Preferred Schematic Report

Brookline 9th Elementary School, Town of Brookline, Massachusetts

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Brookline 9th Elementary School, Town of Brookline, Massachusetts

Owner

Town of Brookline, Massachusetts

Client

Town of Brookline, Massachusetts

Architect

Jonathan Levi Architects LLC

7 April 2017

1 Introduction

1.1 Introduction and Goals

This study was initiated in October 2016 with the purpose of assisting the town of Brookline, its constituents, School Committee, Board of Selectmen and staff in developing and analyzing alternative layouts for the town's ninth K-8 elementary school on the Baldwin site. The need for this school, including the underlying demography and educational program intent, is well described elsewhere in the school departments and school committees various presentations and publications on the subject.

The charge to the design team was to work with the Town and its relevant departments to assess the relative feasibility of alternative design strategies. The Baldwin site was selected by the Board of Selectmen and School Committee in October 2016. The 9th School is currently anticipated to accommodate 645 students from Pre-K through eighth grade, and to comprise approximately 142,800 gsf. Please see Chapter 2 for building program.

1.2 Site Analysis

The Baldwin site consists of two distinct parcels. The first, 2.6 acres fronting on Heath Street, is controlled by the school department and includes a small former elementary school which is currently being used for a specialty high school program and as a daycare facility. In addition to the school, this site also has a small portion dedicated for recreational use and currently developed as tennis courts. The second parcel, the Soule Recreation Center, is not part of the site proper, but is part of the Town of Brookline Parks and Recreation portfolio.

Access to the school department site is currently restricted to Heath Street; which is experiences significant congestion relating to the Hammond Street intersection. The site includes complex topography. There are a number of large trees as well as exposed ledge indicating the presence of ledge throughout the site below grade. A short private road, Oak Street, serves several single-family residence abutters and the existing school. There are also a significant number of abutters in single and multifamily structures to the East and Southwest.

The Soule Recreation Center property includes two large play fields, one of which is artificial which are used extensively

by the community. There is also a significant undeveloped portion to the Northeast which has potential for development as a shared parking area. This area is accessible from further east on Heath Street and from Woodland Road, which would add fewer vehicles to the Hammond Street congestion as compared to Heath Street access to the new school. The upper fields could potentially be shared by a future adjacent K-8 school, and would benefit from enlargement, and possible modification to artificial turf. These fields are not currently supported by sufficient parking, so there is opportunity for parking improvements to be developed on the Soule property which would serve the Soule property at its peak usage times (non-school hours) and also provide parking for the school during school hours, when community demand for the Soule playfields is low.

1.3 Process

1.3.1 Meetings and Deliberations

The study process was organized with the structure of regular meetings with key Brookline staff to discuss the team's findings as well as facilitating information gathering and inputs from key stakeholders. More formal presentations were made to both the School Building Committee and School Committee. In addition there were also presentations at the Brookline High School and Heath School for public input and commentary.

The collaborative effort across Brookline Departments and Commissions included meetings with:

- Advisory Committee and related subcommittees (weekly)
- Building Department
- Fire Department
- Parks and Recreation
- Planning Department
- Preservation Commission
- Traffic Department
- Net Zero Ninth School Subcommittee of the Climate Action Committee

1.3.2 Existing Conditions Data Collection

Extensive data gathering and analysis for the Baldwin and Soule sites has been performed, including:

- Survey - A formal site survey of the Baldwin site and portions of the adjacent Soule recreation land was performed

by Hancock Associates for the purposes of conceptual configurations of buildings, structures and site amenities. A full formal survey of the Soule property will be performed in Schematic Design. See Appendix.

- Geotechnical – Subsurface borings were performed at both the Baldwin and Soule sites to assess the subsurface soil and groundwater conditions at the site as they relate to foundation design and construction. Data was collected and formalized by McPhail Associates into a conceptual Foundation Engineering Report. It is recommended that the proposed school building be supported on conventional spread footing foundations in conjunction with a soil-supported slab-on grade. Depending upon the location of the proposed school building and the elevation of the lowest level floor slab, bedrock excavation may be required for construction of footings, slabs-on grade and utilities. Based on the extent of the bedrock excavation and the quality of the bedrock, shallow rock excavation may be feasible using mechanical means. A final subsurface exploration program will be conducted in Schematic Design to obtain supplemental geotechnical information for the final foundation design and foundation engineering report. For additional detail, please refer to the appendix of this report.

- Geoenvironmental - Phase 1 Site Assessments were performed for both properties by EndPoint Engineers with the following Findings:

  Baldwin: A 5,000-gallon #2 Fuel Oil tank, is located in a room adjacent to the boiler room, within a block enclosure at the School, and is reportedly still used for at least one week each year. The tank is also completely covered by sand and unable to be visually inspected, and is therefore considered an underground storage tank (UST). Standard practice indicates that Additional study is needed to determine whether any leakage has occurred, or special remediation measures required.

  Soule: The findings represent a de minimis condition. For additional detail, please refer to the appendix of this report.

- Hazardous Materials - Surveys were produced for the existing Baldwin School, Soule Gym, and Soule Environmental Education Building by EndPoint Engineers. Suspect ACMs were observed to be in good condition (intact). The Suspect ACMs will need to be would need to be sampled, analyzed, and removed as part of future asbestos abatement activities prior to

any renovation or demolition projects that would disturb those materials. Visual inspection identified potential PCB-containing materials, including window/door glazing and caulking, and brick or cement joint caulking/grout. These would need to be sampled and analyzed in order to determine if the materials do not contain PCBs, prior to any renovation or demolition. For additional detail, please refer to the appendix of this report.

- The civil engineering consultant has met with Brookline Engineering Department to review availability of site utilities. Initial review suggests that sufficient utility infrastructure is available for the new building. Draft site utility plans will be reviewed with the Brookline Engineering Department as part of the Schematic Design process.

- A Transportation Impact Analysis was developed by Vanasse and Associates for the site to evaluate on-site traffic proposals as well as neighborhood impacts. In summary, the proposed site is a good location for a new school and a safe environment can be maintained with traffic conditions maintained at manageable levels. While the school can be safely accommodated and will increase delays and queues during limited period of the day (20-25 minutes at peaks), improvements will be necessary to minimize the impacts and enhance safety conditions. For additional detail, please refer to the appendix of this report.

- A preliminary Building Code Analysis was developed for the project, and indicates no unusual constraints for a project of this type. For additional detail, please refer to the appendix of this report.

