the High School via Underwood Street (56%) and those entering via Hittinger Street (44%). Nearly nine out of ten (89%) of vehicles exit the High School via the main driveway onto Concord Avenue, where all vehicles are required to make a westbound right turn. Of these vehicles exiting onto Concord Avenue, half (44.5%) continue west to Belmont Town Center, while the other half turn left onto Goden Street, presumably to reach destinations east of the High School. Just 11% perform a loop in the primary student parking lot before exiting east via Underwood & Hittinger Streets to Brighton Street and points north. These access and egress patterns are shown in Figure 8.

The six study intersections above were evaluated for Level of Service (LOS) analysis. The following figures display AM and PM peak turning movements for each mode at each of these intersections. Due to the unique geometry of intersection 6, turning movements are included in a separate exhibit (Figures 4 to 6).

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Figure 3: AM and PM Peak Motor Vehicle Turning Movements

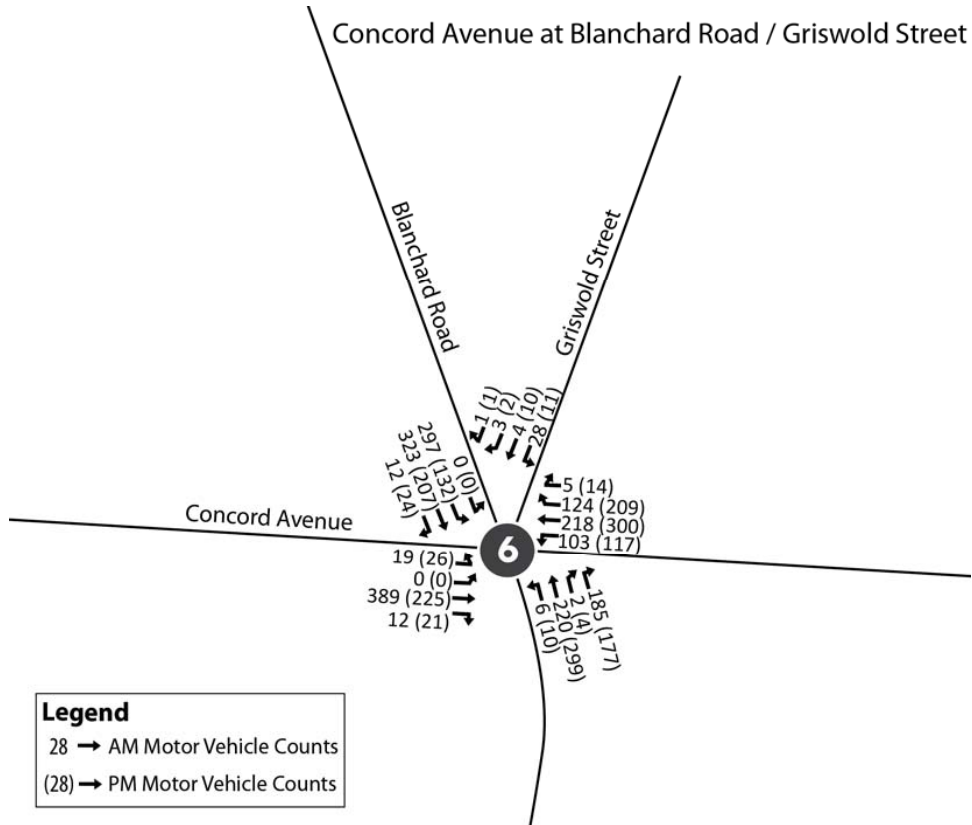




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Figure 4: Concord at Blanchard AM and PM Peak Motor Vehicle Movements

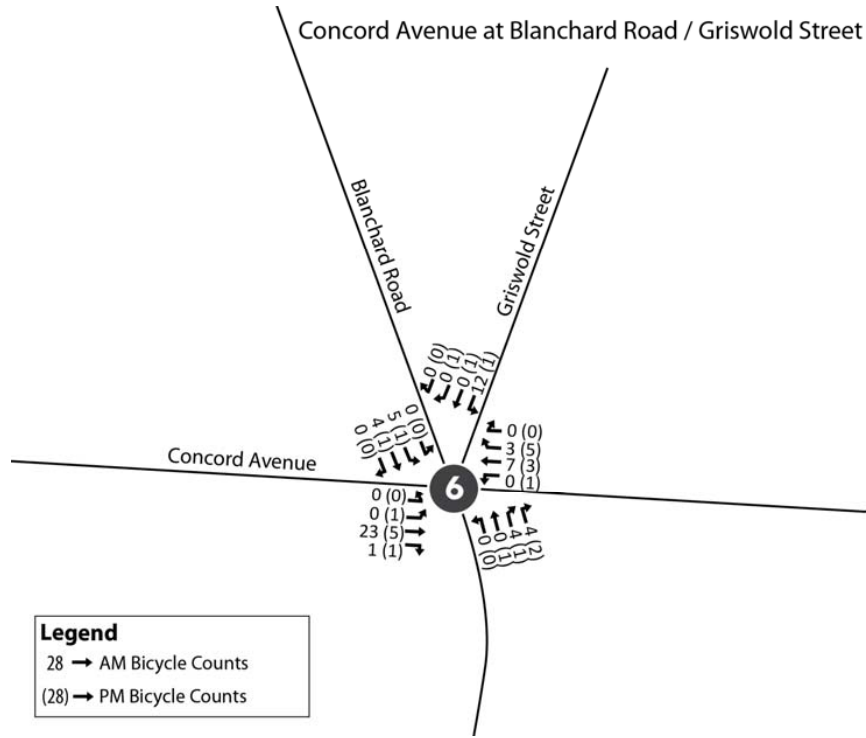


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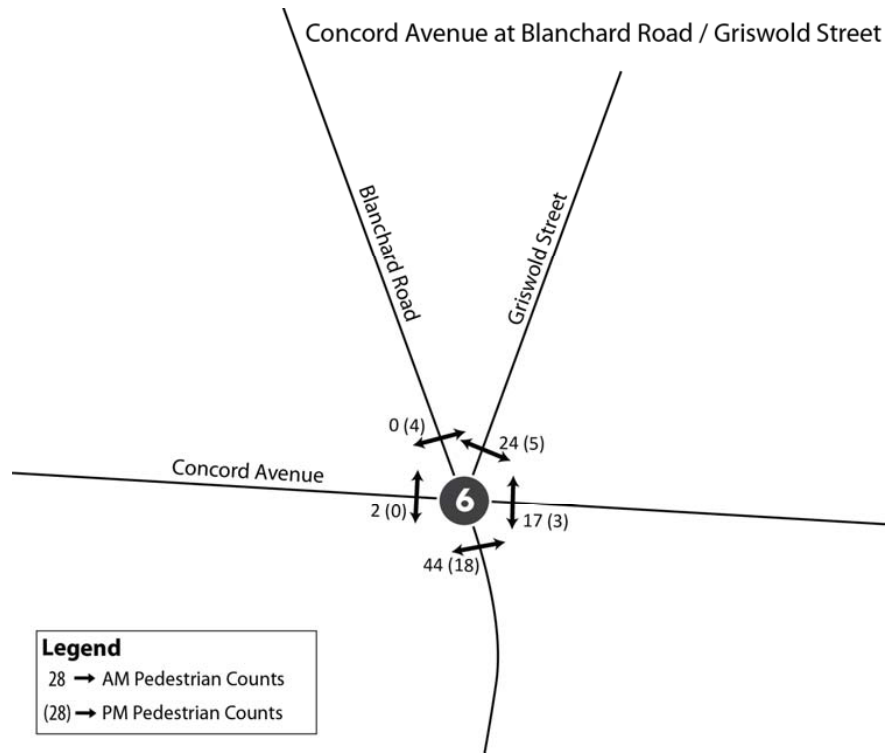
Figure 5: Concord at Blanchard AM and PM Peak Bicycle Movements



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Figure 6: Concord at Blanchard AM and PM Peak Pedestrian Movements



Using these observed turning movement counts, vehicular Level of Service and delay was calculated according to Highway Capacity Manual methods for each intersection. Results from this analysis are displayed in the table below. The majority of study intersections operate at an acceptable LOS D or above. While LOS D and C represent moderate amounts of delay, they are within a reasonable expectation of operations at urban intersections.<sup>5</sup> Leonard Street and Concord Avenue, however, operates at LOS F during both AM and PM periods, indicating a failure to accommodate the observed levels of traffic. Concord Avenue at Goden Street also operates at LOS F during the PM peak, indicating that vehicles often queue at the Goden Street stop sign before turning left or right onto Concord Avenue.

Detailed descriptions of modeled traffic operations for each intersection are as follows:

- Leonard Street / Concord Avenue / Common Street:** This intersection experiences extreme delay and queuing during both AM and PM observed periods. Due to the uncontrolled nature of the intersection, lack of a roundabout configuration, and the platooning effect of traffic patterns, one more approaches to the intersection are regularly

<sup>5</sup> The Level of Service metric consists of an average of all approaches at a signalized intersection. For unsignalized intersections, Level of Service may provide less reliable estimates of vehicular delay than other models.

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forced to wait for upwards of 60 seconds prior to passing through the intersection. Each approach to the intersection experiences this effect in intervals. The westbound approach often experiences massive queueing when multiple left turning vehicles are forced to wait for a gap in cross traffic, forcing the larger volumes of right turning vehicles to wait for clearance. A similar effect occurs on the southbound approach, where multiple right turn or through vehicles stack up and prevent the larger volumes of left turning vehicles from proceeding freely.

- **Concord Avenue / Goden Street:** This intersection operates freely on both Concord Avenue approaches. However, during the AM peak queue occasionally form for vehicles turning left or right out of Goden Street, particularly when left turning vehicles must wait for an adequate gap. This effect also exists during the PM peak with even greater severity, forcing vehicles at the Goden Street approach to wait upwards of 50 seconds before completing their turns.
- **Concord Avenue / Site Driveway:** This intersection operates without significant delay. Vehicles exiting the site driveway are only allowed to turn right and almost always find a sufficient gap in Concord Avenue traffic to complete their turns with delay.
- **Concord Avenue / Underwood Street:** This intersection operates without perceptible delay during AM and PM periods. As Underwood Street is a one-way northbound corridor, vehicles turning right onto it from Concord Avenue face no delay. Eastbound vehicles turning left onto Underwood Street rarely have trouble finding an acceptable gap to make their turns, resulting in little delay.
- **Concord Avenue / Blanchard Road / Griswold Street:** This intersection is a signalized intersection with dedicated phases for each main approach. The Griswold Street approach is not signalized and operates with stop control. The intersection does experience moderate delay during both AM and PM peaks, but overall achieves LOS D, indicating an acceptable level of service for an urban arterial intersection.
- **Blanchard Road / Hittinger Street:** This intersection is stop-controlled at Hittinger Street and operates freely along Blanchard Road. While queue do form along Hittinger Street, particularly when vehicles attempt to turn left onto Blanchard Road, overall delay is within acceptable limits, indicating LOS D during the morning period and LOS C during the PM period.

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Figure 7 AM and PM Motor Vehicle Level of Service and Delay

Intersection Name	AM LOS	AM Delay	AM Avg Queue (Worst Approach)	PM LOS	PM Delay	PM Avg Queue (Worst Approach)
Leonard Street / Concord Avenue / Common Street	F	68.8	743 (SB)	F	72.4	616 (WB)
Concord Avenue / Goden Street	D	34.3	74 (NB)	F	52.8	143 (NB)
Concord Avenue / Site Driveway	A	7.7	61 (SB)	A	7.3	61 (SB)
Concord Avenue / Underwood Street	A	8	154 (EB)	A	5.3	66 (EB)
Concord Avenue / Blanchard Road / Griswold Street	D	42.1	381 (EBT)	D	45.8	524 (WBT)
Blanchard Road / Hittinger Street	D	26.3	82 (EB)	C	19.5	64 (EB)

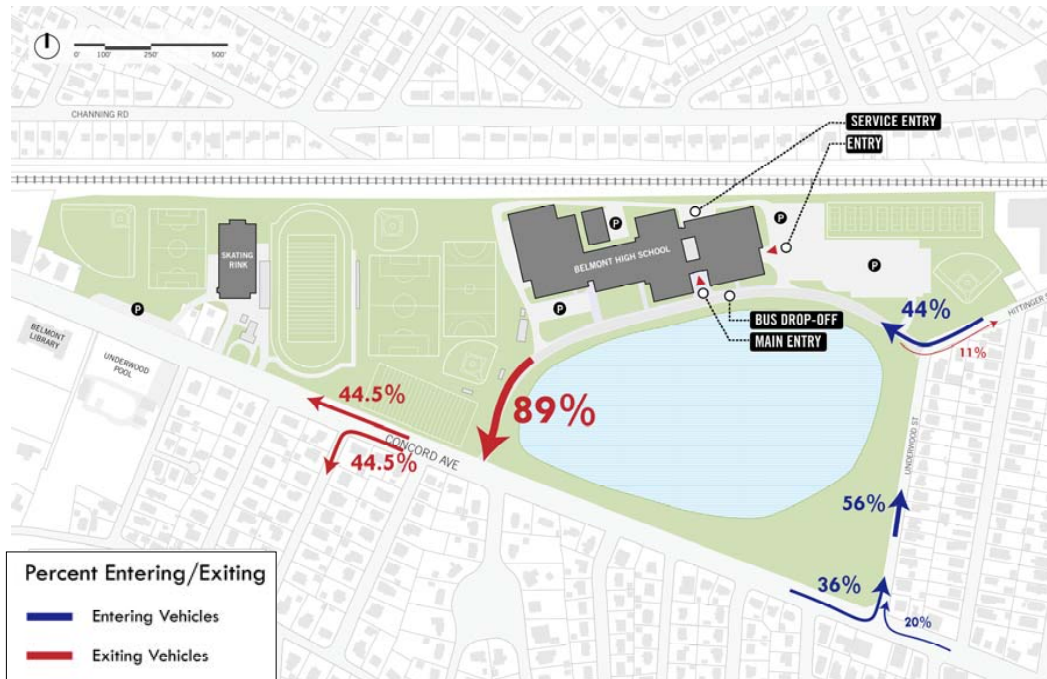
Given these operational characteristics, the majority of study area intersections are operating within expected limits of their capacity, with a Level of Service of “D” or better. The intersection of greatest concern is Leonard Street at Concord Avenue, which experiences extreme delay and queuing, creating a safety and efficiency barrier of access for all users.

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Figure 8 Vehicular Access/Egress Patterns



Source: Nelson\Nygaard

Qualitative site observations<sup>6</sup> showed that congestion in and around the High School results not only from vehicles dropping off students, but from the dozens of campus affiliates wishing to park on-site. In particular, long queues on Underwood and Hittinger Streets result from conflicts between vehicles entering the High School entryway, from either Underwood or Hittinger, and vehicles that exit the High School campus after drop-off by making a left turn in the eastbound direction on the school drive from the student parking lot to exit via Hittinger.

Drop-off issues are more critical during the morning drop-off peak, while in the afternoon pick-up peak many students finish at staggered times due to after school activities. During stakeholder meetings, it was also reported that there is not a formally designated curb area for student drop-off and pick up; rather, students typically wait where their parents typically wait for them. Stakeholders consider this to be a safety concern. In the morning, the majority of students were observed being dropped off on the school's driveway, near the main building entrance, with a smaller number being dropped off at the building's eastern entrance from the faculty/staff lot.

The narrow period of access and egress observed also poses a challenge, with the majority of drop-off traffic occurring during a concentrated 20-minute span of about 7:18 – 7:38 a.m., in advance of the typical first period bell at 7:35 a.m. This generates longer queues and driver frustration, which can lead to impatient and dangerous maneuvers. Of the total vehicular counts

<sup>6</sup> Recorded on October 2, 2017, between about 6:50 a.m. and 7:50 a.m.



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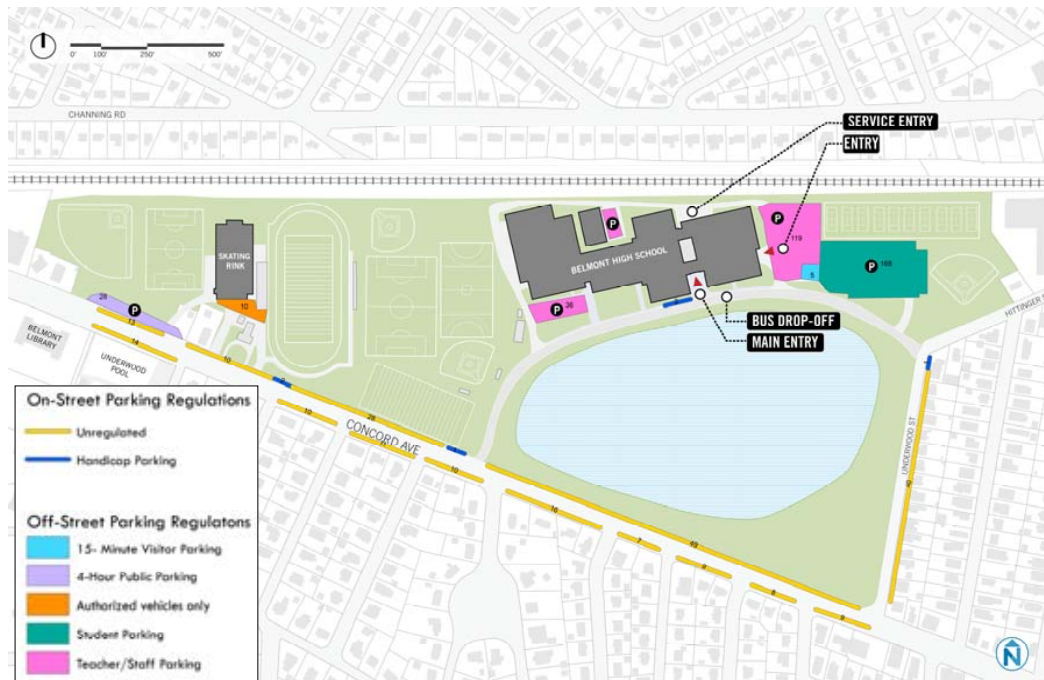
### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT TOWN OF BELMONT

collected, the overall morning peak of general commuter traffic on Concord Avenue occurred within the span of 7:15 – 8:15 a.m.

### Existing Parking

There are 168 spaces allocated to students and 155 spaces dedicated to faculty and staff. In addition, there are five visitor spaces in the main faculty/staffing parking area, and two on-street disabled spaces located along the High School’s main driveway. There are two off-street parking areas west of the football stadium, adjacent to Concord Avenue: one is a 28-space public parking facility just east of Concord Avenue, regulated with a 4-hour time limit, and the other is reserved for authorized service vehicles just south of the skating rink. During data collection, users were observed walking from the public parking lot towards the Belmont Town Center, indicating that, during the daytime, this lot is likely not utilized by High School affiliates. In total, there are 368 off-street spaces in campus parking facilities, and 229 on-street spaces located nearby on Concord Avenue or Underwood Street. Parking inventory is shown in Figure 9.

Figure 9 Parking Inventory



Source: Nelson\Nygaard

The project team conducted parking utilization counts on October 2, 2017, at 10 a.m – a time selected to represent peak accumulation once most affiliates have travelled to campus. Utilization counts showed that during peak occupancy, the High School’s core parking facilities are about 76% full, with 251 vehicles parked in 330 available spaces. Demand in the student parking lot at the eastern end of campus approached 85% utilization, a threshold indicating it is functionally full, i.e. it might be difficult but not impossible to find a parking space. However, significant capacity remains unoccupied in the eastern faculty/staff lot, which has utilization of less than

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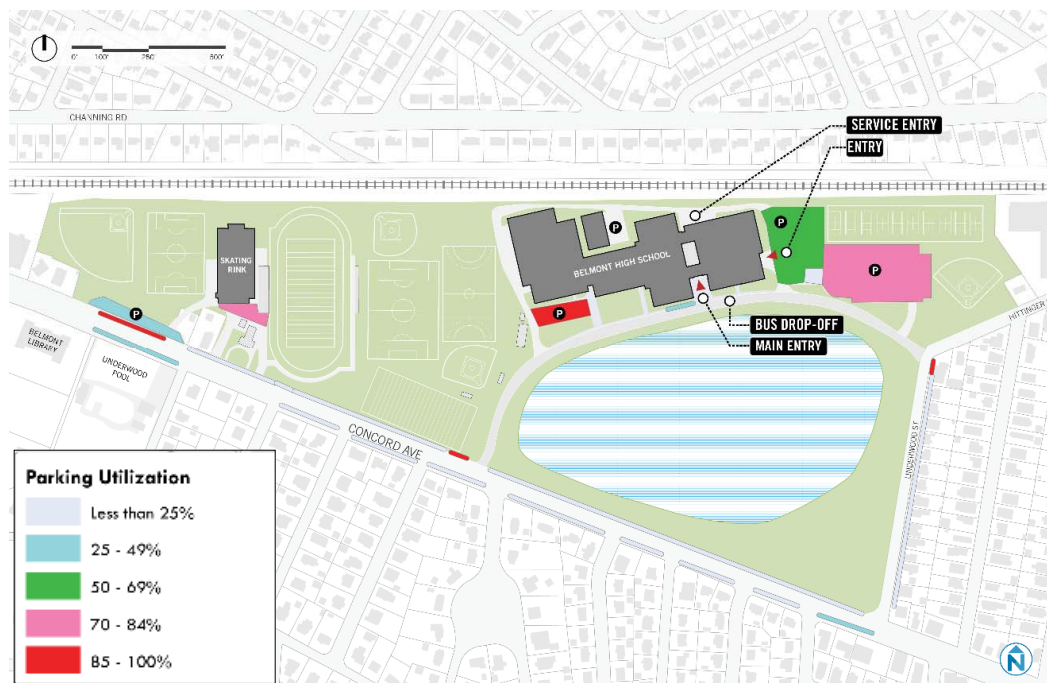
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70%. On-street spaces on Concord Avenue and Underwood Street remain under-utilized, with utilization rarely exceeding 25% on these segments. Parking utilization in and around campus is shown in Figure 10.