- An arborist's review of the existing mature oaks on the Baldwin site was performed by the Brookline Department of Public Works to inform the decision to protect and preserve several of these trees. The assessment included a ground level inspection and an aerial inspection of the crowns of these trees. All of the mature red oaks under consideration for preservation are in good condition. For additional detail, please refer to the appendix of this report.

1.3.4 Town Department Input

Parks and Recreation
Initial discussions centered on the Baldwin site and the potential for improving the recreational facilities at the adjacent Soule playfields which could also be used by the school

population. In addition a collaborative approach was discussed which would entail sharing of enlarged and formalized parking at the Northeast portion of the parks and recreation parcel. Such shared parking would alleviate frequent overcrowding of parking areas for recreational access while at the same time providing offstreet parking for teachers and staff. The architects presented preliminary alternatives to the Parks and Recreation Commission on 1/10/17 and 4/4/17.

Brookline Fire Department
The fire department was provided an opportunity to review the alternative designs for the site, and provided comment on necessary site access to service the site as well as general town requirements for equipment access.

Zoning
The Town's Building Commissioner was consulted on two occasions. In the first meeting general dimensional and usage restrictions were discussed in regard to evaluating the relative merits of 3 alternatives. A second meeting was held to review the alternatives and identify potential concerns, particularly regarding possible exceptions to height restrictions.

School Committee
Elected committee input was received at 3 joint meetings of the School Committee. Committee commentary on the design team's preliminary draft of the building program and evaluation matrix were received.

1.4 Community Input

(Note: the following information is on the town's website: http://www.brookline.k12.ma.us/Page/1970)

December 12, 2016 - Community Kickoff Meeting
This meeting was cancelled by the town's Deputy Fire Marshall due to overcrowding and was rescheduled for January 9, 2017 at the Heath School Auditorium at 100 Eliot Street. Please see below.

December 14, 2016 - Building Committee Meeting
The Building Committee for the 9th School at Baldwin had its second meeting on December 14th. During the meeting the Jonathan Levi Architects discussed design philosophy, site design, site evaluation and design alternatives. The bulk of the JLA's presentation focused on five preliminary concepts which allowed the building committee to begin to discuss the whether a four section or a three section school should be considered. The committee also discussed community

process and decided to hold two Community Meetings at the Heath School in January. The January 4th meeting will focus on traffic and access considerations, and the January 9th meeting will focus more broadly on neighborhood input into building and site design. The January 9th meeting is the rescheduled Kickoff Meeting that was originally scheduled for December 12 at the town golf course. The committee scheduled upcoming committee meetings to be on the second and fourth Tuesdays each month. The committee also discussed the need to file a demolition permit for the Baldwin School with the Board of Preservation due to the 18 month timeline for considering such a permit.

Please See Appendix for Presentation Materials

January 4, 2017 - Community Meeting on Traffic Concerns
Nearly 150 community members attended the January 4th meeting to hear an update on the traffic study being conducted as part of the Feasibility Phase for the 9th Elementary School at Baldwin. Jonathan Levi of Jonathan Levi Architects and traffic consultant, Giles Hamm presented, the scope, guidelines, and intended purpose of the traffic study that is underway. More than 40 people spoke and asked questions of the architect and the Building Committee members who attended the meeting. Concerns about safety, traffic, and the need for a transparent and open process related to the analysis of traffic were voiced repeatedly. Community representatives also requested that the data from the traffic study be shared publicly and with other traffic consultants who have been hired by a group of residents. For a summary of the public input please follow the link below. This summary has been shared with all members of the Building Committee for the 9th School at Baldwin.

Please See Appendix for Presentation Materials

January 9, 2017 - Community Meeting: Kickoff of Feasibility Phase
More than 170 people came to Brookline High School for the community meeting to kickoff the Feasibility Phase of the 9th School building project. Superintendent Andrew Bott opened the meeting with a presentation detailing the longstanding and ongoing enrollment growth in our public schools, how the school department has renovated existing schools and leased space to add 55 classrooms since 2008, and the impact of growth if a new elementary school is not built. Lead architect Jonathan Levi explained the work his firm will do during the Feasibility Phase and showed five preliminary concepts that the Building Committee for the 9th School will consider during

its January 10 meeting. Mr. Levi also described the site analysis and design principles which will guide his firm's work including daylighting, creating collaborative spaces, building on a residential scale, and connecting the physical structure with the outdoors. 46 community members participated in public comment providing input and asking questions.

Please See Appendix for Presentation Materials

January 10, 2017 - Building Committee Meeting
The Building Committee for the 9th Elementary School at Baldwin held its third open meeting. The committee discussed five preliminary design concepts, criteria for evaluation of the designs. and the request for the traffic study data to be jointly reviewed by the traffic consultant hired by the architect and one hired privately by community members. Project Manager Ray Masak informed the committee that the town's traffic engineer and the community member's traffic consultant had exchanged dates and were setting up a meeting to collaborate. After Jonathan Levi's presentation on the five preliminary design concepts, the committee used the evaluation criteria to discuss and evaluate them. Discussion included the need for open space, the importance of building a "green" school that minimized environmental impact during and after construction, access to the site, and the educational merits of each concept. Committee members agreed that the architects should develop Concepts A, D and E further. You can see all five preliminary concepts in the presentation this is linked to below. Towards the conclusion of the meeting, Committee Member John Doggett suggested a new design approach that would be built primarily on Soule Recreation land and would require a driveway between Heath and Hammond Streets that would pass underneath the building and include underground parking.

Please See Appendix for Presentation Materials

January 24, 2017 - Building Committee Meeting
On January 24, the Building Committee had its fourth working meeting. Jonathan Levy Architects (JLA) reviewed the three design alternatives the committee chose to pursue during the January 10 meeting. Discussion included the height of the proposed building, outdoor playspaces, parking options, and options for improvements for the Soule Recreation area. JLA presented preliminary costs of the three design alternatives. Slides of the initial designs, preliminary costs estimates and an initial evaluation matrix are included in the presentation that is linked to below. The committee also reviewed a proposed

schedule for upcoming committee meetings and meetings with other town boards and commissions. This schedule is in draft form and is likely to change as this phase of the project progresses.Project Manager Ray Masak reported to the committee that on January 18, Vanasse and Associates, the firm doing the traffic study for the 9th School at Baldwin, met with representatives of VHB, the traffic consultant that is working with neighborhood representatives. At the January 4th traffic meeting that was held at Heath School, community members requested that the two firms meet and work together.

Please See Appendix for Presentation Materials

February 2, 2017 - School Committee Meeting
At their February 2 workshop the School Committee focused on the 9th School at Baldwin and the Brookline High School expansion projects. JLA Architects presented the space summary for a three-section and a four-section elementary school that represented the rooms and spaces needed based on the 9th School educational plan. Superintendent Andrew Bott presented his recommendation for the number of sections needed in the school. The School Committee discussed at length the superintendent's recommendation and will discuss it further at the February 9 School Committee meeting. (Note: The February 9 School Committee meeting was cancelled due to weather so the School Committee will further discuss Superintendent Bott's recommendation on February 16.)

Please See Appendix for Presentation Materials

February 14, 2017 - Building Committee Meeting
The Building Committee for the 9th Elementary School at Baldwin held its fifth meeting on Tuesday, February 14th. In addition to the Building Committee, participants included community members, Jonathan Levi and Philip Gray of Jonathan Levi Architects (JLA), and Traffic Engineer Giles Hamm of Vanasse and Associates, Inc. Mr. Hamm presented the Traffic Study for the 9th School, starting with the "Traffic Impact Assessment" that included data on traffic counts, pedestrian facilities deficiencies, existing wait time and queue lengths and accident data. The presentation highlighted accessibility to the proposed school via surrounding roads and sidewalks, pedestrian improvement, bicycle considerations, transit usage, busing of students, a drop-off/pick-up traffic management plan, a construction management plan, and traffic monitoring (to be done three months after opening and annually). Overall, the qualitative assessment concluded that Baldwin is a good site for the new school. Discussion following the Traffic Study

presentation included topics such as busing in Brookline and the ongoing collaboration between Parks and Recreation and PSB. The committee also took comments and answered questions from community members attending the meeting. The committee then scheduled a Community Open House to allow the public to have a full update on the project, engage in dialogue with the Building Committee Members and provide input. This meeting is scheduled for March 6, 2017 at 7:00 p.m. with the location still to be determined.

Please See Appendix for Presentation Materials

February 28, 2017 - Building Committee Meeting
The Building Committee for the 9th Elementary School at Baldwin met on Tuesday, February 28th to continue discussing design alternatives. David Pollak reported to the Building Committee that, based on Superintendent Bott's recommendation, the School Committee voted in favor of a 3-section PK-8 school that includes a district-wide special education program and a district-wide English language learner program. Taking into consideration community concerns on building size, future school assignment boundaries, and traffic the proposed 3-section school will add students geographically as a 3-section while having 100 fewer students than a full 4-section school. Mr. Pollak also explained that including the district-wide programs will help alleviate the overcrowding in at least two other K-8 schools while providing some cost savings and future flexibility. Following the brief discussion on the School Committee decision, Jonathan Levi and Philip Gray of Jonathan Levi Architects (JLA) presented three design alternatives: Option A, Option D, and Option E. While discussing these options, committee members raised questions about student drop off, car access to the site, and parking, and requested further details on traffic flow. During this preliminary discussion, committee members expressed support for Option D. Toward the end of the meeting, community members were also able to provide input, ask questions, and voice concerns. In addition to traffic considerations, the topic of student reassignment was also brought up, and it was noted that current reassignment criteria can be found on the school district's website. An "open house" format public meeting will be held on Monday, March 6th in the Heath School Cafeteria from 7:00 p.m. to 8:30 p.m. so the Building Committee can continue to get public input on the design alternatives before making a final decision on a preferred design.

Please See Appendix for Presentation Materials

March 6, 2017 - Community Open House Meeting
On Monday, March 6th, more than 100 community members participated in the 9th Elementary School Open House at the Heath School Cafeteria. The meeting began with a brief introduction from Superintendent Bott and a presentation by JLA Architects, then moved into an "open house" environment in which participants visited "stations" on a variety of topics. The Open House format allowed for community members to engage in direct conversation with the Building Committee members, School Committee members, members of the School Committee, Jonathan Levi and Philip Gray from JLA Architects, traffic engineer Giles Hamm, Parks and Recreation representatives, and School Department leaders. Unlike a typical public hearing, the Open House allowed for more community members to participate, get answers to their individual questions, and create a better understanding of where in the process the project stands. The stations included the following: Design Alternative "A", Design Alternative "D", and Design Alternative "E"; Why Brookline Needs a New School; the Traffic Study; Soule Recreation Center Improvements; and Student Assignment. Community members were also offered the opportunity to submit written comments, as well as sign-up for electronic communication about the building project and future meetings.

Please See Appendix for Presentation Materials

March 28, 2017 - Building Committee Meeting
The School Building Committee voted unanimously to proceed with Design Alternative "D".

Please See Appendix for Presentation Materials

April 4, 2017 - Parks and Recreation Commission Meeting
JLA presented alternative proposals for Soule parking access, grading, and improvements.

Please See Appendix for Presentation Materials

April 6, 2017 - School Committee Meeting
Brookline School Committee voted unanimously to proceed with Design Alternative "D".

1.5 LEED Scorecards

The Town of Brookline currently requires that the new school be LEED Silver certifiable as a minimum, but is interested in understanding the potential to build to a Platinum level, and possibly to meet the criteria for Net Zero Emissions. To that end, JLA's LEED consultant The Green Engineer has developed alternative LEED scorecards for the 2 different approaches so as to initiate a comparative analysis.

LEED for Schools v4
Project Scorecard

Project Name: Brookline Ninth Elementary School - Typical MSBA Approach
Project Address: Heath Street, Brookline, MA
Date Updated: March 30, 2017

Yes	?	No
54	23	33

Phase	Yes	?	No			
	1	0	0		**Integrative Process**	1
D	1			Credit 1	**Integrative Process**	1

Yes	?	No
8	3	4

					Location & Transportation	15
D			x	Credit 1	**LEED for Neighborhood Development Location**	15
D	1			Credit 2	**Sensitive Land Protection**	1
D			2	Credit 3	**High Priority Site**	2
D	2	2	1	Credit 4	**Surrounding Density and Diverse Uses**	5
D	3		1	Credit 5	**Access to Quality Transit**	4
D		1		Credit 6	**Bicycle Facilities**	1
D	1			Credit 7	**Reduced Parking Footprint**	1
D	1			Credit 8	**Green Vehicles**	1