The Belmont School District operates eight school buses, which are parked at the High School in the easternmost portion of the student parking lot during the school day. High School stakeholders are evaluating whether school buses will continue to be stored in this location.

Figure 10 Parking Utilization



Source: NelsonNygaard

### Existing Walking and Biking Access

Walking and biking are popular means of accessing Belmont High School. The High School is accessible by on-street bike lanes on Underwood Street and on Concord Avenue, between Leonard Street and the Cambridge line. The High School is connected to a nearly complete network of sidewalks along Concord Avenue and Underwood Streets, along with two high-visibility pedestrian crossing signals at Concord Avenue & Orchard Street (Figure 11) and Concord Avenue & Cottage Road. The only significant gap in the sidewalk network exists on the north side of Hittinger Street, adjacent to the off-street parking area of the industrial facility that occupies a large property between Brighton Street and Trowbridge Street. In addition, a multiuse trail running parallel to the MBTA tracks, known as the "Fitchburg Cutoff Bikepath," runs from Alewife Station to the campus, terminating at the intersection of the tracks and Brighton Street, roughly 200 feet north of the intersection of Brighton & Hittinger. This off-street path provides walking and biking access not only to the Alewife "T" station but also to other destinations in Cambridge and Somerville. An off-street recreational path also exists around the circumference of

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Claypit Pond, just south of the High School, although this path does not currently offer direct or accessible connections to nearby on-street bike or pedestrian facilities.

**Figure 11 Pedestrian Crossing Signal at Concord & Orchard**



Source: Nelson\Nygaard

In site observations conducted during the AM peak period<sup>7</sup> of October 2, 2017, the project team counted roughly 250 people walking (Figure 16) and 100 people biking to the campus (Figure 15), comprising almost a quarter of all affiliates. The heaviest volumes of people walking were observed crossing Concord Avenue at Orchard Street into the High School’s driveway (about 200 people walking observed), crossing Concord Avenue at Underwood Street (about 25 people walking), and crossing Brighton Street onto Hittinger (about 25 pedestrians). About 30 people bike to the High School via each intersection, as shown in Figure 15

In discussions with campus stakeholders, the most commonly cited walking access issue was that students frequently cross the MBTA tracks at a location immediately north of the baseball field, indicated on

<sup>7</sup> Approximately 6:50 a.m. – 7:50 a.m. on October 2, 2017.



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Source: Nelson\Nygaard

Figure 13, to connect with Alexander Avenue, Sherman Street, and other destinations in northern Belmont. Stakeholders noted that affiliates had previously cut a hole in the chain-link fence between the campus and the railroad tracks so that baseball players could retrieve foul balls. In addition to presenting a serious safety issue in which students are exposed to the risk of fatal collisions with oncoming rail traffic while crossing the tracks, this problem highlights the need for enhanced walking connections between the High School and neighborhoods in northern Belmont. Under existing conditions, there are no points of access between Concord Avenue and northern Belmont neighborhoods between Leonard Street and Brighton Street, a distance of over three-quarters of a mile.

Other stakeholders expressed concern over the lack of connection between the sidewalks on Concord Avenue and Underwood Street and the off-street path encircling the Claypit Pond. If present, the off-street path could provide additional utility for bikes and pedestrians on the east side of the High School's driveway or the west side of Underwood Street.

Bike racks in and around campus had high utilization during the site observation period described above (Figure 12). The high demand for bike parking on campus is evidence of the need for additional bike parking and enhanced biking access and safety improvements.

**Figure 12** Full Bike Racks at Belmont High School

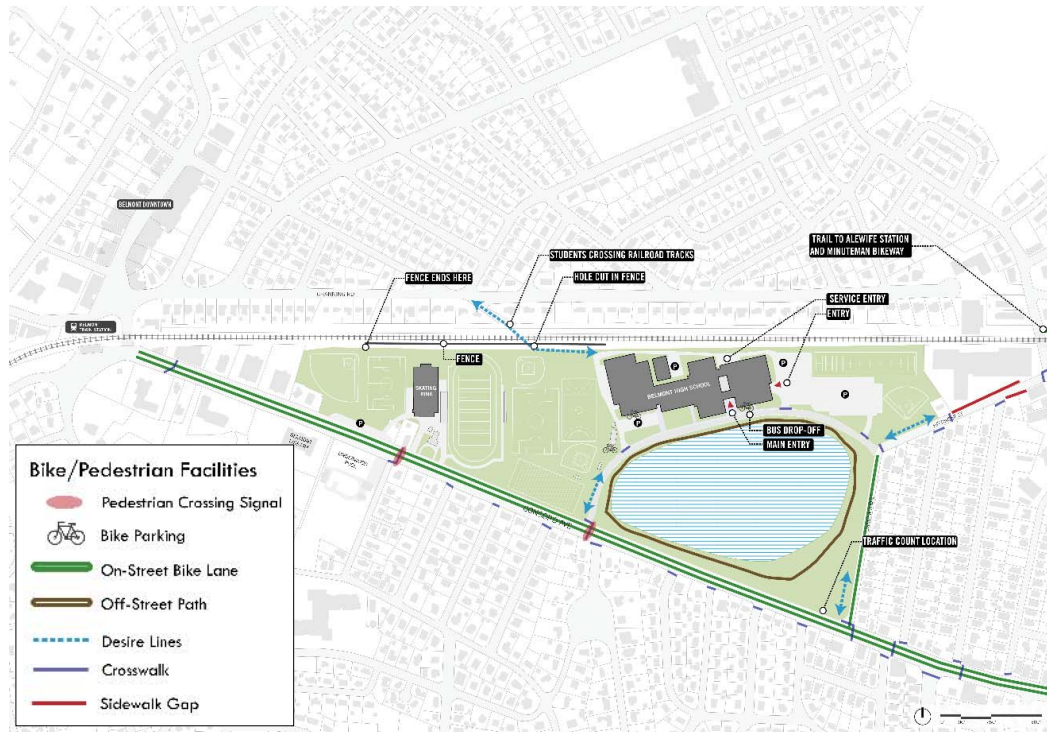


Source: Nelson\Nygaard

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Figure 13 Campus Bike and Pedestrian Access



Source: Nelson\Nygaard

### Crash Propensity Analysis

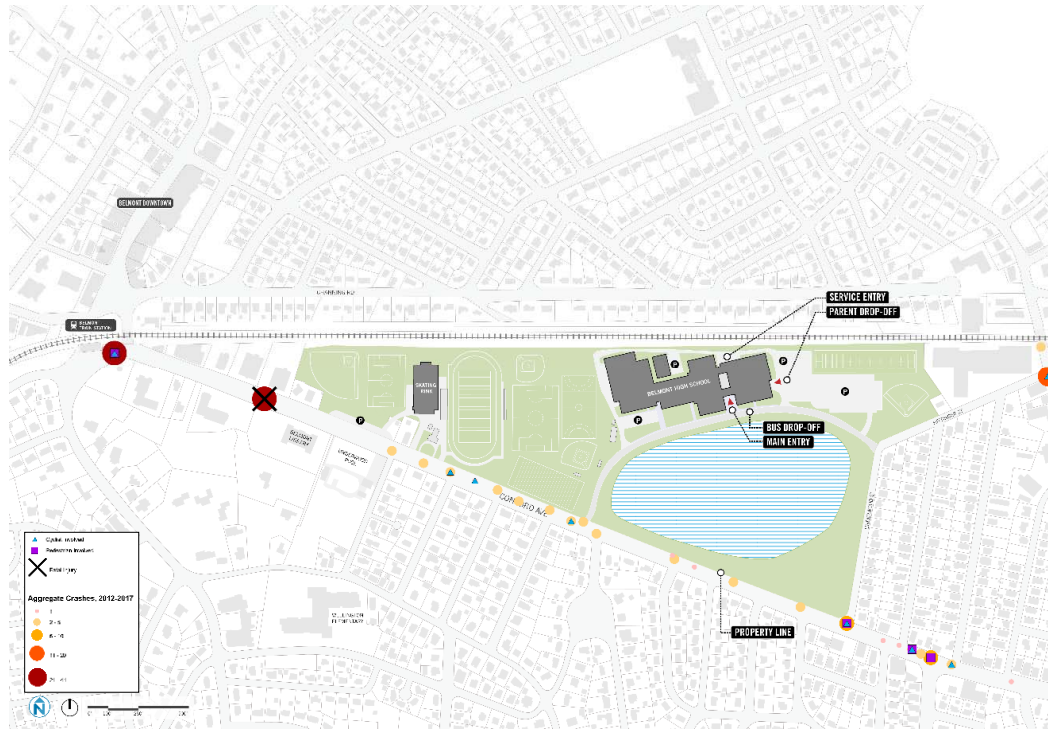
The project team mapped and analyzed Belmont Police Department crash data from the last five years, 2012-2017. These data indicated that several locations on Concord Avenue have a high propensity for vehicle crashes, particularly those involving people walking and biking. The locations with the highest propensity for crashes in this period were Concord Avenue & Leonard Street/Common Street, Concord Avenue between Leonard Street and Cottage Road (mid-block), and Brighton & Hittinger Streets. Each of these locations have featured at least 10 crashes in the five-year period. The full results of the crash propensity analysis are shown in **Error! Not a valid bookmark self-reference.** According to MassDOT, neither Brighton Street/Blanchard Road nor Concord Avenue are listed among the Top 200 intersection clusters in any survey period between 2002 and 2014. These corridors are also not among those eligible for Massachusetts Highway Safety Improvement Program (HSIP) funding.

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Figure 14 Crash Locations and Propensity



Sources: Belmont Police Department





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Figure 16: AM and PM Peak Pedestrian Movements





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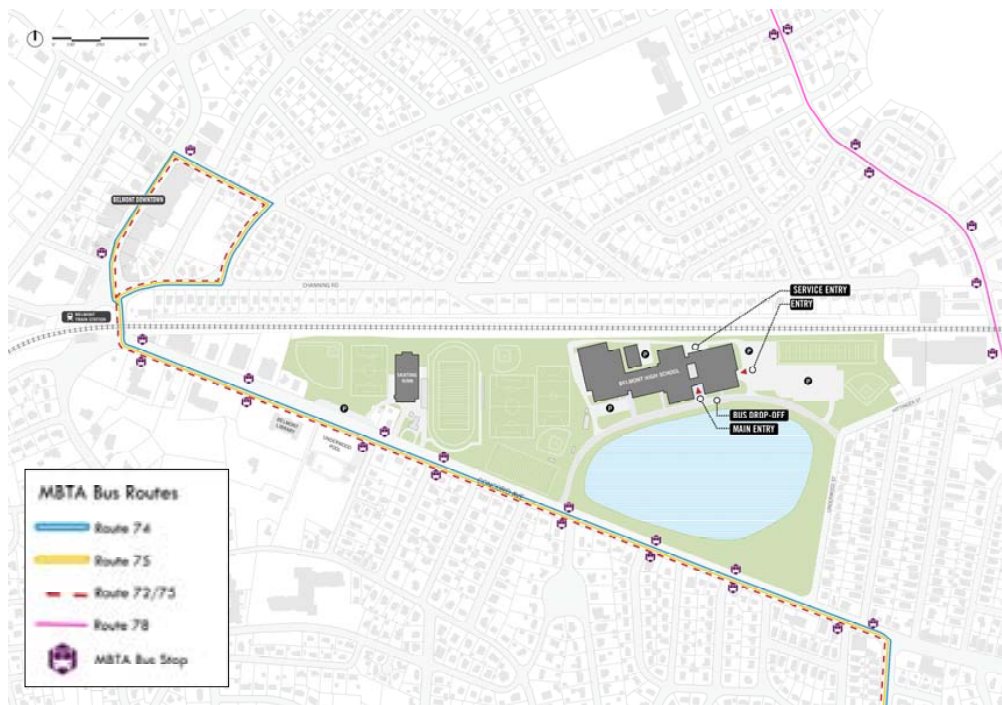
### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT TOWN OF BELMONT

#### Existing Transit Access

Four MBTA bus transit routes operate within walking distance of the campus, routed primarily along Concord Avenue and Brighton Street (Figure 17). Stakeholders report that teachers and staff make use of MBTA services to access campus but a ride survey has not been completed to objectively document this mode share. Through METCO, a statewide voluntary school desegregation program, Belmont High School currently receives 43 students from the City of Boston that board and alight at MBTA bus stops at Concord Avenue & Orchard Street.

A high-visibility pedestrian crossing signal at this intersection helps these students safely cross Concord Avenue into the campus. While bus stops exist within the vicinity of campus, none has bus stop amenities such as benches, shelters, lighting, or real-time travel information, which may encourage campus affiliates to take transit. Belmont High School can also be accessed via MBTA's Fitchburg Line, with a 15-minute walk along Concord Avenue to the west. Alternatively, campus affiliates can access the school via "T" subway service on the Red Line at Alewife Station, with a 9-minute bike ride on the Fitchburg Cutoff Bikepath that connects to Hittinger Street.

Figure 17 Transit Access near Belmont High School



Source: MBTA

#### FUTURE SCENARIOS

##### No Build Scenario Conditions

The No Build Scenario assumes no implementation of the planned school expansion. A 1% annual growth rate is applied to current traffic volumes with an analysis year of 2021. No transportation

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improvements are added in this scenario. This results in somewhat worsened conditions throughout the study area, as summarized in the table and figure below.

- Level of Service decreases from LOS D to LOS E at Concord Avenue and Blanchard Road
- Queues lengthen somewhat at Goden Street and Concord Avenue and Hittinger Street and Brighton Avenue

Figure 18 No Build Scenario AM Peak Level of Service



Figure 19 No Build Scenario AM Peak Results

Intersection Name	Existing Conditions			No Build Scenario		
	AM LOS	AM Delay	AM Avg Queue (Worst Approach)	AM LOS	AM Delay	AM Avg Queue (Worst Approach)
Leonard Street / Concord Avenue / Common Street	F	68.8	743 (SB)	F	63.5	728 (SB)
Concord Avenue / Goden Street	D	34.3	74 (NB)	F	96.1	149 (NB)
Concord Avenue / Site Driveway	A	7.7	61 (SB)	B	13.5	89 (SB)
Concord Avenue / Underwood Street	A	8	154 (EB)	A	5.3	98 (EB)
Concord Avenue / Blanchard Road / Griswold Street	D	42.1	381 (EBT)	E	55.4	409 (SB)
Blanchard Road / Hittinger Street	D	26.3	82 (EB)	F	66.7	133 (EB)

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#### Build Scenario Conditions

The Build Scenario assumes implementation of the planned school expansion with a series of associated transportation improvements in order to determine potential impacts and possibilities for mitigation. All build scenarios assumed that all students, including the 7<sup>th</sup> and 8<sup>th</sup> grades added by the school expansion and the new high school students, arrive during the same peak hour. These scenarios also assume a background growth rate of 1% annually with a build year of 2021. Three build scenarios were analyzed to evaluate various circulation configurations, as follows:

- **Scenario 2.1:** This scenario assumes a primary entrance-only driveway to the site opposite Orchard Street at Concord Avenue, without a curb cut allowing through traffic from Orchard Street. A primary exit-only driveway is aligned with Goden Street at Concord Avenue which allows right turns onto Concord Avenue and through movements southbound on Goden Street, but no left turns onto Concord Avenue. This intersection is stop controlled. An entrance and exit driveway is also available at Hittinger Street and Trowbridge Street, which is also stop controlled. Figure 20 below displays the circulation pattern analyzed in this scenario.
  - The large amount of vehicles exiting the school via the Goden Street driveway creates significant queueing for both northbound and southbound traffic
  - Queues at Hittinger and Brighton remain lengthy

Figure 20 Scenario 2.1 AM Peak Level of Service



- **Scenario 2.4:** This scenario assumes a primary entrance and exit driveway is located on Concord Avenue at Goden Street. The intersection of Concord Avenue and Goden Street

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is stop controlled, with free-flowing traffic on Concord Avenue. Vehicles may make all turning movements, allowing access to and from the school from Goden Street and Concord Avenue in all directions. A secondary entrance and exit driveway is located on Hittinger Street at Trowbridge Street. Figure 21 below displays the circulation pattern analyzed in this scenario.

- The large amount of vehicles accessing the school via the Goden Street driveway creates significant queueing for both northbound and southbound traffic
- Queues at Hittinger and Brighton remain lengthy

Figure 21 Scenario 2.4 AM Peak Level of Service



- **Scenario 2.4 with Goden Street Signal:** This scenario assumes a primary entrance and exit driveway is located on Concord Avenue at Goden Street where a traffic signal is implemented to alleviate safety issues and prevent lengthy queueing on Goden Street as vehicles wait to turn left onto Concord Avenue. Vehicles may make all turning movements, allowing access to and from the school from Goden Street and Concord Avenue in all directions. A secondary entrance and exit driveway is located on Hittinger Street at Trowbridge Street. Figure 22 below displays the circulation pattern analyzed in this scenario.
  - Implementation of the signal at Goden Street shortens queues for southbound and northbound traffic while improving safety conditions. LOS at the intersection improves from F in the No Build and 2.4 without signal scenarios to C.
  - Residents on Goden Street have a safer, easier way to make left turns onto Concord Avenue



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- During off-peak hours, the signal can be taken out of operation to avoid undue delay times at the Goden Street intersection
- Queues remain an issue at the intersection of Hittinger and Brighton

Figure 22 Scenario 2.4 with Goden Street Signal AM Peak Level of Service



Intersection analysis results for each build scenario are summarized in the table below for the AM peak (the worst condition observed throughout the day).

Figure 23 Build Scenario AM Peak Results

Intersection Name	Scenario 2.1			Scenario 2.4			Scenario 2.4 with Goden Street Signal		
	AM LOS	AM Delay	AM Avg Queue (Worst Approach)	AM LOS	AM Delay	AM Avg Queue (Worst Approach)	AM LOS	AM Delay	AM Avg Queue (Worst Approach)
Leonard Street / Concord Avenue / Common Street	F	62.5	743 (SB)	F	65.8	738 (SB)	F	67.1	734 (SB)
Concord Avenue / Goden Street	F	93.2	250 (SB)	F	104.7	249 (SB)	C	26.2	186 (NB)
Concord Avenue / Site Driveway	A	3.5	-	A	3.5	-	A	3.7	-
Concord Avenue / Underwood Street	A	9.0	140 (EB)	B	11.6	79 (EB)	A	3.8	28 (WB)
Concord Avenue / Blanchard Road / Griswold Street	E	62.6	768 (WBT)	E	68.2	787 (WBT)	E	66.9	773 (WBT)
Blanchard Road / Hittinger Street	F	150.3	204 (EB)	F	185.7	225 (EB)	F	137.9	203 (EB)

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Hittinger Street / Trowbridge Street / Site Driveway	F	57.7	78 (NB)	F	87.5	69 (NB)	F	59.6	77 (NB)
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The results in Figure 20 indicate that Scenario 2.3 provides significant improvements to delay at Concord Avenue and Goden Street when compared with Scenario 2.1 due to implementation of a traffic signal. Furthermore, implementation of this traffic signal provides improvement when compared with the existing condition at this intersection, which currently operates at LOS D with 34.3 seconds of delay without a traffic signal (see Figure 7). All other intersections operate with similar levels of service across both analyzed build scenarios.

### RECOMMENDATIONS

Given the results of the existing conditions and build scenario analyses, signalization of the Concord Avenue and Goden Street intersection is recommended. Adding a signal at this location will improve safety for pedestrians reaching the school site, reduce delay for residents traveling northbound, and improve overall delay at the intersection when compared with alternatives without a signal. A series of additional transportation improvements to alternative transportation modes and internal site circulation will further improve conditions in the build scenarios.

In order to further reduce impacts from the school site expansion, the following recommendation measures should be considered:

- 1) Site access at Concord Avenue and Goden Street should be signalized
  - a) Signalization will reduce queues on Goden Street
  - b) Allowing left turns at all approaches will eliminate U-turns on Concord Avenue, improving safety conditions
  - c) Signalization makes walking to school safer and easier
- 2) Implement two full access site driveways (one at Goden Street and one at Trowbridge Street) to improve internal site circulation
  - a) Multiple driveways distribute traffic more evenly to reduce queuing while entering and exiting the site
  - b) Fire and safety access is improved when multiple driveways are available
- 3) Provide dropoff loops internal to the site to prevent queues from spilling onto neighboring streets
- 4) Improve walking, biking and transit access
  - a) Add a new walk/bike only gateway on Concord Avenue
  - b) Signalization of Goden Street improves walk and bike access at this intersection
  - c) Improve the walk/bike entry at Underwood Street and Hittinger Street
- 5) Improve overall bicycle access
  - a) Gateway improvements (as previously listed) improve bicycle entry to the site
  - b) New connections to the proposed multi-use path enhance access
  - c) Implement the cross-campus bike path to improve internal site bicycle access



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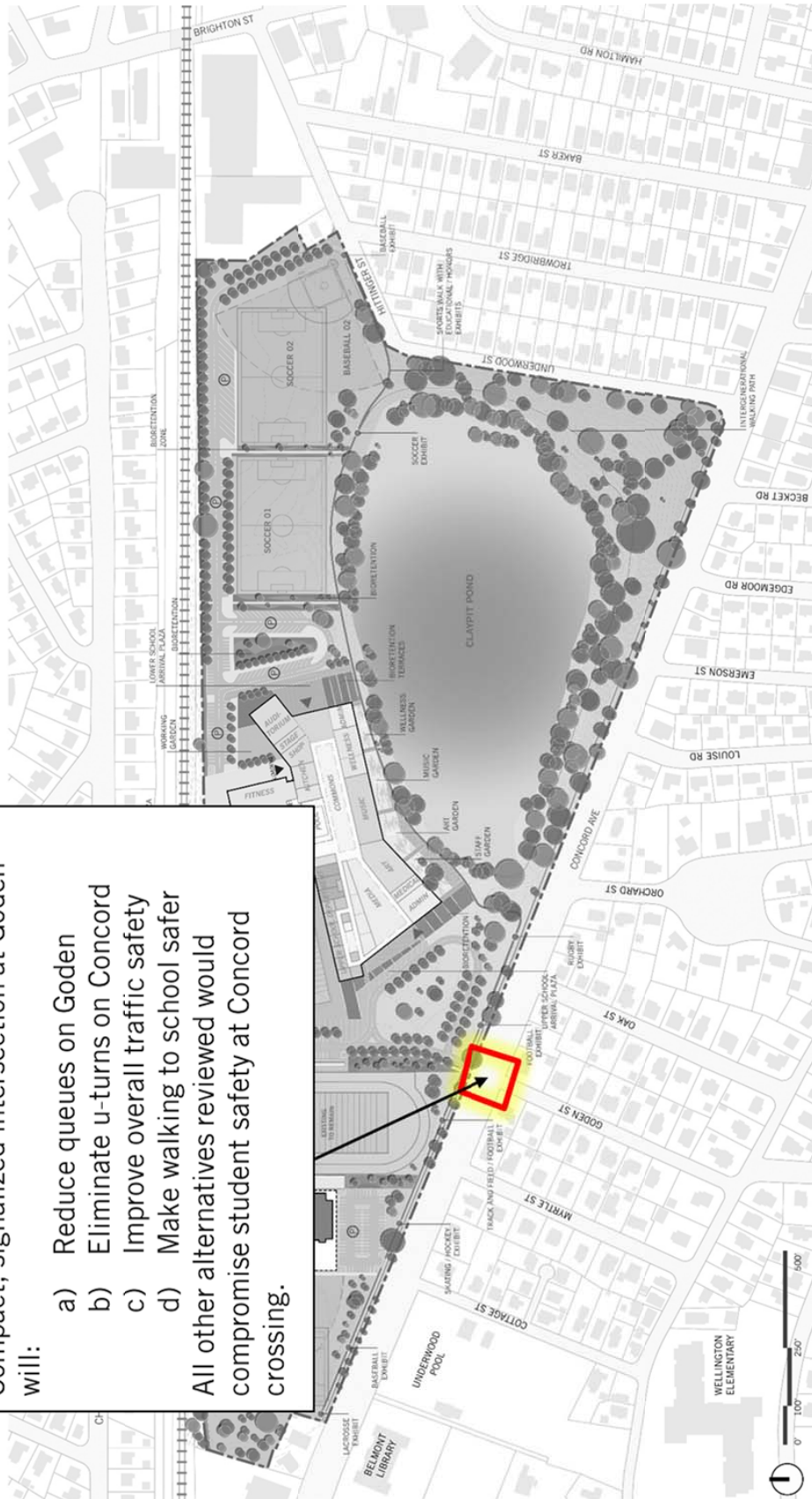
### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT TOWN OF BELMONT

Figure 24 Measure 1: Signalized Intersection at Concord and Goden

Compact, signalized intersection at Goden will:

- a) Reduce queues on Goden
- b) Eliminate u-turns on Concord
- c) Improve overall traffic safety
- d) Make walking to school safer

All other alternatives reviewed would compromise student safety at Concord crossing.

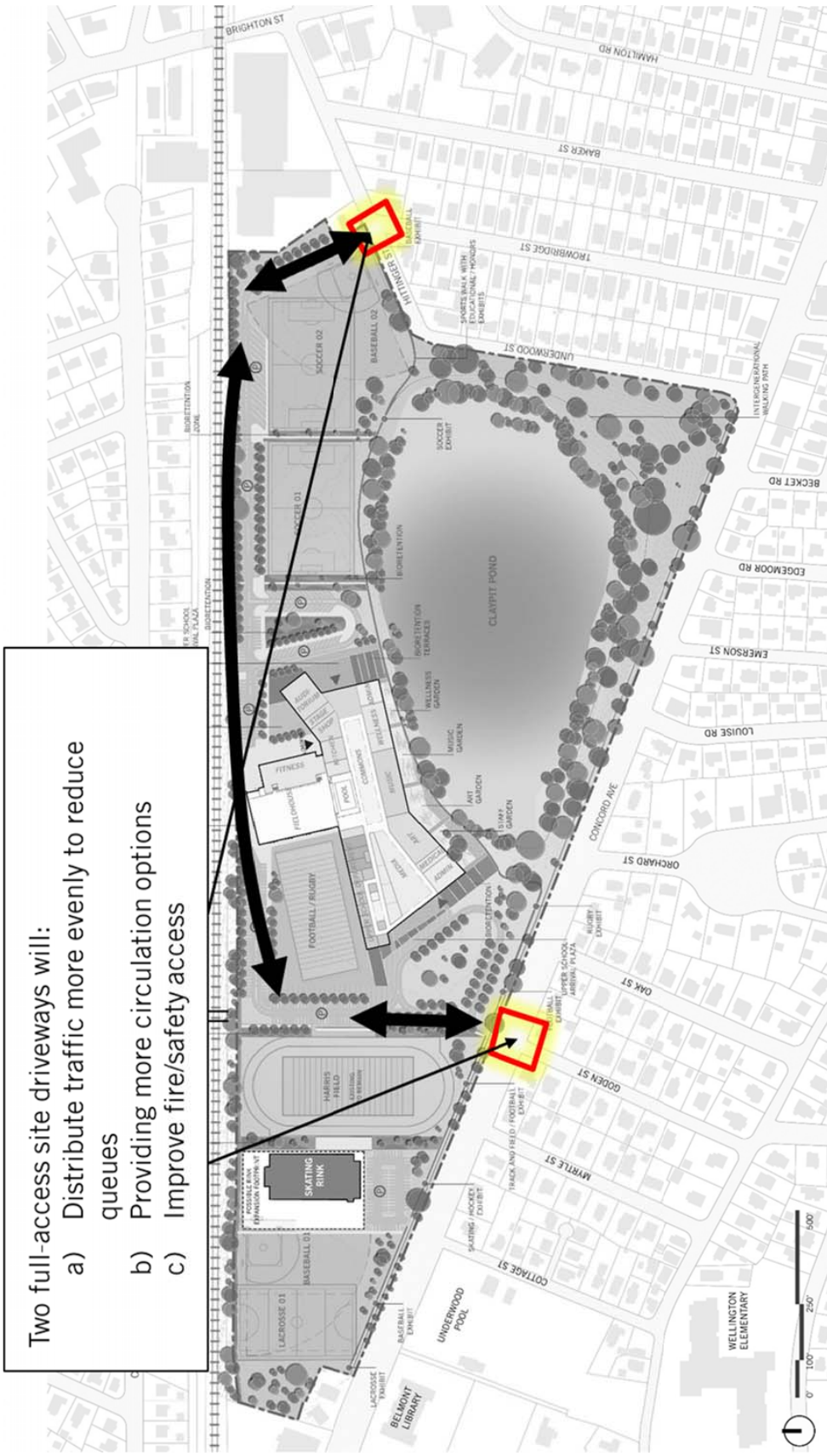




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Figure 25 Measure 2: Two full-access site driveways reduce delays



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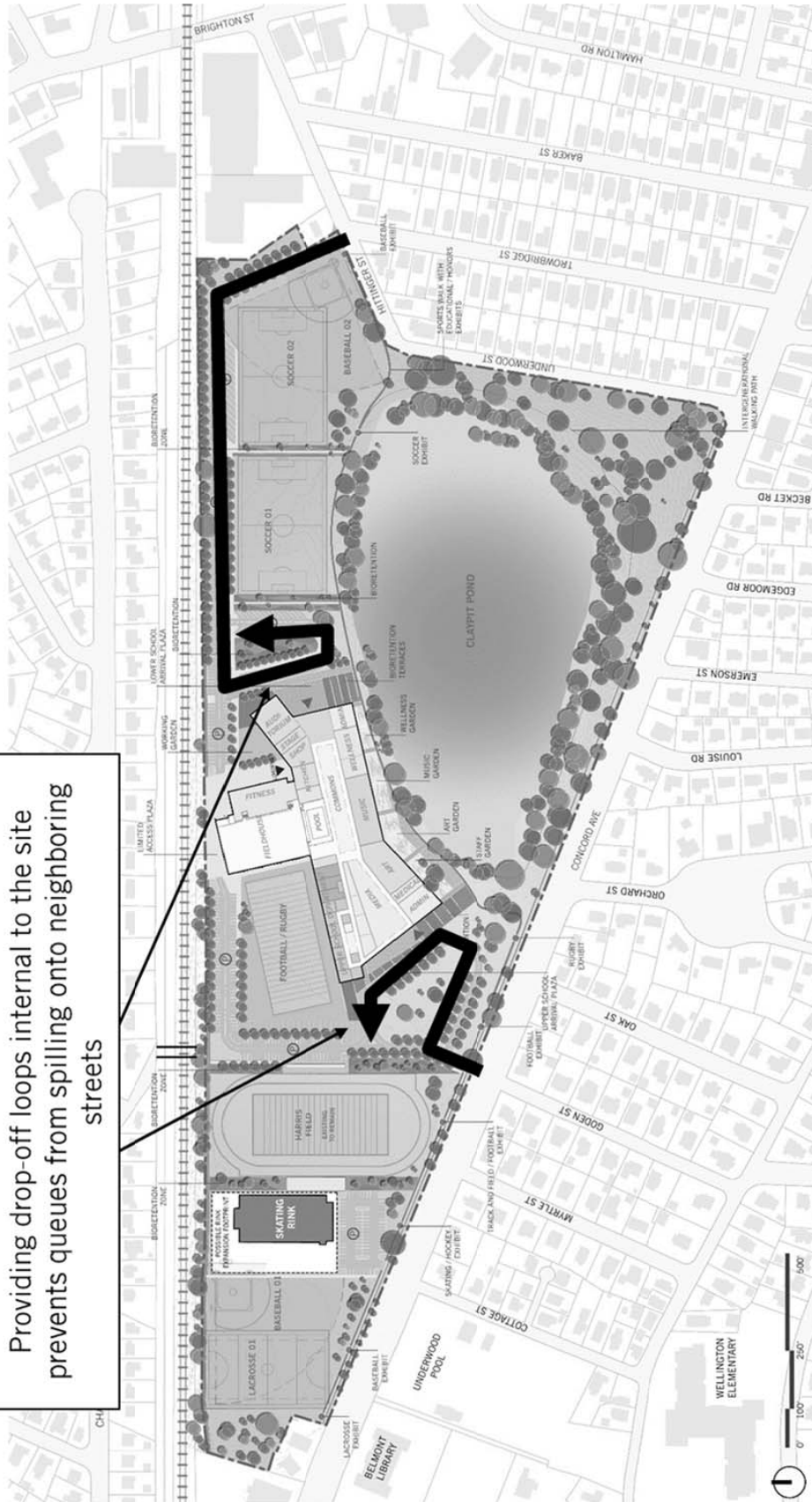
# 3.3.2 - EVALUATION OF EXISTING CONDITIONS

## C. TRAFFIC REPORT

### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT TOWN OF BELMONT

Figure 26 Measure 3: Internal drop-off loops

Providing drop-off loops internal to the site prevents queues from spilling onto neighboring streets

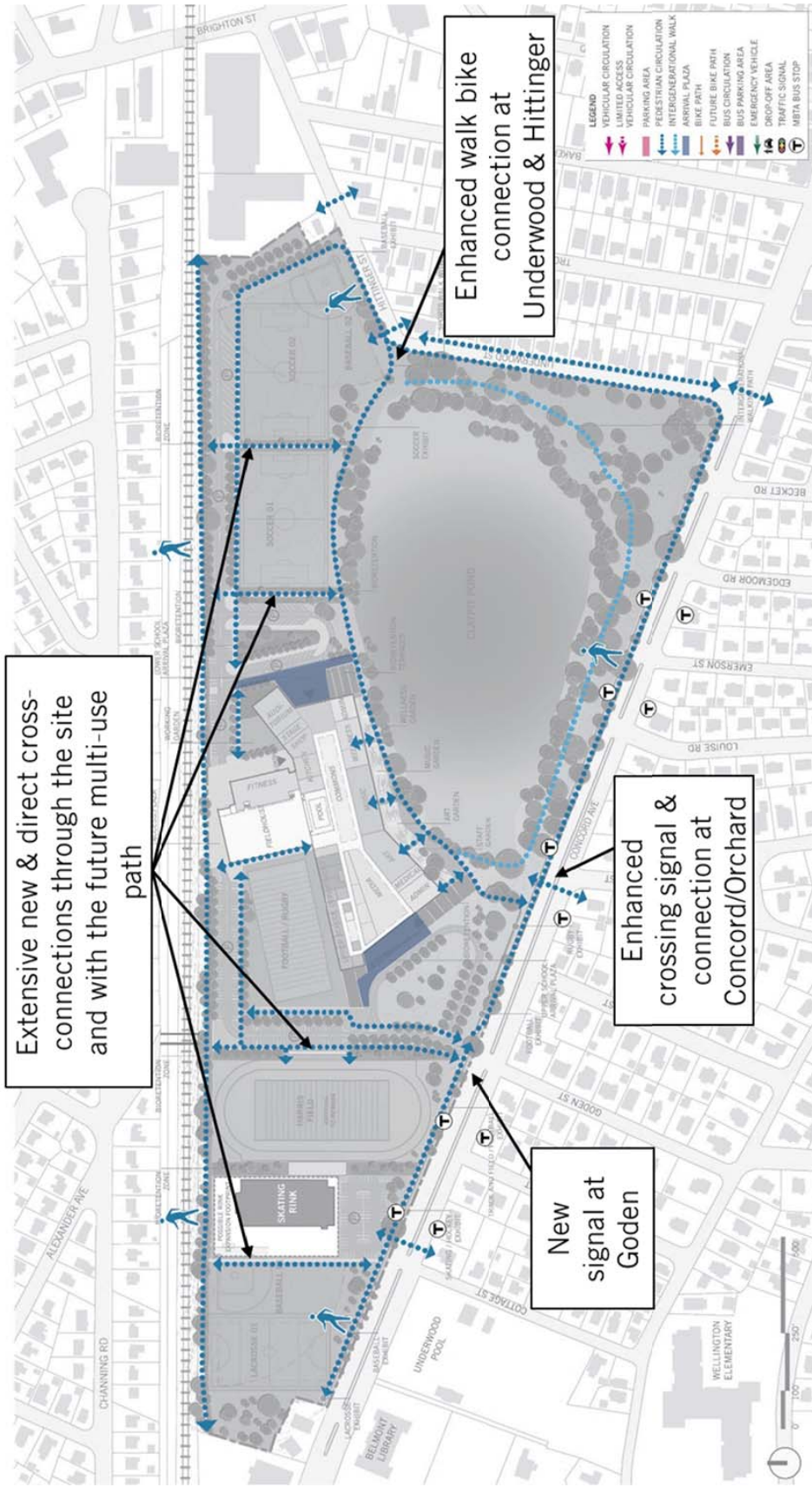




C. TRAFFIC REPORT

BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT  
TOWN OF BELMONT

Figure 27 Measure 4: Enhanced Pedestrian Circulation



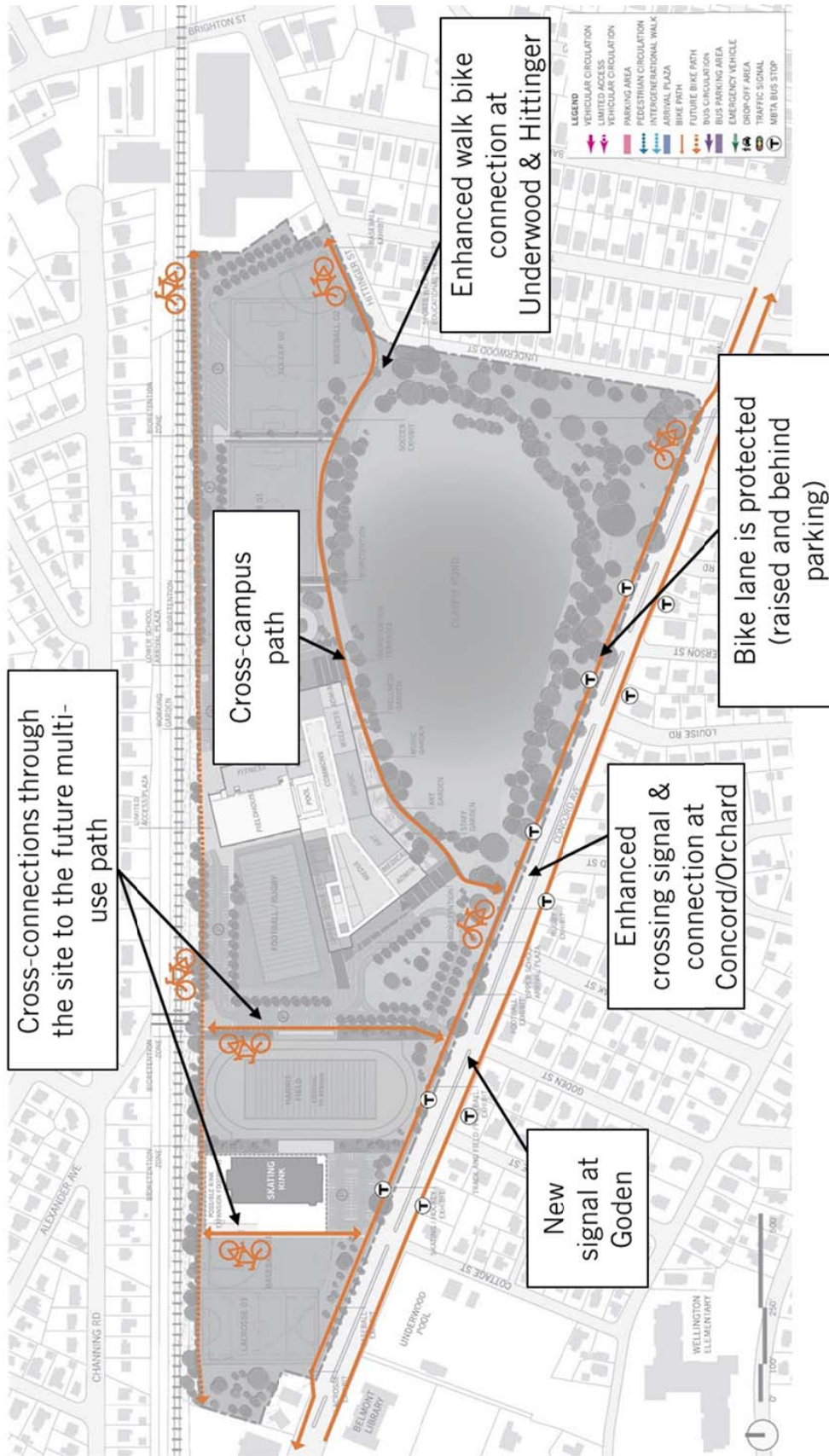
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# 3.3.2 - EVALUATION OF EXISTING CONDITIONS