Yes	?	No
5	4	3

					Sustainable Sites	12
C	Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
D	Y			Prereq 2	**Environmental Site Assessment**	Required
D	1			Credit 1	**Site Assessment**	1
D		1	1	Credit 2	**Site Development - Protect or Restore Habitat**	2
D			1	Credit 3	**Open Space**	1
D		3		Credit 4	**Rainwater Management**	3
D	2			Credit 5	**Heat Island Reduction**	2
D	1			Credit 6	**Light Pollution Reduction**	1
D			1	Credit 7	**Site Master Plan**	1
D	1			Credit 8	**Joint Use of Facilities**	1

Yes	?	No
4	1	7

					Water Efficiency	12
D	Y			Prereq 1	**Outdoor Water Use Reduction**	Required
D	Y			Prereq 2	**Indoor Water Use Reduction**	Required
D	Y			Prereq 3	**Building-level Water Metering**	Required
D	1		1	Credit 1	**Outdoor Water Use Reduction**	2

D	2	1	4	Credit 2	**Indoor Water Use Reduction**	7
D			2	Credit 3	**Cooling Tower Water Use**	2
D	1			Credit 4	**Water Metering**	1

Yes	?	No				
14	6	11		**Energy & Atmosphere**		31
C	Y		Prereq 1	**Fundamental Commissioning and Verification**		Required
D	Y		Prereq 2	**Minimum Energy Performance**		Required
D	Y		Prereq 3	**Building-level Energy Metering**		Required
D	Y		Prereq 4	**Fundamental Refrigerant Management**		Required
C	3	2	1	Credit 1	**Enhanced Commissioning**	6
D	11		5	Credit 2	**Optimize Energy Performance**	
					6% Improvement in Energy Performance	1
					8% Improvement in Energy Performance	2
					10% Improvement in Energy Performance	3
					12% Improvement in Energy Performance	4
					14% Improvement in Energy Performance	5
					16% Improvement in Energy Performance	**6**
					18% Improvement in Energy Performance	7
					20% Improvement in Energy Performance	8
					22% Improvement in Energy Performance	9
					24% Improvement in Energy Performance	10
				x	26% Improvement in Energy Performance	11
					29% Improvement in Energy Performance	12
					32% Improvement in Energy Performance	13
					35% Improvement in Energy Performance	14
					38% Improvement in Energy Performance	15
					42% Improvement in Energy Performance	16
D		1		Credit 3	**Advanced Energy Metering**	1
C			2	Credit 4	**Demand Response**	2
D			3	Credit 5	**Renewable Energy Production**	
				Credit 2	1% Renewable Energy	1
				Credit 3	5% Renewable Energy	2
				Credit 4	10% Renewable Energy	3
D		1		Credit 6	**Enhanced Refrigerant Management**	1
C		2		Credit 7	**Green Power and Carbon Offsets**	
				Credit 7	50% Total Energy Addressed by Green Power, RECs +/or Offsets	1
				Credit 8	100% Total Energy Addressed by Green Power, RECs +/or Offsets	2

Yes	?	No				
6	1	6		**Materials & Resources**		13
D	Y		Prereq 1	**Storage & Collection of Recyclables**		Required
C	Y		Prereq 2	**Construction and Demolition Waste Management Planning**		Required
C	3		2	Credit 1	**Building Life-cycle Impact Reduction**	5
C	1		1	Credit 2	**Building Product Disclosure and Optimization**-Environmental Product Declarations	2
C			2	Credit 3	**Building Product Disclosure and Optimization**-Sourcing of Raw Matls.	2
C		1	1	Credit 4	**Building Product Disclosure and Optimization**-Material Ingredients	2

C	2			Credit 5	**Construction and Demolition Waste Management**	2

Yes	?	No			
8	6	2		**Indoor Environmental Quality**	16
D	Y		Prereq 1	**Minimum IAQ Performance**	Required
D	Y		Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
D	Y		Prereq 3	**Minimum Acoustical Performance**	Required
D	1	1	Credit 1	**Enhanced IAQ Strategies**	2
C	1	1	1	Credit 2	**Low-Emitting Materials**	
				Y	Three of seven compliant categories	1
				M	Five of seven compliant categories	2
				N	Six of seven compliant categories	3
C	1			Credit 3	**Construction IAQ Management Plan**	1
C	2			Credit 4	**IAQ Assessment**	2
D	1			Credit 5	**Thermal Comfort**	1
D	1	1		Credit 6	**Interior Lighting**	2
D		3		Credit 7	**Daylight**	3
D	1			Credit 8	**Quality Views**	1
D			1	Credit 9	**Acoustic Performance**	1

Yes	?	No			
6	0	0		**Innovation**	6
D	1			Credit 1	**Innovation in Design: To be determined**	1
D	1			Credit 2	**Innovation in Design: To be determined**	1
D	1			Credit 3	**Innovation in Design: To be determined**	1
C	1			Credit 4	**Innovation in Design: To be determined**	1
C	1			Credit 5	**Innovation in Design: TBD Pilot**	1
C	1			Credit 6	**LEED Accredited Professional**	1

Yes	?	No			
2	2	0		**Regional Priority Credits - earn up to 4 points**	4
				Zip code: 02445	
		1	Credit 1	**Renewable Energy Production (2pt / 3%)**	1
		1	Credit 2	**High Priority Site (2 pts)**	1
	1		Credit 3	**Rainwater Management (2 pts)**	1
1			Credit 4	**Building Life-Cycle Impact Reduction (2pts)**	1
1			*Credit 5*	**Optimize Energy Performance (8pts)**	
	1		*Credit 6*	**Indoor Water Use Reduction (4 pts)**	

Yes	?	No		
54	23	33	**Project Totals (Certification Estimates)**	110

Certified: 40-49 points, **Silver:** 50-59 points, **Gold:** 60-79 points, **Platinum:** 80+ points

LEED for Schools v4
Project Scorecard

Project Name: Brookline Ninth Elementary School - Platinum NZE
Project Address: Heath Street, Brookline, MA
Date Updated: March 30, 2017

Yes	?	No
83	5	22

Phase	Yes	?	No			
	1	0	0		**Integrative Process**	1
D	1			Credit 1	**Integrative Process**	1

	Yes	?	No			
	9	2	4		**Location & Transportation**	15
D			x	Credit 1	**LEED for Neighborhood Development Location**	15
D	1			Credit 2	**Sensitive Land Protection**	1
D			2	Credit 3	**High Priority Site**	2
D	2	2	1	Credit 4	**Surrounding Density and Diverse Uses**	5
D	3		1	Credit 5	**Access to Quality Transit**	4
D	1			Credit 6	**Bicycle Facilities**	1
D	1			Credit 7	**Reduced Parking Footprint**	1
D	1			Credit 8	**Green Vehicles**	1