## C. TRAFFIC REPORT

### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT TOWN OF BELMONT

Figure 28 Measure 5: Enhanced Bike Circulation





C. TRAFFIC REPORT

BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT  
TOWN OF BELMONT

Figure 29 Measure 6: Mitigating spillover parking effects



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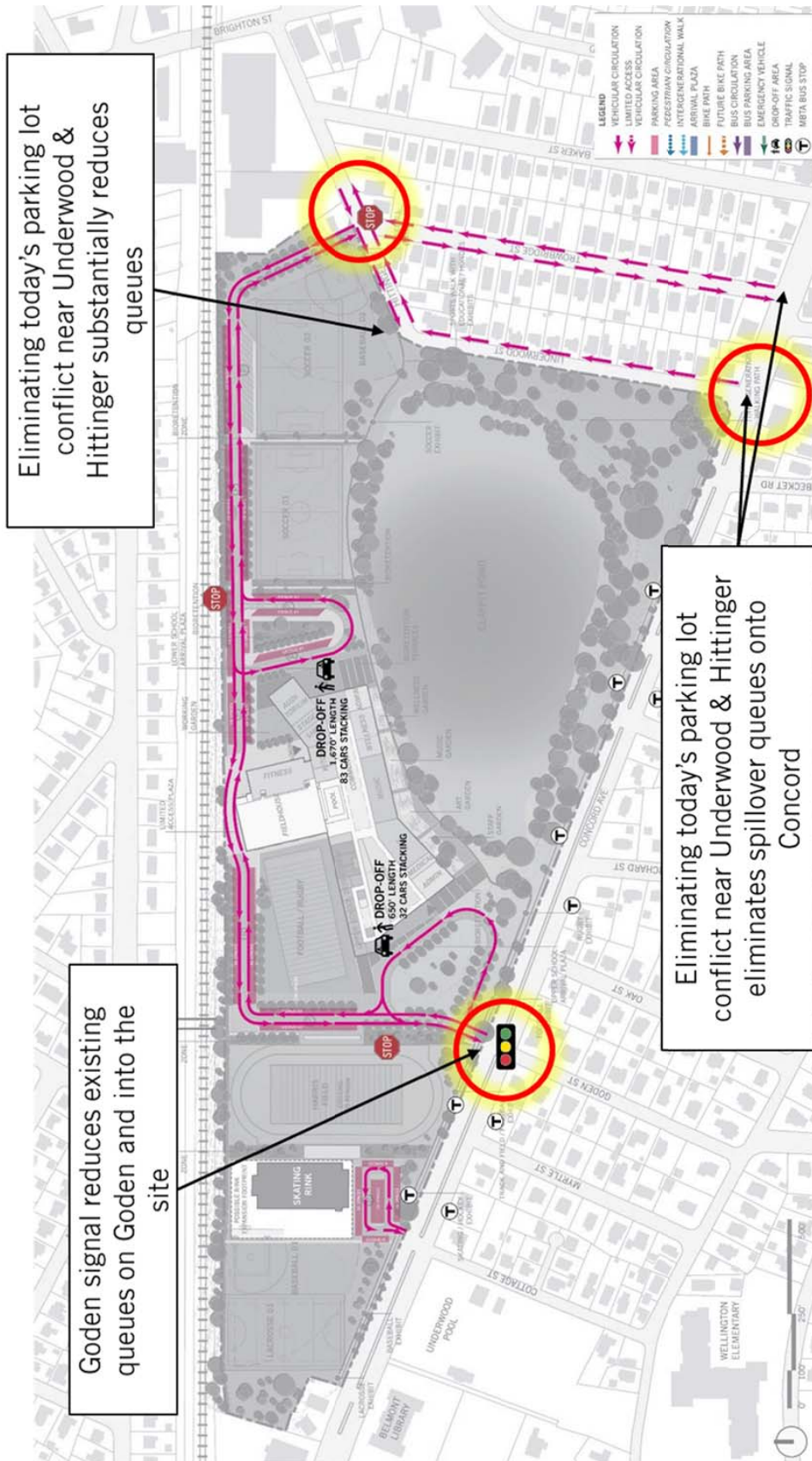
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# 3.3.2 - EVALUATION OF EXISTING CONDITIONS

## C. TRAFFIC REPORT

### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT TOWN OF BELMONT

Figure 30 Measure 7: Reduced delays & queues at all intersections



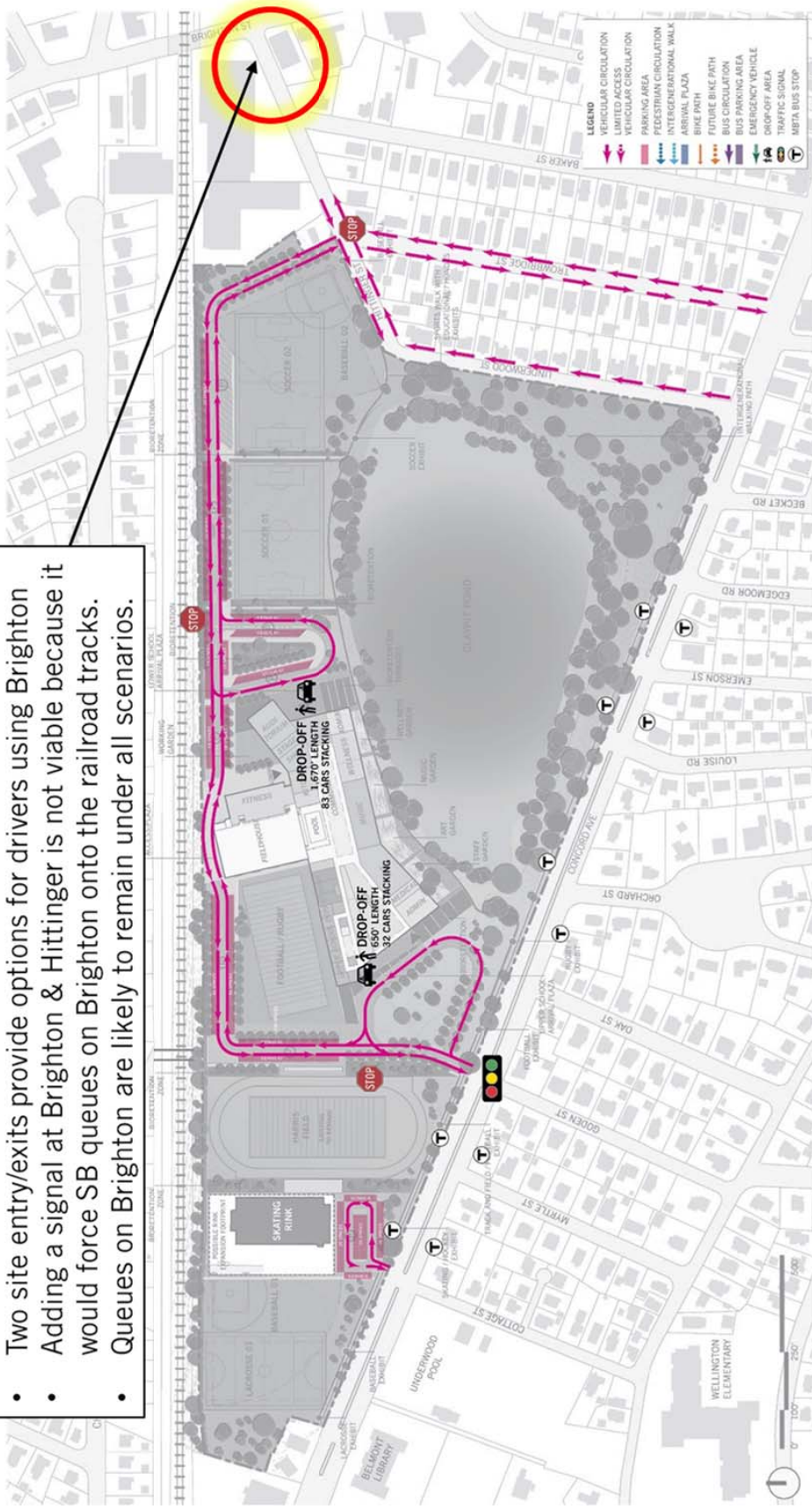


C. TRAFFIC REPORT

BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT  
TOWN OF BELMONT

Figure 31 Measure 8: Neutral impacts on Hittinger at Brighton

- Two site entry/exits provide options for drivers using Brighton
- Adding a signal at Brighton & Hittinger is not viable because it would force SB queues on Brighton onto the railroad tracks.
- Queues on Brighton are likely to remain under all scenarios.



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# 3.3.2 - EVALUATION OF EXISTING CONDITIONS

## C. TRAFFIC REPORT

### BELMONT HIGH SCHOOL TRAFFIC STUDY - EXISTING CONDITIONS REPORT TOWN OF BELMONT

Figure 32 Measure 9: Enhanced Emergency Vehicle Circulation



# 3.3.3 FINAL EVALUATION OF ALTERNATIVES

OPTION 3.1	OPTION 2.3	OPTION 1
<i>Prospective Site Analysis</i> A	<i>Prospective Site Analysis</i> A	<i>Prospective Site Analysis</i> A
<i>Construction Impact</i> B	<i>Construction Impact</i> B	<i>Construction Impact</i> B
<i>Concept drawings</i> C	<i>Concept drawings</i> C	<i>Concept drawings</i> C
<i>Structural Systems</i> D	<i>Structural Systems</i> D	<i>Structural Systems</i> D
<i>Site Utilities</i> E	<i>Site Utilities</i> E	<i>Site Utilities</i> E
<i>Building Systems</i> F	<i>Building Systems</i> F	<i>Building Systems</i> F
<i>Cost Estimates</i> G	OPTION 2.4	OPTION 2.1
<i>Permitting Requirements</i> H	<i>Prospective Site Analysis</i> A	<i>Prospective Site Analysis</i> A
<i>Design &amp; Construction Schedule</i> I	<i>Construction Impact</i> B	<i>Construction Impact</i> B
<i>Preliminary Design Pricing</i> J	<i>Concept drawings</i> C	<i>Concept drawings</i> C
<i>Qualitative Matrix</i> K	<i>Structural Systems</i> D	<i>Structural Systems</i> D
	<i>Site Utilities</i> E	<i>Site Utilities</i> E
	<i>Building Systems</i> F	<i>Building Systems</i> F

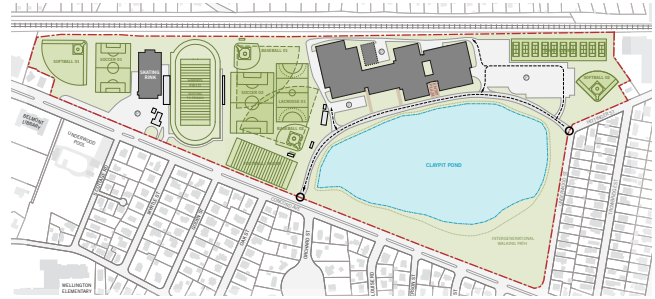
# 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

## INTRODUCTION

The five final options consisted of the following:

- 1. OPTION 1: Base repair only
- 2. OPTION 2.1: Major renovation minor addition
- 3. OPTION 2.3: Minor renovation major addition
- 4. OPTION 2.4: Minor renovation major addition
- 5. OPTION 3.1: New construction

The decisions that lead to the determination of the final five options have been reviewed in Section 3.3.1 Introduction.



OPTION 1



OPTION 2.1



OPTION 2.3



OPTION 2.4



OPTION 3.1

# OPTION 1 - BASE REPAIR ONLY

## SUMMARY

The Base Repair Option retains the building as it is currently configured. The existing Belmont High School requires significant systems upgrades. While well maintained, most of the existing systems have not been upgraded or replaced since the building was constructed in 1970 (over 47 years ago).

The required upgrades in the Base Repair Option include, but are not limited to, interior finishes, replacement of windows, envelope repair, replacement of all MEP systems, and life safety. Upgrades that bring the building up to current accessibility standards are also required effecting all communicating stairs, egress stairs, ramps, door hardware, casework, elevators and signage as well as other architectural systems. The existing building requires replacement of all hardware, lighting fixtures and built-in casework. It should be noted that if any repairs, renovations, additions, or change of occupancy are made to the existing structures, a check for compliance with 780 CMR, Chapter 34 "Existing Building Code" (Massachusetts Amendments to The International Existing Building Code 2015) of the Massachusetts Amendments to the International Building Code 2015 (IBC 2015) and reference code "International Existing Building Code 2015" (IEBC 2015) is required. The intent of the IEBC (and the related Massachusetts Amendments to IEBC) is to provide alternative approaches to alterations, repairs, additions and/or a change of occupancy or use without requiring full compliance with the code requirements for new construction.

The current square footage of the existing Belmont High School is 257,120 square feet, which is too small to accommodate even the smallest MSBA program requirement for grades 9-12. The developed summary indicates a Gross Square Footage for grades 9-12 of 343,494 GSF which is 86,374 GSF over the existing BHS building. As a result, it can be stated that this option does not solve either the educational or capacity requirements for the grade configuration approved by the Belmont School Committee. Much of the teaching space that exists is severely compromised by its proximity to the existing, highly used MBTA commuter rail line to the north of the site. This adjacency, which produces noise, vibration, particulate and safety issues cannot be overstated as it has a significant influence on any option's academic evaluation.

## SITE STRATEGY

Site circulation and building position for the Base Repair Option would remain unchanged with a single access point into the site from the east and a single exit to the west. With added bus and

drop-off traffic due to the changing grade configuration the renovation and associated site work would do little to alleviate current traffic issues related to school vehicular circulation.

The existing playing fields are currently constrained by the drop-off road and required parking, many are configured in sub-optimal orientation. Given the road and parking constraints it would be difficult to reorient them for safer game play.

The construction phasing of the Base Repairs Option would require significant moving of students around the existing facility to complete the phased renovations at the BHS Facility. Given the constraints of the existing building, the intensity of athletic and recreational site use and the absence of available swing space in the Town of Belmont to accommodate all of the school's population, it could be anticipated that modular classrooms would need to be employed to house students during the multi-year construction period. Finding available space on site for modular classrooms would likely displace athletic and recreational programming.

## SUSTAINABILITY AND BUILDING PERFORMANCE

The following sustainability and resiliency attributes have been considered in evaluating this option:

ENVELOPE- Limited thermal and vapor performance upgrades would be executed making meeting the community's performance goals difficult. Exploring over-cladding or skin replacement would still produce significant thermal bridging.

ORIENTATION- The orientation is fixed making optimized daylighting challenging for existing east and west facing learning environments.

SKIN TO VOLUME RATIO- The skin to volume ratio of the base repair scheme is fixed.

WINDOW TO WALL RATIO- The window to wall ratio of the base repair scheme is fixed making daylighting and heat gain optimization challenging.

PV POTENTIAL- The ability to retrofit the existing roof structure is challenged by the placement of existing mechanical equipment and shafts as well as the roof's structural capacity.

SITE ENVIRONMENTAL PERFORMANCE- This scheme allows for one large geo-exchange field but allows limited performative landscape to deal with storm water quality and quantity due to the position of the existing road.



## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### A. PROSPECTIVE SITE ANALYSIS - OPTION 1

#### SITE

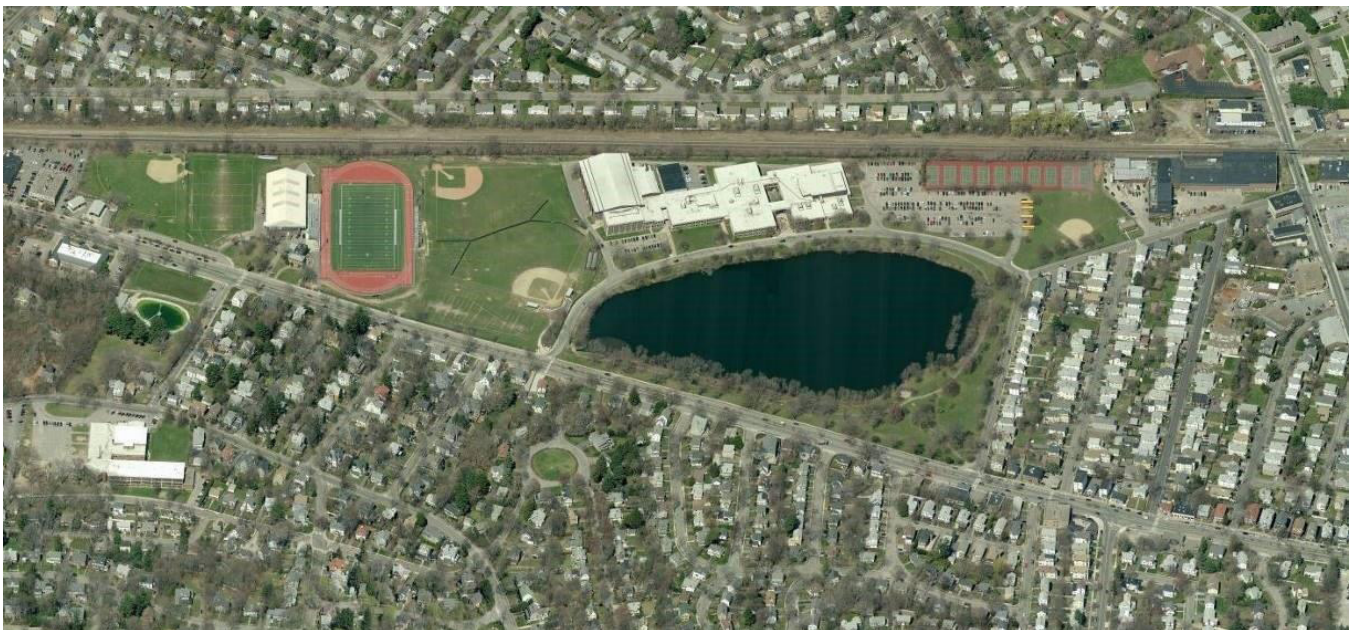
This narrative provide an analysis of the option including natural site limitations, building footprint(s), athletic fields, parking areas and drives, bus and parent drop-off areas, site access, and surrounding site features. This narrative excludes temporary site facilities, phasing implications, site drainage, utilities and permitting requirements addressed separately.

Harris Field including the track and supporting facilities are existing to remain. Spatial accommodations have been made in the site planning for the school project to accommodate a multi-modal community path along the north property line abutting the MBTA right-of-way and a multigenerational path around Clay Pit Pond – both with separate funding and implementation timelines. The school building project site design is anticipated to incorporate the portion of the multigenerational path that connects across the north side of Clay Pit Pond, as that will serve as a vital link between the school's site program elements and circulation through the campus.

The existing school building is located on higher ground north of Claypit Pond towards the rear (north) of the site. The primary vehicular (car and bus) circulation and drop-off is a one-way loop from east (Hittinger Street) to west (Concord Avenue). The main pedestrian entrances are the

south sides of the building. Buses drop off and pick up students along the south side of the building. The site has three primary parking areas. The largest parking lot (292 spaces) is located to the east of the school building. Small lots are located to the south (36 spaces) and north (21 spaces) of the building. Nine buses currently park along the far east side of the east parking lot. All parking areas contain accessible parking.

Most of the school's athletic facilities are located west of the school building including two baseball fields (varsity is played on Grant Memorial Field which includes bleacher seating, dugout shelters and a prominent gateway) with rectangular field layouts (for soccer and field hockey) overlapping their outfields, a rugby/football practice field and Harris Field which includes a running track and synthetic turf field, home and away bleachers and sports lighting. An indoor skating rink in poor condition and a football field house separate these fields from the varsity softball field further west with lighting and a soccer/lacrosse field overlapping the outfield. Ten tennis courts are located adjacent to the east parking area and the junior varsity softball field is located further east of the primary east parking area.





## A. PROSPECTIVE SITE ANALYSIS - OPTION 1

### BASE REPAIRS

The Base Repairs option addresses the deteriorated physical conditions and code non-compliance. Site repairs are limited to repairing deficient areas and extending the life cycle of the site materials without any changes to the site layout. Areas on non-code compliance will be addressed to meet current minimum code. Scope of repairs includes but is not limited to pulverizing, blending and repaving all vehicular asphalt paving, replacement of all curbing, manhole rim resetting, parking/traffic striping, walkway pavement replacement in kind (asphalt and concrete). Code compliance includes the addition of accessible walks to all exterior doors and to each athletic field, adding pedestrian guardrails and handrails where required and installation of accessible ramps and curb cuts.

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### 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

#### B. CONSTRUCTION IMPACT - OPTION 1

Option 1 would require major renovations within the existing occupied school and would be undertaken in 3 or 4 phases. Modular classrooms would also be required on site to provide necessary swing space during renovations. The anticipated construction schedule is 48 months.

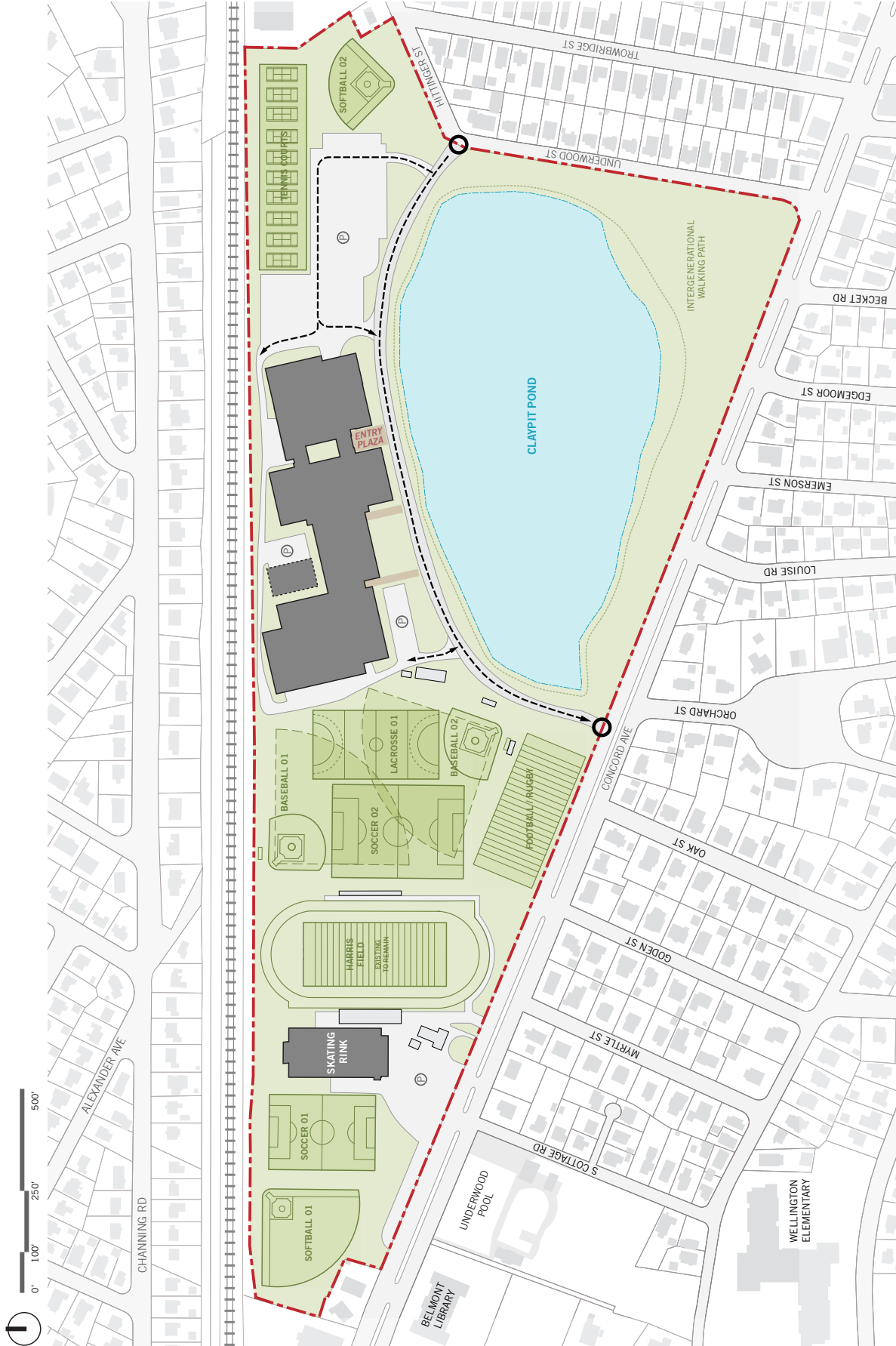
Work under this would be very disruptive to students and staff. Students would be forced to move three to four times to accommodate the multiple construction phases. Disruption from noise, dust, odors and construction traffic could be anticipated.