	Yes	?	No			
	10	0	2		**Sustainable Sites**	12
C	Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
D	Y			Prereq 2	**Environmental Site Assessment**	Required
D	1			Credit 1	**Site Assessment**	1
D	1		1	Credit 2	**Site Development - Protect or Restore Habitat**	2
D			1	Credit 3	**Open Space**	1
D	3			Credit 4	**Rainwater Management**	3
D	2			Credit 5	**Heat Island Reduction**	2
D	1			Credit 6	**Light Pollution Reduction**	1
D	1			Credit 7	**Site Master Plan**	1
D	1			Credit 8	**Joint Use of Facilities**	1

	Yes	?	No			
	7	0	5		**Water Efficiency**	12
D	Y			Prereq 1	**Outdoor Water Use Reduction**	Required
D	Y			Prereq 2	**Indoor Water Use Reduction**	Required
D	Y			Prereq 3	**Building-level Water Metering**	Required
D	2			Credit 1	**Outdoor Water Use Reduction**	2

D	4		3	Credit 2	**Indoor Water Use Reduction**	7
D			2	Credit 3	**Cooling Tower Water Use**	2
D	1			Credit 4	**Water Metering**	1

Yes	?	No			
26	2	3		**Energy & Atmosphere**	31
C	Y		Prereq 1	**Fundamental Commissioning and Verification**	Required
D	Y		Prereq 2	**Minimum Energy Performance**	Required
D	Y		Prereq 3	**Building-level Energy Metering**	Required
D	Y		Prereq 4	**Fundamental Refrigerant Management**	Required
C	5		1	Credit 1	**Enhanced Commissioning**	6
D	16			Credit 2	**Optimize Energy Performance**	
					6% Improvement in Energy Performance	1
					8% Improvement in Energy Performance	2
					10% Improvement in Energy Performance	3
					12% Improvement in Energy Performance	4
					14% Improvement in Energy Performance	5
					16% Improvement in Energy Performance	**6**
					18% Improvement in Energy Performance	7
					20% Improvement in Energy Performance	8
					22% Improvement in Energy Performance	9
					24% Improvement in Energy Performance	10
					26% Improvement in Energy Performance	11
					29% Improvement in Energy Performance	12
					32% Improvement in Energy Performance	13
					35% Improvement in Energy Performance	14
					38% Improvement in Energy Performance	15
					x 42% Improvement in Energy Performance	16
D		1		Credit 3	**Advanced Energy Metering**	1
C			2	Credit 4	**Demand Response**	2
D	3			Credit 5	**Renewable Energy Production**	
				Credit 2	1% Renewable Energy	1
				Credit 3	5% Renewable Energy	2
				Credit 4	X 10% Renewable Energy	3
D		1		Credit 6	**Enhanced Refrigerant Management**	1
C	2			Credit 7	**Green Power and Carbon Offsets**	
				Credit 7	50% Total Energy Addressed by Green Power, RECs +/or Offsets	1
				Credit 8	X 100% Total Energy Addressed by Green Power, RECs +/or Offsets	2

Yes	?	No			
6	1	6		**Materials & Resources**	13
D	Y		Prereq 1	**Storage & Collection of Recyclables**	Required
C	Y		Prereq 2	**Construction and Demolition Waste Management Planning**	Required
C	3		2	Credit 1	**Building Life-cycle Impact Reduction**	5
C	1		1	Credit 2	**Building Product Disclosure and Optimization**-Environmental Product Declarations	2
C			2	Credit 3	**Building Product Disclosure and Optimization**-Sourcing of Raw Matls.	2
C		1	1	Credit 4	**Building Product Disclosure and Optimization**-Material Ingredients	2
C	2			Credit 5	**Construction and Demolition Waste Management**	2

Yes	?	No				
14	0	2		**Indoor Environmental Quality**		16
D	Y		Prereq 1	**Minimum IAQ Performance**		Required
D	Y		Prereq 2	**Environmental Tobacco Smoke (ETS) Control**		Required
D	Y		Prereq 3	**Minimum Acoustical Performance**		Required
D	2		Credit 1	**Enhanced IAQ Strategies**		2
C	2		1 Credit 2	**Low-Emitting Materials**		
				Y	Three of seven compliant categories	1
				Y	Five of seven compliant categories	2
				N	Six of seven compliant categories	3
C	1			Credit 3	**Construction IAQ Management Plan**	1
C	2			Credit 4	**IAQ Assessment**	2
D	1			Credit 5	**Thermal Comfort**	1
D	2			Credit 6	**Interior Lighting**	2
D	3			Credit 7	**Daylight**	3
D	1			Credit 8	**Quality Views**	1
D			1 Credit 9	**Acoustic Performance**		1

Yes	?	No			
6	0	0		**Innovation**	6
D	1		Credit 1	**Innovation in Design: To be determined**	1
D	1		Credit 2	**Innovation in Design: To be determined**	1
D	1		Credit 3	**Innovation in Design: To be determined**	1
C	1		Credit 4	**Innovation in Design: To be determined**	1
C	1		Credit 5	**Innovation in Design: TBD Pilot**	1
C	1		Credit 6	**LEED Accredited Professional**	1

Yes	?	No			
4	0	0		**Regional Priority Credits - earn up to 4 points**	4
				Zip code: 02445	
1			Credit 1	**Renewable Energy Production (2pt / 3%)**	1
		1	Credit 2	**High Priority Site (2 pts)**	1
1			Credit 3	**Rainwater Management (2 pts)**	1
1			Credit 4	**Building Life-Cycle Impact Reduction (2pts)**	1
1			*Credit 5*	**Optimize Energy Performance (8pts)**	
1			*Credit 6*	**Indoor Water Use Reduction (4 pts)**	

Yes	?	No		
83	5	22	**Project Totals (Certification Estimates)**	110

Certified: 40-49 points, **Silver:** 50-59 points, **Gold:** 60-79 points, **Platinum:** 80+ points

1.7 Building System Narratives

Garcia, Galuska & DeSousa Engineers have developed preliminary narratives for HVAC, Plumbing, Fire Protection, Electrical, and Technology systems for initial review and cost estimating purposes.