The detailed plan for phasing and swing space would be determined during schematic design to best coordinate with the educational programs to minimize the impact on students and staff.

#### OPTION 1 - I. DESIGN AND CONSTRUCTION SCHEDULE

Anticipated MSBA Approval of PSR	April 10th, 2018 (MSBA Board Meeting)
Anticipated MSBA Approval of SD	August 29th, 2018 (MSBA Board Meeting)
Special Town Meeting/Ballot Vote	November 2018
Design Development Complete	November 2018 - April 2019
Construction Documents Complete	May 2019 – January 2020
Bid and Award	February 2020 - March 2020
Construction (multiple phases)	April 2020 – March 2024 (48 months)

C. CONCEPT DRAWING - OPTION 1/ Site



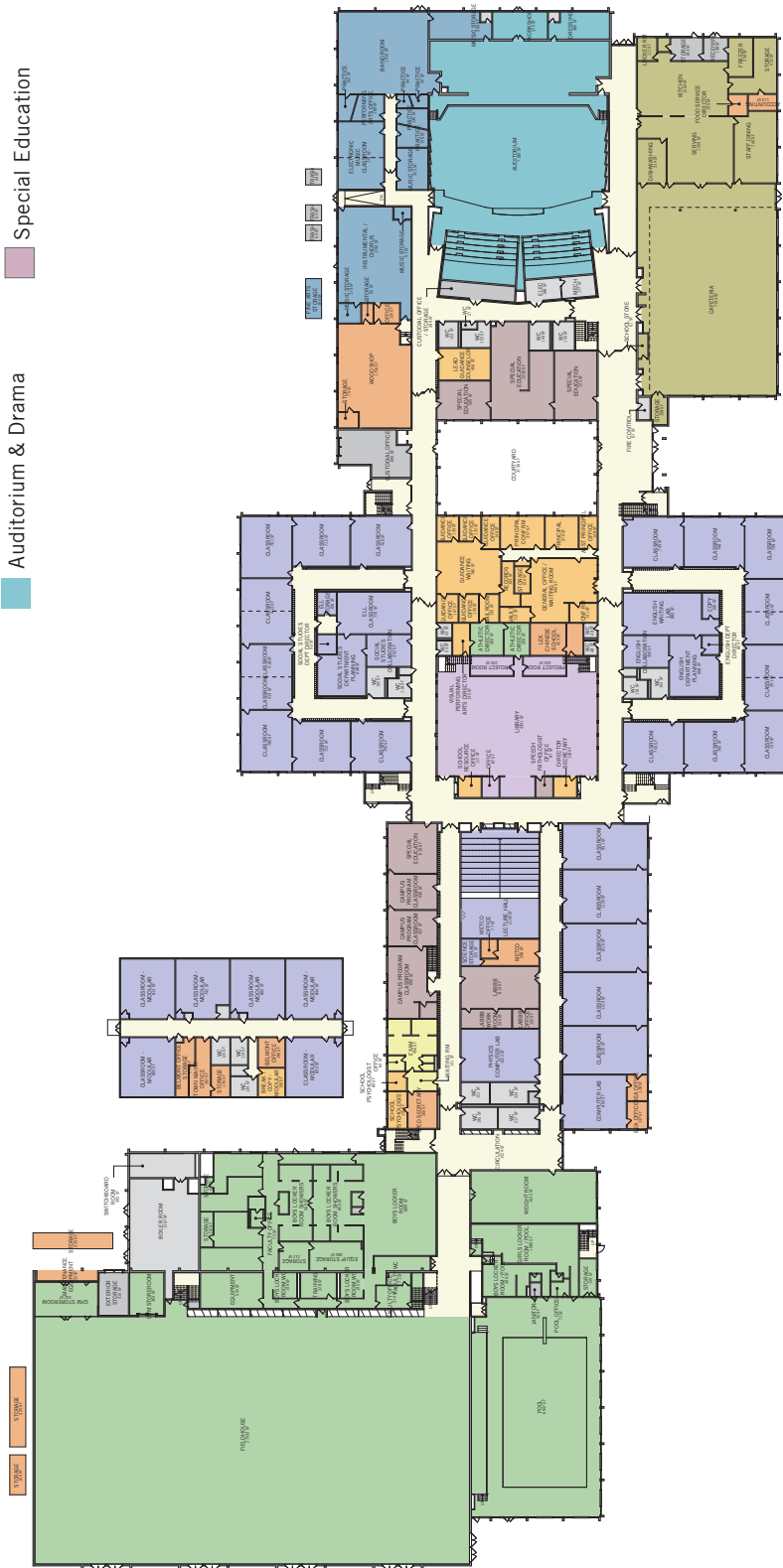
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# 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

## C. CONCEPT DRAWING - OPTION 1/ Architectural

### 3.3.3 BELMONT HIGH SCHOOL : LEVEL 01 FLOOR PLAN

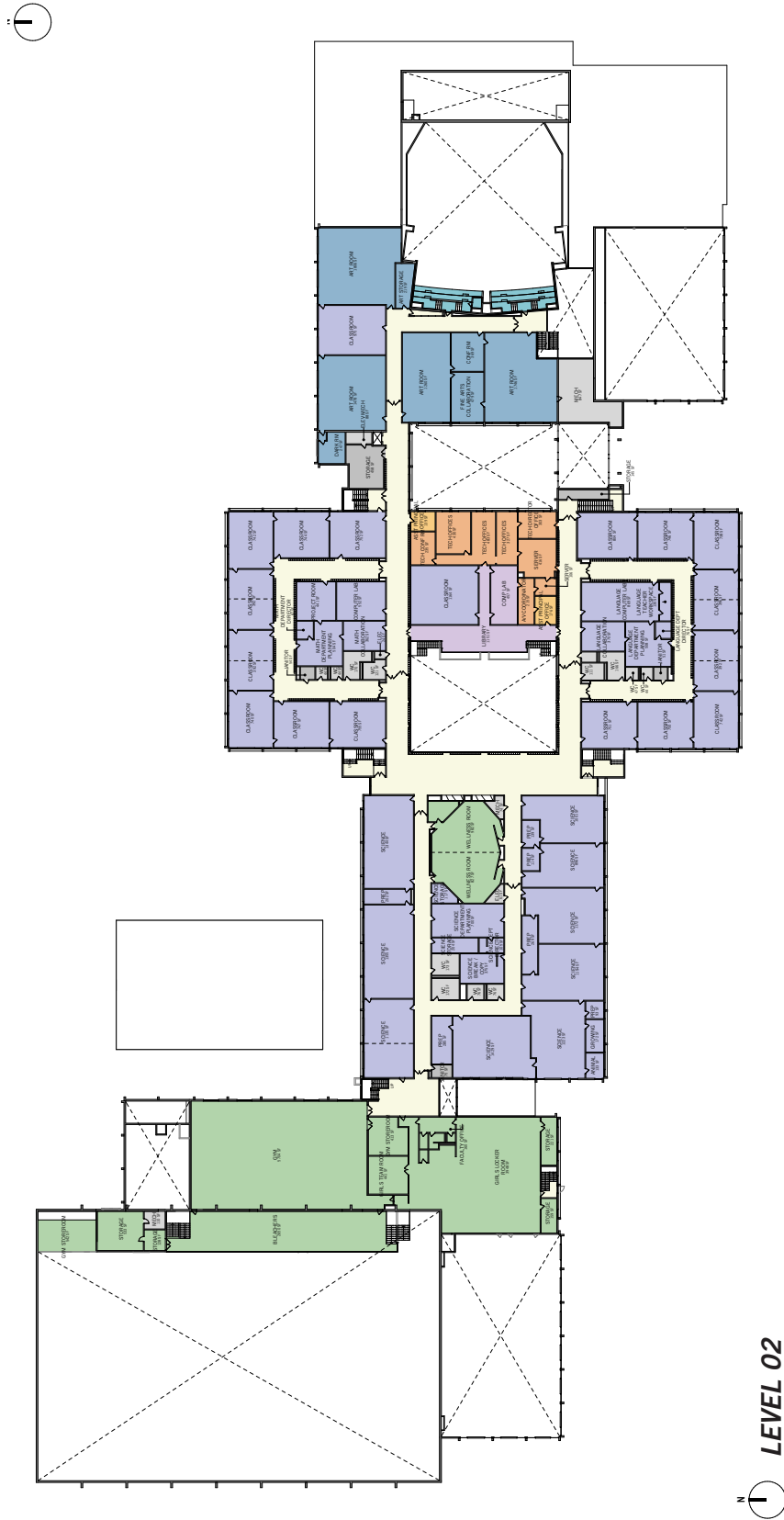
- Core Academic
- Art & Music
- Administration & Guidance
- Health & Physical Education
- Media Center
- Auditorium & Drama
- Dining & Food Service
- Medical
- Circulation
- Custodial & Maintenance
- District Offices
- Special Education



N  
LEVEL 01

C. CONCEPT DRAWING - OPTION 1/ Architectural

3.3.3 BELMONT HIGH SCHOOL OPTIONS : LEVEL 02 FLOOR PLAN



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# 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

## D. STRUCTURAL SYSTEMS - OPTION 1

**BELMONT HIGH SCHOOL**  
Belmont, Massachusetts

*Structural Narrative*  
Base Repair Only

### **BELMONT HIGH SCHOOL** **Structural Narrative** **Base Repair Only** January 22, 2018

#### **PROPOSED SCHEME – Base Repair Only**

The proposed scheme will require repairs and only minor renovations and upgrades to the existing school triggered by requirements for compliance with the International Existing Building Code. All of the proposed renovations will essentially be Architectural in nature and will require no major reconfiguration of the structure. The proposed scheme requires replacement of all mechanical equipment, and renovations related to ADA requirements.

#### **PRIMARY STRUCTURAL CODE ISSUES RELATED TO THE EXISTING STRUCTURE**

Based on the proposed scope, we would recommend following the compliance requirements of the Prescriptive Compliance Method since it will be the most cost effective method for this proposed scheme. If there is no reconfiguration of demising walls or spaces then there is no requirement to clip masonry walls since the work area as defined in the International Existing Building Code is less than 50% of the aggregate floor area of the building

#### **PROPOSED STRUCTURAL SCHEME**

The proposed scheme does not call for any reconfiguration of the existing structure. The structural scope is essentially what is triggered by following the compliance requirements of the Prescriptive Compliance Method.

Based on the scope of the proposed scheme, no structural upgrades are triggered or required.

The replacement mechanical units can be supported on the existing framing, if the proposed units are lighter in weight than the existing units. Some of the mechanical equipment may be required to be supported on dunnage platforms. Allow for costs for reinforcement of the roof structure as a percentage of the cost of the mechanical units.

For the renovations related to ADA requirements new ramps will be required on grade and on supported floors, it is possible that a new elevator may be required. The ramps on grade will be a minimum of 12" thick reinforced structural slabs supported on piles. For the ramps on supported floor, the existing framing would require to be reinforced. Pits for any proposed elevator would have to be supported on piles.

## E. SITE UTILITIES - OPTION 1

### SITE UTILITIES

#### Storm Drainage

Record drawings from the Belmont High School 1968 plans indicate that the stormwater from the site appears to be collected by three separate drainage systems and flow to Claypit pond. There appear to be no stormwater quality measures implemented on the site and no known detention, retention, or infiltration systems. To address stormwater quality, new water quality units, similar to Stormceptors would be installed prior to each of the three outfalls. Do to the size of the lines leading to the outfalls, the water quality units would need to be installed in an offline configuration, which requires at least two additional manholes and associated piping per unit.

#### Sewer

The sewer system for the school is currently serviced by five sewer services connecting to the 24-inch sewer main in the school driveway. Sanitary sewer flows from portions of the cafeteria (pot sinks, dish washers, floor drains, etc.) would need to be separated out from the other flows and directed through a new 10,000-gallon external grease trap. The grease trap would need to be vented, with the vent running back to the school and up to the roof. Additional piping and at least one new sewer manhole would be required to direct flows from the grease trap back to the sanitary sewer main.

#### Water

A new 6-inch fire service to the mechanical room from the existing water main that loops through the rear of the school site would need to be installed. The new service would be approximately 80 feet in length.

Three new fire hydrants would be installed along the front of the school to provide sufficient hydrant coverage for the fire department. Approximately 1,000 linear feet of new 6-inch water main would need to be installed along the front of the school to serve those new hydrants.

#### Natural Gas

The existing gas service would be maintained in place unless the mechanical renovations require the line size to be increased. If a new, larger gas service is required, it would be installed along the same route as the existing line.

#### Electrical

The existing electrical conduits would be maintained. If

required, new conductors could be installed in the existing conduits.

#### Pavement

Full-depth reconstruction of the access drive at the rear of the school would be required as part of any major renovation. The remaining site pavement would be milled and overlaid.

### PRELIMINARY PERMITTING CONSIDERATIONS

#### Wetlands Protection Act (310 CMR 10.00)

A Notice of Intent would need to be filed with the Town of Belmont Conservation Commission for any work within 100-feet of Clay Pit Pond. In addition, a Stormwater Pollution Prevention Plan (SWPPP) would need to be prepared and an application filed with the Environmental Protection Agency under the National Pollutions Discharge Elimination System (NPDES) program for the construction related activities. Erosion control measures will need to be installed and maintained in good working order around the perimeter of the site.

#### Flood Plain

Based on the Flood Insurance Rate Map (FIRM), Community Panel Number 25017C0418E dated June 4, 2010, the portions of the existing High School site are located within Zone X (Areas determined to be outside the 0.2% annual chance floodplain). There is no regulatory requirement for working within a Zone X. The Zone AE, which is associated with the 100-year flood area, is located in close proximity to the banks of Clay Pit Pond. None of the existing building or any critical infrastructure is currently understood to be within the Zone AE.

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / PFP - OPTION 1

#### FIRE PROTECTION

- A. To comply with current codes, this building will require a complete sprinkler system installation per the Massachusetts State Building Code, Chapter 34. The Fire Protection system would be designed to meet the requirements of NFPA 13 “Installation of Sprinkler Systems” and Chapter 9 of the Massachusetts State Building Code, 780 CMR, “Fire Protection Systems”.
- B. A new dedicated 8” sprinkler service, connected to the town water system in the street, should be brought into the building. The exact entrance location will need to be coordinated with the Architect. As the sprinkler service enters the building a Massachusetts approved double check valve backflow preventer assembly, complete with OS&Y valves on the inlet and outlet, will be required.
- C. The alarm check valve for the sprinkler system will be installed on the riser after the double check valve assembly in the water service entrance room. The alarm check valve will be complete with a standard trim package including pressure gauges, retard chamber, 2” main drain, water flow indicator and supervisory switches.
- D. The main feeds out to the system from the alarm check valve will extend out to the building through the first floor ceiling space. The piping will then extend to all areas of the building so that each section of the building and each floor can be divided into separate zones.
- E. Due to the building being only two stories the Massachusetts State Building Code does not require a standpipe system throughout the School. However, regulations governing Auditoriums and Stages will require standpipes at each side of the backstage areas.
- F. The sprinkler system risers will feed the sprinkler system at each floor level. Each floor will be a separate zone. The floor control assembly off of the standpipe which feeds each floor will contain a flow switch and tamper switch. An inspector’s test connection will be installed on the floor control valve station. If the stage is greater than 1,000 square feet then the fire department valves are located on each side of the stage.
- G. Sprinkler heads throughout the facility where gypsum or suspended ceiling are installed will be glass bulb, quick response, chrome plated semi-recessed type. In areas where no ceilings are installed brass upright sprinklers will be installed. Where upright sprinklers are subject to potential damage, such as in storage rooms, protective cages will be installed. In areas where it is not possible to run piping above the ceiling the use of sidewall sprinkler heads would be recommended.
- H. Sprinkler piping for the system will be as follows: Piping 2” and smaller shall be schedule 40 black steel with cast iron fittings with threaded joints. Piping 2 ½” and larger shall be Schedule 10 black steel with malleable iron fittings with rolled grooved joints.
- I. All tamper and flow switches installed on the sprinkler system will be connected to the buildings fire alarm system. Each tamper and flow switch will be a dedicated point on the fire alarm system.
- J. The exterior fire department connection for the sprinkler system will be a flush type mounted on the exterior of the building within 100’ of a fire hydrant. Final location of this connection will be coordinated with the Belmont Fire Department. An additional fire hydrant may need to be added on the site to be within the required distance of this connection.
- K. The hydraulic requirements for the building will be as follows:
- a. Light Hazard - All offices, corridors and the auditorium hydraulically calculated to deliver 0.1 gpm per square foot over the most remote 1,500 square feet.
  - b. Ordinary Hazard - All storage rooms and mechanical rooms hydraulically calculated to deliver 0.15 gpm per square foot over the most remote 1,500 square feet.
  - c. Ordinary Hazard Group II - The stage area hydraulically calculated to deliver 0.2 gpm per square foot over the most remote 1,500 square feet.

#### PLUMBING

##### A. Plumbing Fixtures

- 1) The majority of water closets, urinals and lavatories in the building are old and not current water conserving type. Removal of all fixtures is recommended as

## F. BUILDING SYSTEMS / PFP - OPTION 1

the existing fixtures have reached the end of their serviceable life. Water closets should be replaced with new low-flow flush valve fixtures (1.6 gpf or less). Urinals should be replaced with 0.25 gpf fixtures. Lavatories should be replaced and new low-flow type faucets (0.5 gpm or less) added with temperature limit stops which will deliver water with a maximum temperature of 110°F. ADA requirements will also need to be met during a renovation to the toilet rooms.

- 2) The state plumbing code dictates the number of plumbing fixtures required in a building. Minimum plumbing fixture requirements will be determined once the total occupancy numbers for the building have been established based on the final plan layout.

### B. Domestic Cold Water System

- 1) The 6" water line that enters the building is the original service to the building. Although the 6" line which feeds the domestic water service appears to be adequate to meet the current building water requirements, this would be a good time to bring in a new 6" dedicated domestic water service since a new 8" service would be brought in to feed the proposed sprinkler system. The installation of a water meter on the new service would also be recommended.

### C. Domestic Hot Water System

- 1) The existing steam water heaters serving the larger portions of the building are original to the building and have passed their useful life expectancy. Also with the use of these steam water heaters the boilers are required to operate during the summer months to allow hot water to be created for the building. It is recommended to install new gas-fired storage type water heaters in the same locations as the existing. It is also recommended that redundant water heaters be included in the new system design. This would allow the system to continue to deliver hot water if one of the water heaters were to need service. The water heaters would be sized to serve the existing fixtures as well as any planned additions to the building.
- 2) The existing electric water heaters serving the various wings of the building are older and have passed their useful life expectancy. These should be replaced with

new electric water heaters of similar size.

### D. Sanitary and Vent System

- 1) The sanitary system in the existing building appears to be in good condition but replacement may be required as a consequence of a possible fixture count change and probable relocation of fixtures in the renovation plan. Any new piping would connect to the existing waste and vent piping at a convenient point to be determined by further investigation.

### E. Storm Drainage

- 1) The existing building roof drainage appears to be in good condition and no replacement is required. The roof itself appears to be in good condition and leaks around the roof drains themselves have not been reported.
- 2) Backwater valves should be installed on all interior storm system piping originating from roof drains on lower roof sections as per the state plumbing code.
- 3) Opportunities for the management and /or re-use of the storm water drainage should be explored with the civil engineer to determine if there could be any benefit to the school.

### F. Natural Gas System

- 1) Currently the existing gas service is more than adequate to meet the school's demand requirements. Any new gas-fired kitchen equipment can be connected to the new capped gas service located just outside of the building near the kitchen.

### G. Insulation

- 1) The insulation that currently exists should be tested to determine the extent of any hazardous materials. The insulation should be removed and replaced with new fiberglass insulation with an all service jacket. Piping which is not currently insulated should have new insulation installed.
- 2) Insulation will also need to be provided on waste piping and water piping below handicapped lavatories and sinks.

### H. Hose Bibbs and Wall Hydrants

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / PFP - OPTION 1

- 1) During any renovation done to the building, the existing hose bibbs in the toilet rooms should be removed and new wall mounted hose bibbs with an integral vacuum breaker and removable tee handle installed.

#### I. Cross Connection Control

- 1) As stated previously, the existing hose bibbs and wall hydrants do not have backflow prevention devices. Backflow devices will be integral to all new hose bibbs and wall hydrants installed during the renovation.
- 2) All service sink faucets installed during a renovation will also have integral vacuum breakers.
- 3) A new reduced pressure backflow preventer assembly should also be installed on the existing 6" domestic water (or on a new service if this is the preferred option) service to further protect the town's domestic water system.

#### J. Boys, Girls and Pool Locker Room/Shower Areas

- 1) All locker room/shower areas should be completely renovated. Floor drains within any new shower stalls should be arranged so that the water from one shower does not enter into the adjacent shower area. New shower valves should be installed with code compliant shower heads. Master mixing valves should be installed at each shower location. Valves shall be provided with limiting stops set to a maximum water temperature delivery of 112°F.
- 2) All plumbing fixtures will be replaced as discussed in the "Plumbing Fixture" section of this report.

#### K. Kitchen

- 1) If kitchen renovations include the addition of new or replaced gas-fired equipment, this equipment can be connected to the new gas service located outside the building as noted above.
- 2) Any new gas equipment would be fed by gas piping connecting to a master shut-off valve that would be interconnected with the kitchen hood and exhaust system. Gas would only operate as long as the kitchen hood exhaust system is operating.
- 3) Additional floor sinks and/or floor drains would be added

to any new equipment design to ensure proper drainage throughout the kitchen.

- 4) A new three-compartment sink with new grease trap should be included per state code requirements.
- 5) A new dishwasher with accompanying grease trap should also be provided per state code requirements.
- 6) A new exterior grease trap, located underground, outside of the kitchen portion of the building will also need to be considered as part of any new design or renovation to the kitchen. Venting of this exterior grease trap should enter back into the school building and exit to the atmosphere above the roof.

#### L. Science Wing

- 1) If the existing science wing is to be renovated in its current location, all existing lab sinks and faucets should be replaced with new fixtures. Faucets should be low-flow type fixtures with a maximum delivery rate of 0.5 gpm.
- 2) The lab waste system should be removed in its entirety and replaced with a new polypropylene acid resistant piping system that empties into a central acid neutralization tank and system. This system would balance the pH of the lab waste and then safely discharge it into the regular sanitary waste system before it connects back to the town's sanitary waste system.
- 3) The existing hot and cold water systems serving the science wing should also be removed in their entirety. New protected hot and cold water systems should be created to serve the renovated science wing by installing reduced pressure backflow preventers on the hot and cold water piping designated to serve this area.
- 4) The existing main gas piping system serving the science wing could possibly be re-used. This piping should be reconnected to the new gas service in a convenient location. Gas piping to each science classroom should feed an emergency shut-off valve located in a valve box on the wall near the classroom exit door. Piping from this valve would then feed any gas turrets within that classroom only.
- 5) All existing emergency showers in the science wing and



## F. BUILDING SYSTEMS / PFP - OPTION 1

connections to the cold water system should be removed. A new tempered water system should be created to serve the science wing. A new gas-fired water heater should be installed somewhere within the science wing and be dedicated to the new tempered water system. Water should be stored at 140°F and a master mixing valve should be mounted nearby and set to deliver tempered water to this wing at approximately 70°F-90°F per state plumbing code requirements.

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## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / HVAC - OPTION 1

#### BELMONT HIGH SCHOOL

#### HEATING, VENTILATING, AND AIR CONDITIONING

#### BASE RENOVATION

##### A. General:

1. This description applies to the Base Renovation option where the existing building remains and is fully renovated.
2. The recommended HVAC systems assume that the existing windows will be replaced and the walls and roof areas to remain will be insulated to meet or exceed the MA energy code.
3. Heating, air conditioning and ventilation systems shall be high-efficiency systems that allow for the ability towards achieving a Net Zero Energy facility.

##### B. Ground Loop Geo-Exchange System:

1. A vertical borehole well field area consisting of (400) 6-inch diameter boreholes spaced 20 feet apart shall be provided. Each borehole shall be 375 to 450 feet deep. Actual depth to be determined based on thermal conductivity testing performed on a test well. The number of boreholes may be increased or decreased based on thermal testing results and/or determination of the final heating and cooling loads.
2. Provide a 1-1/4 inch supply and return pipe within each borehole with a U-bend at the bottom. Piping shall be high density polyethylene (HDPE) with DR9 wall thickness. Polyethylene pipe and fittings shall be heat fused by butt, socket, sidewall, or electrofusion in accordance with pipe manufacturer's procedures. Underground supply and return piping from boreholes shall collect to four buried circuit vaults constructed of HDPE or concrete. Supply and return circuit piping in each vault shall combine to 8 inch main header piping which shall be routed into the building.
3. Steel sleeve casings shall be provided for the upper section of each borehole down to bedrock. Each borehole shall be filled with a bentonite based thermally enhanced grout mixture.

##### C. Central Heating and Cooling System:

1. Central geothermal heating and cooling shall be provided by four high efficiency 300 ton (approx. nominal capacity) heat recovery chiller-heaters or (40) 30 ton modular chiller-heaters connected to the ground loop system.
2. The ground loop circulation system shall be filled with 25% propylene glycol solution and shall be served by three 1000 GPM pumps with variable frequency drives.
3. Chiller-heater condenser water shall be constant flow primary with zero pressure bypass connections to the ground loop distribution and the building heating distribution. There shall be three primary condenser water pumps at 1,000 GPM each.
4. Secondary condenser/heating pumps shall be variable flow with variable frequency drives. There shall be three secondary heating pumps at 1,000 GPM each.
5. Chilled water distribution from chiller evaporators to building distribution shall be variable primary flow with three 750 GPM pumps.

## F. BUILDING SYSTEMS / HVAC - OPTION 1

6. The building circulation loop shall consist of a four-pipe distribution. The main distribution to heating/cooling terminal units in the building shall be four-pipe. Rooftop air handling units, heat recovery air handling units, and central air handling units shall be two-pipe configuration.
7. The building loop piping system shall contain a 25% propylene glycol solution for freeze protection and corrosion protection.
8. The building terminal heating units will be designed to utilize low temperature heating supply water (130°F maximum). Heating terminal units such as fin tube radiation and heating coils may require larger surface areas due to the low water temperature. In areas with high heating loads, two-row fin-tube and heating coils may be required.

### D. Exterior Classrooms - Induction Units with Displacement:

1. The system serving heating, cooling and ventilation for typical exterior classrooms shall utilize four-pipe floor mounted chilled beam induction units with displacement supply air. Four 5 ft. long units shall be provided for each typical classroom mounted along the exterior wall. Units shall be served by two 7-inch diameter primary ventilation supply air ducts.
2. The primary supply air serving each classroom shall be provided with a modulating supply air volume control terminal to control supply air when the room is occupied.
3. Systems will be interfaced to the local space vacancy sensor to reduce ventilation air and reset the space cooling and heating set point temperatures when the room is unoccupied.
4. A carbon dioxide sampling sensing system will be provided in classrooms to provide monitoring and occupied control of ventilation air.

### E. Interior Classrooms and Other Spaces – Ceiling Induction Units:

1. Interior classrooms and other interior occupied spaces will be served with ventilation supply air from a rooftop heat recovery ventilation unit connected to ceiling mounted chilled beam induction terminals. Induction terminals shall be provided with four-pipe supply and return water connections.
2. Individual classrooms shall be provided with a supply air volume control terminal to control ventilation air when the room is occupied. A carbon dioxide sampling sensing system shall be provided for classrooms to monitor and control ventilation air.

### F. Classroom and Interior Ventilation Systems:

1. Outside ventilation air for classrooms and interior spaces will be provided by roof mounted dedicated outside air heat recovery units (HRU).
2. The HRU's will be variable air volume and will include supply and exhaust fans with variable frequency drives, total energy recovery wheels and secondary sensible reheat wheels to allow for a low level of dehumidification control. The units will be provided with two-pipe dual temperature water connections to a single combination pre-heat and cooling coil. Changeover between hot water and chilled water supply shall be provided with the use of changeover valves connected to the hot water and chilled water systems. Each unit shall include 100% recirculation dampers for morning warm-up mode and after-hours night setback heating.
3. All unit energy recovery wheels and coils shall be sized for low face velocity to increase unit and system efficiency.

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / HVAC - OPTION 1

4. Variable supply air will be based on demand from classrooms and interior spaces. Return/exhaust air shall be controlled by air flow measurement and tracking of the supply and exhaust air with limited volume control terminals in the exhaust air system.
5. Corridors will be provided with ventilation air from the HRU system. Air quantities in excess of basic ventilation requirements will be provided for building exhaust makeup air as required. Corridors will not be fully air conditioned with the exception of areas that have direct solar loads.

#### G. Existing Gymnasium:

1. The existing heating and ventilating units in the gym shall be replaced with new HVAC units. The units shall include a hydronic coil for heating and cooling using hot water and chilled water. Units shall also include a heat recovery section with an enthalpy wheel for outdoor air heat recovery meeting the requirements of the MA energy code due to the level of outdoor air required.
2. Two units shall be provided, which shall be located indoors or outdoors depending on structural and architectural requirements. Units be provided with a round ductwork distribution exposed within the space.
3. The units shall be provided with variable frequency drives for the supply and return fans to reduce the fan speed during times of low demand. Supply, return, and outside air flow measurement and control shall be provided.
4. Provide a new H&V unit with plate heat exchanger to serve the existing locker rooms.

#### H. Existing Swimming Pool:

1. The existing heating and ventilating unit serving the pool shall be replaced with a new H&V unit. The unit shall include a hydronic coil for heating using hot water. The unit shall also include an air-to-air flat plate heat exchanger for exhaust air sensible heat recovery.
2. The pool deck exhaust system shall remain, and existing exterior mounted exhaust fan may be relocated if required.
3. Provide a new H&V unit with flat plate heat exchanger to serve the locker rooms.

#### I. Miscellaneous Areas:

1. All normally occupied areas will be air conditioned except for corridors, the kitchen, and culinary classrooms with kitchen hoods (if applicable). The kitchen and culinary areas are partially tempered by using transfer air from the commons for make-up air.
2. The Auditorium, Stage, Media Center, Cafeteria, and Administration areas, will be served by rooftop air conditioning units (RTU). Separate occupancy scheduling for each unit will provide operational flexibility.
3. Rooftop air conditioning units (RTU) will include supply fan, return fan, hot water heating coil, chilled water cooling coil, filters, and variable frequency drives. Units serving Administration, Media Center, Band/Chorus, and the Cafeteria will be variable air volume (VAV) with local variable air volume boxes for zone temperature control.
4. The Auditorium and Gymnasium units will be single zone with a variable frequency drive to modulate the supply air during periods of low demand and occupancy.

## F. BUILDING SYSTEMS / HVAC - OPTION 1

5. The Auditorium, Gymnasium, Cafeteria, and Media Center systems will be provided with space carbon dioxide (CO<sub>2</sub>) sensors to provide modulation of outside air based on occupancy demand.

### J. Building Management System (BMS):

1. Provide direct digital control (DDC) BMS with local and unitary controls and web interface for remote access, alarms, and monitoring of all HVAC equipment in the building including; chillers, pumps, heat recovery units, rooftop units, fans and terminal units shall be controlled and mapped to a central monitoring station. System shall be based on the Niagara Framework open protocol for interoperability between manufacturers.
2. BMS system shall be interfaced to the building electrical and gas sub-meters. Daily, weekly, and annual energy use shall be reported for each meter.

### K. Carbon Dioxide Sensing System:

1. Provide an Aircurity, or equal, carbon dioxide air sampling and sensing system consisting of room sensors, cabling, tubing, room probes, air routers, and vacuum pumps.
2. Air tubing from room sensors shall be collected through air routers to sensing stations.
3. The system shall include an information management system and shall be integration with the building management system.
4. Building management system input shall provide control input for modulating supply air terminal units or automatic dampers.

### L. Electrical and BTU Metering:

1. Electrical metering shall be provided for collection of historical and real-time performance data. Separate meter groups shall be provided for the upper school areas and lower school areas consisting of meters for the measurement of lighting and plug loads for each classroom group by wing, floor or classroom type.
2. Individual metering of lighting and plug loads shall be provided for the Kitchen, Media Center, Auditorium/Stage, Gymnasium, and Administration areas.
3. Electrical metering shall be provided for each air handling system, central system pumps (by each group type), and each chiller-heater.
4. Provide BTU metering of chilled water, hot water, ground loop circulation systems and domestic hot water system.

### M. Phasing Considerations:

1. Renovations are assumed to occur over three major phases, while providing for large areas of the existing building to remain occupied. Therefore, the existing boiler room must remain active and the new chiller-heater plant must be constructed to support the new construction in several phases. Approximately 900 SF of new mechanical space will need to be constructed next to the boiler room in the first phase to provide space for the new equipment.
2. Installation of the entire geothermal borehole field may be accomplished in the initial phases. The entire array may be installed in the area to the west of the building including the soccer and baseball fields, parking and drive lanes.



### 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

#### F. BUILDING SYSTEMS / HVAC - OPTION 1

3. At least one steam boiler must remain active until at the last remaining segment of the steam heating system is taken off-line.
4. Construction phasing must allow for installation of the new chilled water and hot water distribution while the existing steam distribution is phased out. The existing steam distribution must also remain active to provide continued serve areas that have not been renovated.

## F. BUILDING SYSTEMS / Electrical - OPTION 1

Belmont High School

### ELECTRICAL

Option 1 Base Repair Only  
(Renovation Only)

- A. Existing Electric Services:
1. The intent is that upon completion of all renovations, there will be new services throughout the entire renovated facility.
  2. The Main Electric Room housing the main electric switchboard is located adjacent the Boiler Room, these rooms are located at the northwest corner of the facility adjacent the Fieldhouse.
  3. Scope will include maintaining and/or providing new feeders from this location to existing panelboards and mechanical equipment to be kept operational during renovation and new construction.
- B. New Main Electric Service:
1. A new primary service will be provided from utility company primary services via an underground ductbank and manhole system to a new utility company pad mounted transformer.
  2. Secondary service from the new pad mounted transformer will be underground to a new main switchboard at 480/277 volt, 3-phase, 4-wire. Switchboard will be located in a new main electric room.
- C. New Emergency Distribution System:
1. Natural gas/diesel (fuel source to be determined) emergency generator will power emergency egress lighting and exit lighting in corridors, assembly areas, and stairwells. Miscellaneous systems such as kitchen walk-in coolers and freezers, telephone system, security system, district and school IT head-end equipment, fire alarm system, one boiler, one water heater, and associated circulator pumps and controls.
  2. Separate automatic transfer switches shall be provided for emergency and non-emergency loads.
  3. To be determined, in addition to the equipment and systems listed above, the following equipment and systems will be fed from the generator.
    - a. Additional lighting in Gymnasium, Cafetorium, Kitchen, and associated toilets and corridors.
    - b. HVAC ventilation equipment (no air-conditioning) associated with the areas noted above.
    - c. Receptacles in Gymnasium and Cafetorium.
    - d. Cooling equipment for school and district IT equipment.

### 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

#### F. BUILDING SYSTEMS / Electrical - OPTION 1

4. A portable generator connection will be provided to meet National Electric Code Article 700 requirements to have a portable generator available while servicing the building generator.
- D. Sustainable Design Intent LEED 4.0:
1. Sustainable Design Intent compliance will include:
    - a. Advanced measurement and verification of air conditioning, fans, lighting, and receptacle power via electronic sub-meters equal to E-Mon, D-Mon Class 2000 3-phase kWh and demand meters. Measurement and verification metering will be monitored by the Building Management System (BMS).
    - b. Plug and process load reductions through the use of vacancy/occupancy sensor controls for local convenience outlets in classrooms, offices, library and resource rooms. Open areas such as Media Center, Auditorium and Kitchen will be equipped with relay panels controlled via the lighting control system, to reduce loads on a time schedule basis.
    - c. High efficiency lighting systems include LED luminaires throughout the building.
    - d. Advanced lighting controls include a low voltage lighting control system with time schedule control for common areas, vacancy/occupancy sensors, and photocells for daylight harvesting.
    - e. Exterior building mounted and pole top luminaires will be LED type with full cut-off distribution.
    - f. Empty conduits and space provisions will be provided for future photovoltaic (PV) installations.
    - g. Empty conduit provisions will be provided for future green vehicles charger stations based on two percent of the available parking.
- E. Lighting:
1. New luminaires will be provided throughout all renovated areas as well as new construction. Luminaires will be LED. All luminaires will be suitable for respective utility rebate incentives.
  2. Exterior building mounted, roadway, walkway, and parking luminaires will be full cutoff LED type. All exterior lighting will be controlled via the building low voltage lighting control system.
- F. Lighting Controls:
1. A low voltage lighting control system will be provided for common areas such as corridors and other areas not controlled by occupancy sensors.
  2. Manual low voltage override switches to override the time of day lighting control schedules shall be provided. Override switches will permit extension of lighting control program as well as ON-OFF override for exiting the facility.
  3. Lighting program for time of day schedules shall permit all lighting, including exterior to be turned off during non-occupied hours, reducing sky glow and light trespass. Activation of either fire alarm or intrusion detection system shall override the lighting program.

## F. BUILDING SYSTEMS / Electrical - OPTION 1

4. Vacancy and occupancy sensors will control lighting in most spaces including classrooms, offices, and utility type spaces.
  5. Daylight harvesting will be employed in all perimeter classrooms, offices, and other spaces with substantial daylight utilizing daylight sensors in each space.
- G. Auditorium:
1. A professional theatrical lighting system will be provided including complete dimming system with portable dimming controls. Power and control wiring will be provided for all Auditorium and Stage equipment including electric winches, projection screens, and lifts.
- H. Convenience Power:
1. Safety type duplex receptacles will be provided throughout the building in quantities to suit space programming.
  2. Plug load reduction will be achieved by receptacles controlled via occupancy sensors in classrooms, offices, and staff spaces, and circuits routed via relay panels, controlled via lighting control system time schedule for open areas such as Commons/Café, Kitchen and culinary areas.
- I. Fire Alarm:
1. Existing automatic, fully supervised, analog addressable, voice evacuation system will be maintained and utilized where applicable.
- J. Technology per Technology Section.
- K. Integrated Intrusion, Access Control, CCTV, and Alarm System:
1. Intrusion alarm system will provide magnetic switches on perimeter doors, motion sensors in all perimeter rooms on first floor with susceptible access from grade. Motion sensors will be provided in first, second, and third floor corridors. System will have secure-access zoning. Zoning will be provided to suit all proposed off hours usage including community programs.
  2. CCTV coverage will be provided at main and secondary entries as well as other entries to be used by students, staff or for off hours community programs, including but not limited to gymnasium, cafeteria and all interior corridors.
  3. Exterior CCTV coverage will be provided to cover the entire perimeter of the building.
  4. Access control via card access system will be provided at all exterior doors.
  5. CCTV system will be IP based with minimal 30 day recording capacity. System will be web based to allow viewing by Belmont Police Department.

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / Information Technology - OPTION 1

#### **Structured Cabling System:**

The School Department is responsible for the fiber network for both the schools and the Town (including the light department and TV Studio). The fiber network handles general data as well as Phone (VoIP) and security for the school district and the Town. There are three centralization points for the fiber – the high school, Chenery Middle School, and the Town Library. Internet services and wireless controllers in the existing high school MDF provide connectivity at all the school facilities and the Town. These systems must remain operational during construction. Therefore, the MDF and the existing district fiber must be protected during construction.

A new MDF will be created. The existing MDF area could also be renovated. In either case, the MDF will be the central location of all head end equipment including but not limited to servers, storage, switch electronics, security equipment, video equipment, telephone system, public address system and security system. It will be a dedicated space with proper ventilation, environmental treatment and emergency power. The new MDF will be built-out or renovated during an early phase of construction. The district fiber will be re-routed or extended to the new MDF location. Existing Telco lines, which terminate in the Main Office area will need to be protected and re-routed or extended. Temporary cabling and services may be necessary to maintain functionality of existing systems during demo work.

New IDFs will be created. The IDF locations will serve as intermediate closets for local cabling and equipment. The IDFs will be dedicated spaces with proper ventilation, environmental treatment and emergency power. Each closet will connect to the MDF with backbone cabling. IDFs will be built-out and come on line in conjunction with construction phasing. Existing IDFs will be brought offline in conjunction with construction phasing. Temporary cabling and services may be necessary to maintain functionality of existing systems during demo work.

Equipment racks will be installed in the MDF and IDFs for patch panels and network hardware. Two-post and four-post racks will be provided. Racks will be 19" EIA floor mount racks with wide floor mounting flanges, vertical cables guides and horizontal cable managers. Power for rack equipment will be installed in cable tray above the racks. Power will consist of both 20A and 30A twist-lock receptacles.