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HVAC SYSTEMS

NARRATIVE REPORT

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for ***LEED for Schools v4*** where indicated on this narrative.

1. CODES

   All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC 2012, IECC 2015 and IMC 2012 with MA Amendments, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

   Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

   Outside: Winter 5 deg. F, Summer 91 deg. F DB 74 deg. F WB

   Inside: 70 deg. F +/- 2 deg. F for heating, 75 deg. F +/- 2 deg. F (55% RH) for cooling for areas with air conditioning, 78 deg. F +/- 2 deg. F (<60% RH) for areas with displacement/dehumidification*(see note below). Unoccupied temperature setback will be provided (60 deg. F heating (adj.), 85 deg. F cooling/dehumidification (adj.).

   Outside air is provided at the rate in accordance with ASHRAE guide 62.1-2010 and the International Mechanical Code as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

   A. Central Heating Plants: ***LEED for Schools Credit Ep2 & Ec2***

      Heating for the entire building will be through the use of a high efficiency gas-fired condensing boiler plant.

      The new boiler plant shall be provided with (3) 2,500 MBH input high efficiency boilers and (2) end suction base mounted pumps primary and standby with a capacity of 540 gpm each will be located in the mechanical room. Boilers shall each be sized for approximately 50% of the building heating load. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided.

The boiler plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The boiler plant shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the power plants. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

The hot water system will consist of a 35% propylene glycol solution. A glycol make-up feed unit system shall be provided.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will be depending on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: ***LEED for Schools Credit Ep2 & 4, Ec2***

A high efficiency central chilled water cooling plant consisting of a (3) 75-ton high efficiency "Turbo-cor" or "Mag-Lev" (oil-less compressor design) water cooled chillers (total plant capacity of 225 tons), primary and standby chilled water pumps with VFDs, each with a capacity of 540 gpm, accessories, controls and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

An induced draft counter-flow cooling tower system, consisting of (2) two open cell induced draft cooling towers, equipped with filtration and chemical treatment system and condenser water pump set and controls shall be provided as part of the chilled water system.

C. Classroom Heating and Ventilation *(General Classrooms, Science, Art & Music, SPED, Vocational & Technology Classrooms)**:***
LEED for Schools Credit Ep2 & 4, Ec2 & 3, IEQp1 & 3, IEQc1, 2, 3, 4, 5, & 9

It is proposed that new displacement ventilation systems are installed to serve the building's Classroom areas under this Option.

New air handling units with supply and return fan with VFDs, dual energy recovery wheels, hot water heating and chilled water cooling with modulating capacity control, and MERV 13 filtration will be provided to serve a new displacement ventilation system. Supply air will be provided to the space through new insulated, galvanized steel supply duct distribution system and shall be connected to wall mounted displacement ventilation diffusers located within the classrooms. Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided along exterior walls.

Each classroom will be provided with a variable air volume terminal box and CO2 sensor for demand ventilation control.

It is estimated that the air handling equipment with the capacity of 55,000 CFM (200 tons cooling), 1,850 MBH heating will be required to serve the Classroom areas:

Displacement Ventilation:

The displacement ventilation system for the classroom wings are intended to provide a maximum cooling temperature during peak cooling periods of approximately 78 deg. F, however, the ventilation air provided will be extremely dry which will be the result of utilizing cooling equipment to reduce vapor pressure to an extremely low condition of approximately 50 grains of moisture per pound of air and reheating the air to a supply temperature of approximately 68 deg. F which will be distributed to each space. The extremely dry condition of the supply air provides the perception of a condition that is cooler than is actually occurring due to the evaporation of moisture to the adjacent air from the occupants of the space.

Considering maximum cooling requirements occur primarily during the months of July and August when the majority of the academic areas are not in use, it would suggest maintaining slightly higher temperatures may not present a discomfit, however, will relate to a substantial operating cost savings and a reduced installation cost.

An additional major benefit of utilizing dry air within the building will be the overall reduction of vapor pressure typically present in outside ventilation air during summer months. This reduction in vapor pressure will dramatically reduce the amount of moisture entering the building and the potential of condensation resulting in moisture, and a direct relationship with the formation of mold.

Classrooms Requiring Full Air Conditioning:

Classrooms that require full air conditioning will be provided with supplemental cooling active chilled beam induction units.

D. Gymnasium (Partial AC/Dehumidification):
LEED for Schools Credit Ep2 & 4, Ec2 & 3, IEQp1 & 3, IEQc1, 2, 3, 4, 5, & 9

The gymnasium will be served by an air handling unit of the recirculation design. The unit will be approximately 7,500 CFM and will include supply and return fans with VFDs, 400 MBH heating and 25 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through galvanized steel supply duct with high capacity ceiling mounted diffusers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a low wall return air register.

E. Public Gymnasium (Partial AC/Dehumidification):
LEED for Schools Credit Ep2 & 4, Ec2 & 3, IEQp1 & 3, IEQc1, 2, 3, 4, 5, & 9

The gymnasium will be served by an air handling unit of the recirculation design. The unit will be approximately 4,800 CFM and will include supply and return fans with VFDs, 280 MBH heating and 17 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through galvanized steel supply duct with high capacity ceiling mounted diffusers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a low wall return air register.

F. Administration Areas (Air Conditioned):
LEED for Schools Credit Ep2 & 4, Ec2 & 3, IEQp1 & 3, IEQc1, 2, 3, 4, 5, & 9

Spatial heating and air-conditioning for the Administration areas will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

The air handling unit will have a capacity of approximately 2,500 CFM and will include supply and return fan with VFDs, 135 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 10 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

G. Media Center (Air Conditioned):
LEED for Schools Credit Ep2 & 4, Ec2 & 3, IEQp1 & 3, IEQc1, 2, 3, 4, 5, & 9
The Media Center will be provided with an air-handling unit capable of providing 100% outside air and variable air volume operation. The AHU-5 unit will be approximately 4,000 CFM and will include supply and return fan with VFDs, 200 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 15 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. It is proposed that spatial heating and air-conditioning for zones will be provided by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units. Ventilation air to these perimeter areas will be provided by the associated air handling ventilation unit, with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

H. Cafeteria and Staff Lunch Areas (Air Conditioned):
LEED for Schools Credit Ep2 & 4, Ec2 & 3, IEQp1 & 3, IEQc1, 2, 3, 4, 5, & 9

The Cafeteria area will be served by an air-handling unit capable of providing 100% outside air. The units will be approximately 5,500 CFM and will include supply and return fan with VFDs, 320 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 17-ton chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space through galvanized steel supply duct that will connect to floor level displacement diffuser distribution which will satisfy building code requirements based on population. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 800 ppm. As levels drop generally relating to a reduction in population the air-handling unit outside air damper will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by ceiling mounted return air registers.

I. Kitchen (Heating/Partial AC Dehumidification):
LEED for Schools Credit Ep2 & 4, Ec2 & 3, IEQp1 & 3, IEQc1, 2, 3, 4, 5, & 9

The kitchen areas shall be provided with a kitchen exhaust fan from a new kitchen exhaust air fan system. It is estimated that a kitchen exhaust fan system with a capacity of 6,000 CFM is required. The kitchen will be heated and provided with make-up air from a 5,500 CFM make-up air handling unit equipped with hot water heating for heating and chilled water cooling for dehumidification control.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical contractors.

J. Auditorium (Air Conditioned):
LEED for Schools Credit Ep2 & 4, Ec2 & 3, IEQp1 & 3, IEQc1, 2, 3, 4, 5, & 9

The Auditorium will be served by an air-handling unit capable of providing 100% outside air. The units will be approximately 7,500 CFM and will include supply and return fan with VFDs, 380 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 25-ton chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space through galvanized steel supply duct that will connect to floor level displacement diffuser distribution which will satisfy building code requirements based on population. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 800 ppm. As levels drop generally relating to a reduction in population the air-handling unit outside air damper will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by ceiling mounted return air registers.

K. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters and fin tube radiation heating equipment shall be installed to provide heating to these areas. Corridors shall be ventilated from adjacent air handling unit systems.

L. Custodial Support Areas:

Custodial support areas will be heated and ventilated by a heating and ventilation unit. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the loading dock. All custodial closets will be exhausted by exhaust air fan systems.

M. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The main IDF room will be air conditioned by high efficiency ductless AC cooling units.

N. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

O. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) automatic temperature control and building energy management system shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

Lighting control and door access control system shall be integrated into the BMS system.

The control system shall be as manufactured by Johnson Controls (Metasys), Siemens (Apogee) or Delta Controls.

5. TESTING REQUIREMENTS:

A. The mechanical contractor shall provide testing of the following systems with the owner and owner's representative present:

1. Hot Water Boiler plant system

2. Chilled water plant system

3. Air handling unit systems including all indoor air handling systems and exhaust air systems

4. Terminal heating and cooling devices

5. Automatic temperature control and building energy management system

B. Testing reports shall be submitted to the engineer for review and approval before providing to the owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS: When the project is completed, the mechanical contractor shall provide operation and maintenance manuals to the owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS: When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the owner.

8. COMMISSIONING: The project shall be commissioned per Section 018000 of the specifications.

9. PHASING REQUIREMENTS:

During all Phases of Construction, the following SMACNA IAQ Guidelines for Occupied Building Under Construction, 2007shall be meet to maintain proper indoor air quality with in the occupied areas. Areas to remain occupied shall be positively pressured in relationship to the construction zone to prevent constitution debris from entering the occupied areas. Construction areas shall be exhausted to prevent construction debris from entering the occupied areas. All return grilles shall be covered with MERV-8 filter media, all fresh air supply units shall be provided with MERV-13 media and all filter media shall be changed on a regular basis in accordance with SMACNA IAQ Guidelines to maintain the IAQ with in the occupied areas.

All new ductwork shall be installed per SMACNA guidelines for “Duct Cleanliness for New Construction Guidelines”. A high level of indoor air quality shall be maintained throughout the duration of the project construction phase.

Testing, Balancing and Commissioning: A complete HVAC system Testing and Balancing, encompassing all HVAC systems and equipment installed during that phase shall be performed at the completion of each phase. Once all phases are completed a complete testing and balancing report shall be issued which shall require the balancing contractor to re-balance the entire system as a whole and modify systems as required.

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PLUMBING SYSTEMS

NARRATIVE REPORT

The following is the Plumbing system narrative, which defines the scope of work and capacities of the Plumbing system as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for ***LEED for Schools*** where indicated on this narrative.

1. CODES

   A. All work installed under Section 220000 shall comply with the MA Building Code, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. The Plumbing Systems that will serve the project are cold water, hot water, tempered water, sanitary waste and vent system, grease waste system, special waste system, storm drain system, and natural gas.

   B. The Building will be serviced by Municipal water and Municipal sewer system.

   C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

4. DRAINAGE SYSTEM

   A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.

   B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The grease interceptor is provided under Division 33 scope.

   C. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point 10 feet outside the building.

   D. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type 'L' copper.

   E. A separate Special Waste System shall be provided starting with a connection to an interior limestone chip acid neutralizer, running thru the building to collect science classroom fixtures and terminating with vent terminals through the roof. Special Waste and Vent piping will be Schedule 40 electric heat fused polypropylene piping, fittings and traps, flame retardant above grade and non-flame retardant below ground.

5. WATER SYSTEM

A. New 4 inch domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided.

B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

C. Domestic hot water heating will be provided with a combination of two gas fired, high efficiency, condensing water heaters (600,000 BTUH total input), with separate storage tank (300 gallon). System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

D. A pump will re-circulate hot water from the piping system. Water temperature will be 120 deg. to serve general use fixtures. A 140 deg. F hot water will be supplied to the kitchen dishwasher.

E. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high density fiberglass.

6. GAS SYSTEM

A. Natural gas service will be provided for the building and will serve the boilers, domestic water heaters, kitchen cooking equipment, roof top equipment and generator.

B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt welded fittings for 2-1/2 in. and larger.

7. FIXTURES ***LEED for Schools Credit WEp1 & WEc3***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.

C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Eljer, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Manually operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Manually operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet programmed for 10 second run-time cycle.

4. Sink: ADA/MAAB stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

5. Drinking Fountain: Barrier free, hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.

6. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.

7. Laboratory Sinks: Faucets with vacuum breakers and 0.74 GPM aerators.

8. DRAINS

A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

9. VALVES

A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

10. INSULATION

A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.

11. CLEANOUTS

A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

B. Cleanouts for Special Waste System shall be Zurn #Z9A-C04 polypropylene cleanout plug with Zurn #ZANB-1463-VP nickel bronze scoriated floor access cover.

12. ACCESS DOORS

A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

A. Gas fired, high efficiency, condensing water heaters (600,000 BTUH total input), with separate storage tank (300 gallon).