The existing Category 5 horizontal cabling will be replaced. The new data cabling infrastructure will be based on a Category 6A, or most up to date standard at the time of bid. The data channel will be comprised of the passive components including cabling, connectors, patch panel port, and patch cords capable of supporting 10 Gigabit per second networking. Category 6A data cabling will be provided to all equipment requiring data and voice connectivity, including but not limited to data outlets, voice outlets, video surveillance cameras, access control network connections, and other related equipment. This cabling will support computer network requirements, wireless connectivity, telephone system (VoIP) and IP-based security needs. Cabling will terminate in the MDF or one of the IDFs. Temporary cabling may be necessary to maintain functionality of existing systems during demo work.

The existing fiber backbone within the school will be replaced. The new fiber backbone will connect the MDF and all IDFs. It will consist of twelve strands of multi-mode and six strands of single-mode fiber optic cables. All multimode fiber optic cables will use multimode, graded-index fibers with 50-micron cores only. Fiber will be laser-enhanced and guaranteed for transmission distances in 10 Gigabit Ethernet of up to 500 Meters. All single-mode fiber optic cables will be OS2, tight buffered, high flexibility. Temporary cabling and services may be necessary to maintain functionality of existing systems during demo work.

#### **Data and Voice Communication Systems:**

Updated networking hardware will be provided for the MDF and IDFs consisting of network switch electronics for the data and voice communication systems, distributed communication system, audio-video communication system, security system, wireless LAN and other Owner equipment. Components will consist of PoE+ chassis and power supplies, 10/100/1000 PoE+ modules, fiber transceivers, patch cables and UPS equipment. The switches will be fully configured according to network requirements and VLANs will be created according to best practice and equipment requirements. Backbone will be 10Gb minimum.

Updated VoIP server and hardware will be provided. The existing NEC 8300 will be upgraded to the 9300 platform, or current standard at the time of bid. Several elementary schools in the district depend on the existing VoIP system



## F. BUILDING SYSTEMS / Information Technology - OPTION 1

for connectivity, so it must remain operational during construction. The new system must be compatible with existing VoIP equipment in the district.

### Audio/Visual Communication System

Digital signage will be provided in gathering areas and large group instruction spaces. The system will consist of LED displays, media players, and a server or cloud based digital signage solution.

Classrooms and general instruction spaces will be equipped with a local audio system consisting of ceiling speaker, amplification, wireless microphones and auxiliary inputs. There will be an input available for FM assistive listening systems.

### Distributed Communication System

The existing Simplex Building Communication System will be replaced with a new system. The new system should be built-out with the new MDF during an early phase of construction so that newly renovated or constructed areas can come online. The new distributed communication system will consist of a fully operational IP platform public address system for district and school internal communications system incorporating school safety notifications and general communications. It will provide complete internal communications using state of the art IP technology with two-way loud speaker internal communication, bell event notification, emergency announcements that will override any pre-programmed zones assuring that all emergency/lockdown announcements are heard at all locations, and atomic time synchronization. The system will connect directly to the high school's LAN and have the future capability of expanding to connect to other intercom systems in the school district over the WAN for district-wide, emergency, and live voice announcements in the future (additional hardware will be required at the other school facilities for this feature). Configuration of zoning, bell schedules, calendars, and emergency sequences will be accomplished using a browser-based interface.

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / Audiovisual - OPTION 1



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#### **BELMONT HIGH SCHOOL FEASIBILITY STUDY AUDIOVISUAL SYSTEMS, OPTION 1**

**SUBMITTED TO: PERKINS + WILL**

**CONSULTANT: ACENTECH**

**JANUARY 23, 2018**

**ACENTECH PROJECT NO. 629341**

We visited Belmont High School on August 28, 2017 with the school and the entire design team to assess the existing conditions at the school. The following are our comments related to the audiovisual systems for the school.

#### **BACKGROUND**

Acentech is an independent consulting firm specializing in architectural acoustics, noise and vibration control, and the design of advanced sound, audiovisual, multimedia, and videoconferencing systems. In order to provide unbiased consulting and design services, Acentech does not sell or install equipment and does not represent any dealer, distributor, or manufacturer.

#### **ROOM SCHEDULE**

Unless otherwise noted, the focus of this project is limited to the following spaces and/or systems.

- Auditorium
- Music Classrooms
- Cafeteria
- Entry Hall
- Classrooms (including Art Classrooms)
- Lecture Hall (aka Little Theater)
- Book Rooms
- Gymnasium
- Natatorium
- Field House

#### **EXISTING CONDITION EVALUATION**

During our site visit, the existing audiovisual systems were reviewed. In general, the technology being used in the school is outdated and does not support current standards. Additionally, there did not appear to be consistency in the system components from room to room. Standardization is generally desirable so that technical staff can more easily troubleshoot and correct any problems with the systems, and also so that they can stock common replacement parts (such as projector lenses and filters).

Consistency from system to system also allows them to be easier for the end users. If an end user needs to use the audiovisual system in a space that they do not typically use, the user can feel comfortable and confident that they will understand how to use the system in that room since it will be exactly the same as the one they typically use.

In all of the classrooms that we observed, the video projection systems included analog video (VGA) connections, but not digital video (HDMI). Analog video systems are rapidly being phased out. Fewer source

## F. BUILDING SYSTEMS / Audiovisual - OPTION 1

devices support this connectivity, and the cost to support the older technology is increasing due to low supply of the components needed to support this. While some adapters allow users to connect digital video sources to analog displays (projectors and video display panels), the adapters are not reliable and do not always work.

Portable assistive listening systems were observed in some classrooms. These portable systems (“Redcat Lightspeed”) are generally used for speech amplification. They do not typically connect to the audiovisual systems. In spaces with installed amplified sound systems, assistive listening systems are required in order to comply with the ADA (Americans with Disabilities Act). Further information about this requirement is listed later in this report.

It did not appear that audiovisual control system interfaces were used in most of the systems we observed. A control system interface (either as a touch screen control panel, or a button panel) will make the audiovisual system easier to use for the end user. The controls will always be available and in the same location (will not need to look for remote controls that can easily be lost).

The existing audiovisual equipment rack for the Auditorium is located on the downstage left corner. It is located next to electrical equipment and lighting dimmer racks. Unless the dimmer racks are using newer technologies, locating these racks in close proximity to one another should be avoided. Electrical “noise” (RF) from the lighting dimmers can create interference and create audible hum or buzz in the sound system.

Finally, current audiovisual system technologies allow the systems to connect to the data network. This allows the systems to automatically alert technicians about problems. For example, a system can alert a technician when a video projector’s lamp has been used for a set number of hours. This allows the technician to know ahead of time that the lamp will need to be replaced soon, and give them time to order replacement parts before the lamp no longer works.

### BUDGET SUMMARY

This report describes the functionality of the proposed audiovisual systems and does not include cost estimates. A programming meeting with key users is recommended to confirm the features described in this report, and a more accurate narrative and budget can be developed to cover this. Please note that audiovisual technology cost estimates do not cover construction items traditionally carried in the mechanical and electrical engineers’ budgets. These items include, but are not limited to, conduit, junction boxes, structural supports, electrical power, and data network cabling.

### TOTAL COST OF OWNERSHIP

The total cost of ownership of the audiovisual systems, in addition to the installation costs of the systems, includes several on-going costs:

#### Support Staff Costs:

The increase in the use of audiovisual systems carries with it the need to provide additional support for the users of the systems. This is balanced by network tools that allow support staff to work more efficiently. Specifically, the network-based management software will allow the staff to turn systems on and off, verify the operation of the equipment, schedule events for automatic operation, and receive automatic notification of system failures, projector lamp replacement, etc., without visiting the room. Without a detailed study of the current and anticipated support staff requirements, it is not possible to predict the staffing costs following the completion of the project; however, AV system management software is key to minimizing the support staff costs.

#### AV System Service:

The installation contract should require the installing contractor to provide a service contract for all systems for an additional three years beyond the initial one-year P&L warranty. The cost of a service contract for the period following the expiration of the initial contract is likely to be approximately 10% of

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / Audiovisual - OPTION 1

the cost of the initial installation per year. In addition, there will be charges associated with the actual repair of equipment that may fail during the life of the service contract.

#### **Equipment Replacement:**

The useful life of audiovisual system equipment varies with the type of equipment. In general, the useful life of most AV equipment is 5 - 10 years. Replacing individual items of equipment will be necessary during the life of the systems. Complete upgrades of the systems may be appropriate after ten years, as much because of the progress of technology and because of equipment usable life.

### **INFRASTRUCTURE VS. EQUIPMENT**

The distinction between infrastructure and equipment must be emphasized: Infrastructure is part of the building construction including, but not limited to, conduit, raceways, junction and device boxes, and is not outlined in this program. Other infrastructure provisions, such as electrical power and grounding specified exclusively for audiovisual systems cabling and equipment may be required and should be carried in the electrical budget. Properly designed AV infrastructure allows for not only the installation of the initially specified equipment, but for the evolution of the systems over many years. If proper infrastructure is provided, additional capabilities and equipment can be added later as technology progresses.

Equipment refers to the devices that can be connected through the infrastructure. Equipment includes microphones, loudspeakers, mixers, signal processing gear, video projectors, flat panel displays, cameras, AV control systems, equipment racks, and many other devices that comprise an AV system. One thing is certain – equipment will change over the life of the room as user needs and technology change. For this reason, infrastructure is the key to the long-term success of a thoughtfully conceived AV design project because it governs what can and cannot be easily installed in the future.

### **EQUIPMENT NOTES AND DEFINITIONS**

This program is not a technical specification and is insufficient to bid or build an AV system. Except where useful to illustrate a standard of performance or a specific user requirement, equipment manufacturers and model numbers are not used.

- Permanently installed refers to equipment that is part of the room systems and cannot easily be removed for use elsewhere.
- Portable refers to equipment that is available for connection at one or more locations, but is not hard-wired to the system. Portable equipment can be disconnected by the user or technical personnel and stored or used with systems elsewhere in the facility.
- Future Provisions refers to equipment that may be purchased and used or installed at a future date.
- Options refer to equipment or systems that are not at this point considered to be central to the needs of the Owner but may be chosen if desired. Optional equipment is not included in the budget estimate totals.
- OFE (Owner Furnished Equipment) refers to equipment that is either already owned by the Owner, or may be purchased in the future as needs arise. FBO (Furnished by Others), or “by others” refers to any service or equipment (e.g. lighting) required but not a part of the AV system design or installation.

### **SYSTEM CLASSIFICATIONS:**

#### **Presentation Systems**

Presentation systems are the source, routing, and display devices that provide highly intelligible communication of speech, music, information, and graphics to groups of people. This includes equipment such as microphones, loudspeakers, video projectors, plasma displays, computers, and the interfacing, mixing, routing, and control equipment that connects these devices together and allows the user to select the appropriate sources and operate the system.

#### **Assistive Listening Systems**

Permanently installed Assistive Listening Systems (ALS) are required by the ADA (Americans with Disabilities Act), a 1990 federal law that forbids discrimination against persons who are handicapped. A

## F. BUILDING SYSTEMS / Audiovisual - OPTION 1

2010 revision states, “In each assembly area where audible communication is integral to the use of the space, an assistive listening system shall be provided” in the following quantities and versions:

Receivers for Assistive Listening Systems		
Capacity of Seating in Assembly Area	Minimum Number of Required Receivers	Minimum Number of Required Receivers Required to be Hearing-aid Compatible
50 or less	2	2
51 to 200	2, plus 1 per 25 seats over 50 seats <sup>1</sup>	2
201 to 500	2, plus 1 per 25 seats over 50 seats <sup>1</sup>	1 per 4 receivers*
501 to 1000	20, plus 1 per 33 seats over 500 seats <sup>1</sup>	1 per 4 receivers*
1001 to 2000	35, plus 1 per 50 seats over 1000 seats <sup>1</sup>	1 per 4 receivers*
2001 and over <sup>1</sup>	55 plus 1 per 100 seats over 2000 seats <sup>1</sup>	1 per 4 receivers*
		1 “Or Fraction thereof”

The term “assembly area” includes facilities used for entertainment, educational, or civic gatherings. Additionally, courtrooms are required to support Assistive Listening systems regardless of whether or not an installed sound system exists.

### Audiovisual Control System

Audiovisual (AV) control systems are required to centralize the operation of the various functions of the AV system. This includes environmental controls such as lighting presets and shade and drape controls, as well as audiovisual functions such as system and projector power, source device selection and media transport controls, audio volume controls, and many other operational functions identified by the design team before the equipment is installed.

Advanced functions of the AV control system may include multi-level password protection for system operation to prevent unauthorized use, control of automatic system shut-down sequences (to reduce unnecessary wear and tear), and a help system interface for user experiencing technical problems (see below).

### Remote Management

Permanently-installed AV control systems can be connected to the Owner LAN to enable remote control and diagnostics of the AV systems. An asset management hardware / software suite allows monitoring and operation of AV systems via the Owner’s LAN. These products allow technical personnel to operate audiovisual systems in remote locations from any computer with a web browser. The features of remote management systems include:

- Real-time monitoring of system status, including notification of imminent problems in certain devices before they fail.
- Mobile management.
- A method of asset management by tracking equipment usage in real time.
- Will integrate with other control system hardware/software.



## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / Audiovisual - OPTION 1

#### Video Conferencing/Distance Learning

Videoconferencing equipment (HD CODECs, software codecs, cameras, echo cancellers, telephone interfaces and related devices) is equipment specifically designed to transmit and receive audio and video signals over local and wide area networks. This capability is not currently planned for this project.

#### Broadcast Systems

Broadcast quality equipment and systems generally refer to audio and video devices (cameras, recorders, and editing equipment) of the highest quality, specifically designed for the recording, editing, and production at the commercial level, such as in network television studios. Broadcast equipment is an order of magnitude more expensive than "professional" quality equipment, and is not planned for this project.

## PROPOSED AUDIOVISUAL SYSTEM DESCRIPTIONS

### AUDITORIUM

The auditorium will be used for live music and theater performances, multimedia presentations with audio and video, lectures, and panel discussion. It is anticipated that the following will be required:

#### Sound System

- Microphones:
  - Wired Microphones: The system will include a stereo microphone that is hung in the room and used for audio recordings. Another microphone will be permanently installed over the stage/performance area and used for backstage monitoring. A gooseneck microphone will be provided for connection to a lectern (lectern, by others). Connections for wired microphones will be available at the sides of the stage, above the stage performance area, and along the side walls of the seating area.
  - Wireless Microphones: The system will include 4 wireless microphone systems. Each will include an interchangeable handheld and lavalier (clip-on) microphone transmitter.
- Audio Mixers: The system will operate in one of two microphone mixing modes; automatic or manual. These modes will be selectable from a control panel.
  - Automatic Microphone Mixing Mode: This mode will allow an end-user to simply connect a microphone to the system at one of multiple designated microphone receptacle locations. Master volume control will be accessible from the control panels. This will be the system's default setting and will be used for presentations, movies, and lectures.
  - Manual Microphone Mixing Mode: For events when more complex operation of the sound system is required, the automatic microphone-mixing can be bypassed and the system can be run by a trained operator. Volume levels of microphones and other audio playback sources will be controlled from a 32-channel digital mixing console; providing a flexible variety of audio outputs that can be used for special effects, recording, and speech reinforcement. The mixing console will be permanently located at a "tech position" within the house. The mixing location will require ample space for operation of the console and other items such as scripts required for rehearsals or performances. The mixing console will connect to the IT network and will have the capability of being controlled from an Owner-furnished tablet computer (such as an Apple iPad) that is connected via Wi-Fi to the same IT network.
- Audio Recorder: An audio recorder will be used for recording events from the stereo microphone. The recorder will be capable of connecting to the IT network and can upload recorded audio tracks to another computer or server. The USB connection will allow recordings to be transferred to a thumb drive.
- Audio Signal Processing: A digital audio signal processor will be used for automatic microphone mixing, and equalizing the loudspeakers. The signal processor will be expandable so that, if required, additional input and output capacity can be added to the system in the future.
- Production Communications: A two-channel intercom system will be used for communication between production crew members at control locations, and the backstage spaces. AV connection panels within the performance space will include receptacles for the connection of intercom belt-

## F. BUILDING SYSTEMS / Audiovisual - OPTION 1

packs. Wall-mounted speaker stations will be located in the music classrooms and other backstage spaces. The system will be provided with eight dual-channel belt-packs, headsets, and cables.

- **Loudspeakers:**
  - Installed Auditorium System: The loudspeaker system will provide uniform audio coverage through the audience area allowing the system to provide high levels of speech intelligibility and musical clarity.
  - The loudspeaker configuration will consist of a central loudspeaker cluster above and in-line with the primary stage area. It will be used for speech reinforcement and playback of audio. Supplementary "delay" loudspeakers will be provided to cover the rear seating areas. Front-fill loudspeakers will be used in the stage apron. Subwoofers will also be provided. Left and right loudspeakers will be used for stereo audio playback, and for sound effects; which can be panned across the left, center, and right loudspeakers. Amplifiers will be provided to power the loudspeakers.
  - Control Room: A pair of wall-mounted loudspeakers will be installed in the Control Booth and will be used by technicians in the booth to monitoring audio from the stage performance/event. Amplifiers will be provided to power the loudspeakers.
  - Portable: Four portable self-powered loudspeakers will be provided for use on stage as "wedge" monitor loudspeakers. These loudspeakers can also be used in the house or on stage as sound effects speakers. Additionally, the loudspeakers will slant for use as a "wedge" or fold back monitor loudspeaker for use on stage.
  - Backstage and Front of House: In addition to the Auditorium's loudspeakers, ceiling-mounted loudspeakers will be provided in backstage areas, dressing rooms, etc. for audio monitoring (for cues, etc.). Amplifiers will be provided to power the loudspeakers.
- **Assistive Listening System:** An FM-based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers (i.e., headphones) will be stored centrally and issued to participants as required. These receivers are intended to be used by patrons with hearing impairments.

### Display System

- **Video Projector:** The system will display computer and motion video using a high brightness video projector with appropriate lens. The projector will be installed at the rear of the Auditorium in the control booth.
- **Projection Screen:** A motorized video projection screen with a high-contrast screen material will hang from above the stage.
- **AV Sources:** AV sources will include an Owner-furnished computer. Inputs for portable AV devices, such as a laptop computer or portable audio player, will be available at three locations (one on one side of the stage, one at the in-house audio mix location, and one in the Control Booth).
- **Video Cameras:** A high-definition video camera with integral pan/tilt head will be installed in the Theater. In addition, a night vision camera will also be provided for viewing of dark scenes. The cameras will be used to feed images of events in the space to backstage and front-of-house areas with video displays. Control of the cameras will be via presets on the touchscreen control panel.
- **Video Routing and Processing:** A matrix type switcher will be used to route video and audio sources to the displays and sound system. This will include video signal transmitters and receivers that are needed to send digital video signals longer distances. It will support playback and distribution of digital and analog video formats and the transport system will be compatible with newer generation 4K sources. Fiber optic transmitter outputs will be provided to send signals to the backstage areas with video displays, such as the Music Classrooms.

### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of three 10" LCD touch screens (one at the side of the stage, one at the in-house audio mix location, and one in the Control Booth). The control panels will be able to control all functions of the audiovisual system; including source selection and media transport controls, volume control, and can interface with other operational functions including lighting and HVAC.

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## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / Audiovisual - OPTION 1

#### Miscellaneous

Miscellaneous equipment will include a floor-standing and lockable equipment rack(s), AC power distribution, and sequencers in the racks, custom connection panels at the stage/performance area and house mix position, audio press feed connections to locations within the room, and all cable, connectors, and additional hardware and labeling required to install the system.

#### MUSIC CLASSROOMS

The Music Classrooms will include the Band Room and Chorus Room. These spaces will be used for musical instruction and rehearsal for choir, jazz band, orchestra, and band groups. Each audiovisual system will comprise the following sub-systems:

##### Sound System

- **Microphones:** A stereo microphone will be provided and will hang from the ceiling. This microphone will tie into the AV system and can be used for recording performances.
- **Audio Signal Processing:** A digital audio signal processor will be used for signal routing and equalizing the loudspeakers.
- **Audio Recording:** A network USB/SD audio recorder will be provided.
- **Loudspeakers:** Wall-mounted loudspeakers will be wall-mounted at the front of the room for program audio playback. Amplifiers will be provided to power the loudspeakers.
- **Assistive Listening System:** An FM-based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers (i.e., headphones) will be stored centrally and issued to participants as required. These receivers are intended to be used by patrons with hearing impairments.

##### Display System

- **Video Projector:** The system will display computer and motion video using short-throw, 3,300 ANSI lumen video projectors (1280 x 800 WXGA resolution). The projectors will be installed on the wall above the whiteboard/projection screens in each room (whiteboard material to be provided by Others). Note that the whiteboard material should be of a projection quality and should not create reflections or hot spots from the projector.
- **AV Sources:** AV sources will include connectivity for an Owner-furnished computer. Inputs for portable AV devices, such as a laptop computer or portable audio player, will be available at locations at the front of the room. An overflow audio and video feed from the Auditorium will also be provided.
- **Video Routing and Processing:** A matrix type switcher will be used to route video and audio sources to the display and sound system. This will include video signal transmitters and receivers that are needed to send digital video signals longer distances. It will support playback and distribution of digital and analog video formats and the transport system will be compatible with newer generation 4K sources.

##### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of a 7" LCD touch screen at the presentation area. The control panel will be able to control all functions of the audiovisual system; including source selection and media transport controls, and volume control. Control system processing will be embedded in the video matrix switch.

#### Miscellaneous

Miscellaneous equipment will include a floor-standing and lockable equipment rack, AC power distribution and sequencers in the racks, custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

#### CAFETERIA

The Cafeteria will include seating for a large number of students. An audiovisual system will be provided for lectures and will serve as an area to view and hear overflow AV feeds from the Auditorium. The audiovisual system will comprise the following sub-systems:

## F. BUILDING SYSTEMS / Audiovisual - OPTION 1

### Sound System

- Microphones:
  - Wired Microphones: Connections for wired microphones will be available.
  - Wireless Microphones: The system will include a wireless microphone system. This will include lavalier (clip-on) microphone transmitter.
- Audio Signal Processing: A digital audio signal processor will be used for automatic microphone mixing and equalizing the loudspeakers.
- Loudspeakers: The loudspeaker configuration will consist of distributed ceiling-mounted loudspeakers and will be used for program audio and speech reinforcement. Amplifiers will be provided to power the loudspeakers.
- Assistive Listening System: An FM-based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers (i.e., headphones) will be stored centrally and issued to participants as required. These receivers are intended to be used by patrons with hearing impairments.

### Video System

- Video Displays: Two wall-mounted video display panels will be provided to display computer and motion video. These can be used for digital signage with owner provided PC, local AV presentations, or overflow video feeds from the auditorium.
- AV Sources: Inputs for portable AV devices, such as a laptop computer or portable audio player, will be available at one location in the Cafeteria area.
- Video Routing and Processing: A matrix type switcher will be used to route video and audio sources to the display and sound system. This will include video signal transmitters and receivers that are needed to send digital video signals longer distances. It will support playback and distribution of digital and analog video formats and the transport system will be compatible with newer generation 4K sources.

### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of a 7" LCD touch screen. The control panel will be able to control all functions of the audiovisual system; including source selection and media transport controls, and volume control.

### Miscellaneous

Miscellaneous equipment will include a floor-standing and lockable equipment rack, AC power distribution and sequencers in the racks, custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

## ENTRY HALL

The Entry Hall is a public area where large murals are hung. A digital video wall will be used to display electronic artwork, and can also be used to display other images and announcements. The audiovisual system will comprise of the following sub-systems:

### Display System:

- Video Display: The system will display computer and motion video using a wall-mounted video wall consisting of nine (9) x 55" video display panels arranged in a 3 x 3 grid. The overall image size will be approximately 81" high x 143.5" wide.
- AV Sources: Inputs for portable AV devices, such as a laptop computer, will be available at a wall-mounted receptacle panel in the main office area of the school. An Owner-furnished computer will connect to the system.
- Video Routing: A switcher will be used to route video and audio sources to the display and sound system. This will include video signal transmitters and receivers that are needed to send digital video signals longer distances. The video routing equipment will be compliant with newer generation digital video sources (4K).

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / Audiovisual - OPTION 1

#### System Control:

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of a wall-mounted 7" LCD touch screen. It will be able to control all functions of the audiovisual system; including source selection and media transport controls.

#### Miscellaneous:

Miscellaneous equipment will include an equipment rack, AC power distribution and sequencing, custom connection panels, and all cable, connectors, and additional hardware and labeling that are required to install the system.

#### CLASSROOMS

The classrooms (including the art classrooms) will be used for lectures and presentations. The audiovisual systems will each comprise of the following sub-systems:

##### Sound System

- Loudspeakers: A pair of wall-mounted loudspeakers will be used for program audio playback. Amplifiers will be provided to power the loudspeakers.
- Assistive Listening System: An infrared-based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers (i.e., headphones) will be stored centrally and issued to participants as required. These receivers are intended to be used by patrons with hearing impairments.

##### Display System

- Video Projector: The system will display computer and motion video using a wall-mounted short-throw video projector (1920 x 1200 WUXGA minimum resolution). The projector will display content on a wall-mounted white board suitable for projection (white board, by Others).
- AV Sources: AV sources will include inputs for portable AV devices, such as a laptop computer or portable audio player. It will be available at the front of the room on a wall-mounted receptacle panel.

##### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of a wall-mounted button panel. It will be able to control all functions of the audiovisual system; including source selection, volume control, and power.

##### Miscellaneous

Miscellaneous equipment will include custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

#### LECTURE HALL (AKA LITTLE THEATER)

The Lecture Hall will be used for multimedia presentations with audio and video, lectures, panel discussions, and community events.

##### Sound System

- Microphones:
  - Wired Microphones: A gooseneck and handheld microphone will be provided for connection to a lectern (lectern, by others). Connections for additional wired microphones will be available.
  - Wireless Microphones: The system will include a wireless microphone system. The system will include handheld and lavalier (clip-on) microphone transmitters.
- Audio Signal Processing: A digital audio signal processor will be used for automatic microphone mixing and equalizing the loudspeakers.
- Loudspeakers: Loudspeakers will be provided for speech reinforcement and audio playback. Amplifiers will be provided to power the loudspeakers.



## F. BUILDING SYSTEMS / Audiovisual - OPTION 1

- **Assistive Listening System:** An FM-based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers (i.e., headphones) will be stored centrally and issued to participants as required. These receivers are intended to be used by patrons with hearing impairments.

### Display System:

- **Video Projector:** The system will display computer and motion video using a high-brightness video projector (1920 x 1200 WUXGA minimum resolution).
- **Projection Screen:** A motorized video projection screen with a high-contrast screen material will hang from the presentation wall.
- **AV Sources:** AV sources will be an Owner-furnished computer. Inputs for portable AV devices, such as a laptop computer or portable audio player, will be available at two locations at the front of the room.
- **Video Cameras:** One high-definition video camera with integral pan/tilt head will be installed in the Lecture Hall on the rear wall. Control of the camera will be via presets on the touchscreen control panel.
- **Video Routing and Processing:** A matrix type switcher will be used to route video and audio sources to the display and sound system. This will include video signal transmitters and receivers that are needed to send digital video signals longer distances. It will support playback and distribution of digital and analog video formats and the transport system will be compatible with newer generation 4K sources.

### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of a 10" LCD touch screen at the presentation area. The control panel will be able to control all functions of the audiovisual system; including source selection and media transport controls, volume control, and can interface with other operational functions including lighting and HVAC. Control system processing will be embedded in the video matrix switch.

### Miscellaneous

Miscellaneous equipment will include a floor-standing and lockable equipment rack, AC power distribution and sequencers in the racks, custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

## BOOK ROOMS

The Book Rooms will be used for workgroups and tutorial sessions. The audiovisual systems will each comprise of the following sub-systems:

### Sound System

- **Loudspeakers:** A pair of wall-mounted loudspeakers will be used for program audio playback. Amplifiers will be provided to power the loudspeakers.
- **Assistive Listening System:** An infrared-based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers (i.e., headphones) will be stored centrally and issued to participants as required. These receivers are intended to be used by patrons with hearing impairments.

### Display System

- **Video Display Panel:** The system will display computer and motion video using a wall-mounted video display panel.
- **AV Sources:** AV sources will include inputs for portable AV devices, such as a laptop computer or portable audio player. It will be available at the front of the room on a wall-mounted receptacle panel.

### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of a wall-mounted button

## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### F. BUILDING SYSTEMS / Audiovisual - OPTION 1

panel. It will be able to control all functions of the audiovisual system; including source selection, volume control, and power.

#### Miscellaneous

Miscellaneous equipment will include custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

#### GYMNASIUM

The Gymnasium will be used for practice, large games, presentations, and events. The audiovisual system will comprise of a number of sub-systems that include the following:

##### Sound System

- **Microphones:** The system will include one wireless handheld microphone transmitter. Connections for wired microphones will be available at wall-mounted receptacle panels and on a portable equipment rack.
- **Audio Processing and Mixing:** A digital audio signal processor will be used for automatic microphone mixing, and equalizing the loudspeakers. An 8-channel audio mixer in the portable equipment rack will be used to mix microphones and other audio sources.
- **Loudspeakers:** Distributed ceiling-mounted loudspeakers will be provided for speech reinforcement and program audio playback. Loudspeakers will be zoned so that they can be used over the entire Gymnasium floor, or over the individual courts (please note that we not anticipate sufficient acoustical isolation between the courts, and it is not recommended to use the two courts simultaneously for different audio playback or reinforcement). For larger events and games, additional loudspeakers will be used to provide coverage to the bleacher seating area. Amplifiers will be used to power the loudspeakers.
- **Assistive Listening System:** An FM or infrared based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers, intended for use by patrons with hearing impairments, will be stored centrally and issued to participants as required. Inductive neck loop adapters will be provided along with the receivers for compatibility with telecoil-enabled hearing aids.

##### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of one wall-mounted 5" LCD touch screen, and an additional 5" LCD touch screen in the portable equipment rack. The control panel will be able to control all functions of the audiovisual system; including source selection and media transport controls, and volume control.

#### Miscellaneous:

Miscellaneous equipment will include a floor-standing and lockable equipment rack, a portable equipment rack for use during events and games, AC power distribution and sequencers in the rack(s), custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

#### NATATORIUM

The Natatorium will be used for recreation and competitions. The audiovisual system will comprise of a number of sub-systems that include the following:

##### Sound System

- **Microphones:** The system will include one wireless handheld microphone transmitter. Connections for wired microphones will be available on a wall-mounted receptacle panel in the teacher's office.
- **Audio Processing and Mixing:** A digital audio signal processor will be used for automatic microphone mixing, and equalizing the loudspeakers.
- **Loudspeakers:** Distributed weatherized ceiling-mounted loudspeakers will be provided for speech reinforcement and program audio playback.

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- **Assistive Listening System:** An FM or infrared based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers, intended for use by patrons with hearing impairments, will be stored centrally and issued to participants as required. Inductive neck loop adapters will be provided along with the receivers for compatibility with telecoil-enabled hearing aids.

### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of one wall-mounted 5" LCD touch screen. The control panel will be able to control all functions of the audiovisual system; including source selection and media transport controls, and volume control.

### Miscellaneous:

Miscellaneous equipment will include a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack(s), custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

## FIELD HOUSE

The Field House will be used for practice, large games, presentations, and events. The audiovisual system will comprise of a number of sub-systems that include the following:

### Sound System

- **Microphones:** The system will include one wireless handheld microphone transmitter. Connections for wired microphones will be available at wall-mounted receptacle panels and on a portable equipment rack.
- **Audio Processing and Mixing:** A digital audio signal processor will be used for automatic microphone mixing, and equalizing the loudspeakers. An 8-channel audio mixer in the portable equipment rack will be used to mix microphones and other audio sources.
- **Loudspeakers:** Distributed ceiling-mounted loudspeakers will be provided for speech reinforcement and program audio playback. Loudspeakers will be zoned so that they can be used over the entire Field House floor, or only over the smaller sections. For larger events and games, additional loudspeakers will be used to provide coverage to the bleacher seating area. Amplifiers will be used to power the loudspeakers.
- **Assistive Listening System:** An FM or infrared based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers, intended for use by patrons with hearing impairments, will be stored centrally and issued to participants as required. Inductive neck loop adapters will be provided along with the receivers for compatibility with telecoil-enabled hearing aids.

### System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of one wall-mounted 5" LCD touch screen, and an additional 5" LCD touch screen in the portable equipment rack. The control panel will be able to control all functions of the audiovisual system; including source selection and media transport controls, and volume control.

### Miscellaneous:

Miscellaneous equipment will include a floor-standing and lockable equipment rack, a portable equipment rack for use during events and games, AC power distribution and sequencers in the rack(s), custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

## ARCHITECTURAL, MECHANICAL, AND ELECTRICAL CONSIDERATIONS

1. Architectural: The following items should be considered for proper coordination between audiovisual system components and other trades:
  - a. Loudspeaker coverage must not be obstructed.

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#### F. BUILDING SYSTEMS / Audiovisual - OPTION 1

- b. Structure will be necessary to ensure that loudspeakers and the projection screen can be ceiling-mounted at recommended locations.
- c. Antennas for the assistive listening system and wireless microphones will be mounted on the wall.
- d. Wall-mounted connection panel locations will require coordination.
- e. Ceiling-mounted video projectors must be free from vibration.
- 2. AV Equipment Racks:
  - a. Equipment racks will require coordination for space and cooling/airflow requirements. This will include floor-standing equipment racks, and any small equipment racks that may be installed within millwork.
    - i. Floor-standing AV equipment racks shall be fixed in position and will require front access for day-to-day operational needs. They will also require rear access for service. Clearances must be maintained around the AV equipment racks (36") to comply with the requirements of the Americans with Disabilities Act.
    - ii. AV equipment rack rooms may require oversized doors.
- 3. Auditorium Mixing Console:
  - a. The Control Booth's mixing position will require ample space for operation of the console and other items such as scripts required for rehearsals or performances. The audio console is 48" wide by 36" deep.
  - b. Control Booth:
    - i. Please note the following guidelines:
      - 1. Coordination will be required with the acoustical consultant to maintain proper acoustical isolation between the Auditorium and the Control Booth.
      - 2. The glass in front of the video projector should be low iron. It should also be tilted between 2 and 5 degrees. Coordinate direction of tilt with the acoustical consultant.
- 4. Video Projection:
  - a. In order to optimize the viewing experience and achieve the minimum recommended video display contrast ratio, ambient lighting within the spaces with projection will need to be reviewed. Additionally, overhead lighting should be zoned so that lighting areas directly above the projection screen surfaces can be switched off during presentations.
  - b. Whiteboards & marker boards that are used as a projection surfaces shall be of projection quality so that they minimize reflections and projection hotspots.
- 5. Blocking will be required at all wall-mounted video display panel and loudspeaker locations.
- 6. Mechanical/Electrical: The following items should be considered for proper coordination between the audiovisual system components and other trades:
  - a. The AC power system will be designed and specified by the electrical engineer and will include a dedicated power panel, transient voltage surge suppression, and AC outlets.
  - b. Electrical outlets will be required at the equipment racks, mix location floor-box, and wall-mounted receptacle panels.
  - c. IT data drops are strongly recommended at the equipment racks and all AV receptacle panels.
  - d. If lighting control is desired from the audiovisual system control touch panel, the lighting system will require an interface for communication with the control system.
  - e. Equipment Rack Locations:
    - i. AC power requirements and heat loads will need to be considered at each equipment rack and video projector location.

\* \* \* \* \*

End of Feasibility Study



<b>LOCAL ACTIONS &amp; APPROVALS</b>	<b>3.3.5</b>	<b>3.3.4</b>	<b>3.3.3</b>	<b>3.3.2</b>	<b>3.3.1</b>	<b>TABLE OF CONTENTS</b>
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## 3.3.3 - FINAL EVALUATION OF ALTERNATIVES

### OPTION 2.1 - MAJOR RENOVATION / MINOR ADDITION



#### SUMMARY

Option 2.1 proposes a phased renovation and addition expanding both adjacent to as well as above the existing high school to create a new 7-12 High School. In the first phase, a new addition would be constructed off the northwest edge of the existing high school building. The addition would include upper school administration, science labs and general classrooms, as well as a black box theater, an alternative PE space, as well as supporting mechanical space. The upper grades would occupy this new addition enabling a series of renovations to be executed all of which would happen while the building is occupied making disruption and safety critical issues to be mitigated. The substantial first phase will enable the school to be renovated without the need for modular classroom space on an already densely utilized site. The entire existing building structure - including caissons, foundations, concrete floor, roof slabs, and concrete beams would remain and be reused but a new structural system would be required where additional floor levels are added. It is important to note that the existing fireproofing contains asbestos which will require the fireproofing to be removed and replaced with new fireproofing. There are interior functions that would be reconfigured due to added program spaces, increased population and due to disruption of new structural elements. These necessary alterations further reduce the savings one would expect by maintaining the interior planning layout. Substantial portions of the existing building would be renovated as configured including shared common amenity spaces such as the large auditorium, the large gymnasium, and commons. With each renovation phase, new common learning spaces will be layered on the pond side of the existing building allowing for clear wayfinding and a stronger connection between informal learning environments and the exterior.

#### DESIGN STRATEGY

This option proposes two separate entry and exit points to the site helping to disperse traffic congestion during the drop-off and pick-up periods. It also provides separate building entry

points allowing for a sensitivity to scale for lower and upper grades. Even with a vertical expansion component this option will not maintain the current athletic programming accommodated on the high school site today. With limited space available in town for additional fields this will stress the scheduling of athletics and likely require unrealistic timeframes for practices and games. Athletic fields are split on either side of the existing buildings making their maintenance and use less efficient. The intensity of athletic use, expanded parking needs and drop-off requirements required to mitigate major off-site traffic issues were the factors that drove vertical expansion to be explored in this option. While the cost premium for this expansion is recognized it is needed to accommodate the most basic site functionality.

#### SUSTAINABILITY AND BUILDING PERFORMANCE

The following sustainability and resiliency attributes have been considered in evaluating this option:

**ENVELOPE** – Select thermal and vapor performance upgrades would be executed in areas with substantial renovation, the finite scope of façade reconstruction and the existence of brick cavity walls with limited existing insulation makes meeting the schools performance goals difficult.

**ORIENTATION**- The orientation is fixed for the majority of the building making optimized daylighting challenging for existing east and west facing learning environments. Added spaces will build over and to the west of the existing structures with public spaces oriented to the south and most new teaching spaces receiving glare free light from the north

**SKIN TO VOLUME RATIO**- The skin to volume ratio of the major renovation minor addition scheme is the least efficient in that it stretches the building out to its least concise footprint.

**WINDOW TO WALL RATIO**- The window to wall ratio of the base repair scheme will attempt to achieve 30-40 glazing balancing heat gain with effective daylighting.

**PV POTENTIAL**- The ability to retrofit the existing roof structure is challenged by the placement of existing mechanical equipment and shafts as well as the roof's structural capacity. Over-built structure may be able to accommodate a more flexible arrangement of panels.

**SITE ENVIRONMENTAL PERFORMANCE**- This scheme allows for one contiguous but smaller geo-exchange field due to the expanded building footprint but allows for more performative landscape adjacent to the pond allowing outdoor teaching space to overlap with site sustainable strategies at the water edge.

## A. PROSPECTIVE SITE ANALYSIS - OPTION 2.1

### SITE

This narrative provide an analysis of the option including natural site limitations, building footprint(s), athletic fields, parking areas and drives, bus and parent drop-off areas, site access, and surrounding site features. This narrative excludes temporary site facilities, phasing implications, site drainage, utilities and permitting requirements addressed separately. All addition renovation and new building options include complete reconstruction of the site east of Harris Field to accommodate the site program requirements except tennis which will be accommodated at other existing courts in Town.

Harris Field including the track and supporting facilities are existing to remain. Spatial accommodations have been made in the site planning for the school project to accommodate a multi-modal community path along the north property line abutting the MBTA right-of-way and a multigenerational path around Clay Pit Pond – both with separate funding and implementation timelines. The school building project site design is anticipated to incorporate the portion of the multigenerational path that connects across the north side of Clay Pit Pond, as that will serve as a vital link between the school’s site program elements and circulation through the campus.

The existing school building is located on higher ground north of Claypit Pond towards the rear (north) of the site. The primary vehicular (car and bus) circulation and drop-off is a one-way loop from east (Hittinger Street) to west (Concord Avenue). The main pedestrian entrances are the south sides of the building. Buses drop off and pick up students along the south side of the building. The site has three primary parking areas. The largest parking lot (292 spaces) is located to the east of the school building. Small lots are located to the south (36 spaces) and north (21 spaces) of the building. Nine buses currently park along the far east side of the east parking lot. All parking areas contain accessible parking.

Most of the school’s athletic facilities are located west of the school building including two baseball fields (varsity is played on Grant Memorial Field which includes bleacher seating, dugout shelters and a prominent gateway) with rectangular field layouts (for soccer and field hockey) overlapping their outfields, a rugby/football practice

field and Harris Field which includes a running track and synthetic turf field, home and away bleachers and sports lighting. An indoor skating rink in poor condition and a football field house separate these fields from the varsity softball field further west with lighting and a soccer/lacrosse field overlapping the outfield. Ten tennis courts are located adjacent to the east parking area and the junior varsity softball field is located further east of the primary east parking area.

### BUILDING FOOTPRINT

In Option C 2.1, building additions expand the existing building footprint primarily to the west and south.

### ATHLETIC FIELDS

The athletic fields except Harris Field are reconfigured as follows:

- One softball and baseball combination field overlap with a soccer/field hockey field west of the rink.
- One softball and baseball combination field overlap with a soccer field between the new Goden Street entrance and the new building addition.
- Football/rugby field and a lacrosse/soccer field are located at the east side of the site.

### TRAFFIC CIRCULATION

The driveway between the building and Clay Pit Pond is eliminated, and a new 2-way driveway is located around the rear of the building with new access points across from Trowbridge and Goden Streets. Building entrances to the upper and lower school program have separate entrances and drop off loops at the east and west ends of the building. The multigenerational path connecting along the north side of the pond links the site and building program elements and provides pedestrian, bicycle and emergency vehicle access through the site.

### PARKING

This site plan meets the school’s parking need for 420-430 space. Parking is redistributed with a large lot between the school building and Harris Field with the remaining parking spaces located along the driveway across the north side of the site between the MBTA rail line and the rest of the school campus.