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FIRE PROTECTION SYSTEMS

NARRATIVE REPORT

The following is the Fire Protection system narrative, which defines the scope of work and capacities of the Fire Protection system as well as the Basis of Design.

1. CODES

   A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. In accordance with the provisions of the Massachusetts Building Code, a school building of greater than 12,000s.f. must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. The new building will be served by a new 8 inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.

   B. System will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   C. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain. Standpipes meeting the requirements of NFPA 14-2013 shall be provided in the egress stairwells and in the Stage area.

   D. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.

   E. All sprinkler heads will be quick response, pendent in hung ceiling areas and upright in unfinished areas.

   F. Fire department valves and cabinets will be provided on each side of the Stage in the Building.

5. BASIS OF DESIGN

A. The mechanical rooms, kitchen, science classrooms, and storage rooms are considered Ordinary Hazard Group 1; stage is considered Ordinary Hazard Group 2; all other areas are considered light hazard.

B. Required Design Densities:

Light Hazard Areas:	0.10 GPM over 1,500 s.f.
Ordinary Hazard Group 1:	0.15 GPM over 1,500 s.f.
Ordinary Hazard Group 2:	0.20 GPM over 1,500 s.f.

C. Sprinkler spacing (max.):

Light Hazard Areas:	225 s.f.
Ordinary Hazard Areas:	130 s.f.

D. A flow test must be performed to confirm capacity of Municipal water supply.

6. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.

B. Double check valve detector assembly shall be of one of the following:

1. Watts Series 757-OSY
2. Wilkins 350A-OSY
3. Conbraco Series 4S-100
4. Or equal

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ELECTRICAL SYSTEMS

NARRATIVE REPORT

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting system as well as the Basis of Design. The electrical systems shall be designed and constructed for ***LEED for Schools*** where indicated on this narrative. This project shall confirm to LEED Silver rating.

1. CODES

   All work installed under Division 26 shall comply with the Massachusetts State Building Code, IBC 2009 Appendix 115AA - Stretch Energy Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Section 260000 is indicated in this narrative report. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. SEQUENCE OF OPERATIONS AND INTERACTIONS

   A. Classroom and corridor lighting will be controlled via “addressable relays”, which is achieved through programming. The control of the relays shall be by automatic means such as an occupancy sensor in each classroom and corridors.

   B. Exterior lighting will be controlled by photocell “on” and “schedule” for “off” operation. The vehicle circulation area lighting will be controlled by “zones” and will have dimming-level control.

   C. Emergency and exit lighting will be run through life safety panels to be on during normal power conditions as well as power outage conditions.

4. DESCRIPTION OF THE SYSTEMS

   A. Electrical Distribution System:

      1. New construction service ratings are designed for a demand load of 10 watts/s.f. The service capacity will be sized for 2000 amperes with 100% rating at 277/480 volt, 3Ø, 4wire. New lighting and power panels will be provided to accommodate respective loads. The service capacity will be sized for 20% spare capacity. The service will be central to main building and feed other buildings. A single meter will be used for entire site so that future PV will serve all loads on site.

B. Interior Lighting System:

1. Classroom lighting fixtures consist of indirect LED luminaries with dimming drivers. The fixtures will be pre-wired for dimming control where natural daylight is available and also for multi-level switching. Office lighting fixtures will consist of similar fixtures to classrooms. Offices on the perimeter with windows shall have daylight dimming controls**.** In existing building recessed LED panel fixtures will be used.

   In general lighting power density will be 40 percent less than IECC 2015. The power density reduction relates to ***LEED for Schools Credit EAC1.***

2. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming footcandle level will be in compliance with ***LEED for Schools IEQ 6.1.***

3. Gymnasium and multi-purpose lighting will be comprised of direct LED fixtures with dimming drivers. The fixtures will be provided with protective wire guards. The light level will be designed for approximately 50 foot candles.

   Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

4. Corridor lighting will be comprised of linear indirect lighting using LED light source. The corridor light level will be designed for approximately 15 foot candles. Corridor lighting will be on a schedule through the DDC system control and only “on” during occupied hours. The corridor lighting will have two level control.

5. Cafeteria lighting will be LED fixtures with dimming drivers. The light levels will be designed for approximately 20 foot candles.

6. Kitchen and Servery lighting will consist of recessed 1 ft. x 4 ft. lensed and gasketed LED panels. Light levels will be approximately 50 foot candles.

7. Library lighting will consist of indirect fixtures with LED dimmable drivers. Light levels will be approximately 30 foot candles.

9. Each area will be locally switched and designed for multi-level controls. Each classroom, office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight sensors will be installed in each room where natural light is available for dimming of light fixtures. The manual controls will allow user to dim each scene.

10. The entire school will be controlled with an automatic lighting control system using the DDC control system for schedule programming of lights.

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C. Emergency Lighting System:

1. An interior 100 kW natural gas fuelled indoor emergency generator will be provided. Emergency light fixtures and LED exit signs will be installed to serve all egress areas such as corridors, intervening spaces, toilets, stairs and exit discharge exterior doors. The administration area lighting will be connected to the emergency generator.

2. The generator will be sized to include life safety systems, boilers and circulating pumps and communications systems.

D. Site Lighting System

1. Fixtures for area lighting will be pole-mounted cut-off 'LED' luminaries in the drop-off areas. The fixtures shall be per Town of Brookline standards. Pole heights will be below 12 ft. The exterior lighting will be connected to the automatic lighting control system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5 foot candle minimum for parking areas in accordance with Illuminating Engineering Society.

2. Building perimeter fixtures will be wall mounted cut-off over exterior doors for exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit. Refer to drawings.

2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.

3. Corridors will have a cleaning receptacle at approximately 25 foot intervals.

4. Exterior weatherproof receptacles will be installed at exterior doors.

5. A system of computer grade panelboards with double neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with 60 battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms. The control panel shall be manufactured by Notifier.

2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.

3. The sprinkler system will be supervised for water flow and tampering with valves.

4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas and other large spaces. Strobe only units will be provided in single toilets and conference rooms.

5. Manual pull stations will be provided at exit discharge doors.

6. The system will be remotely connected to automatically report alarms to fire department via wireless master box.

G. Uninterruptible Power Supply (UPS):

1. One (1) 24kw, three (3) phase centralized UPS systems will be provided with battery back-up.

2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers, communication systems, etc. during a prolonged power outage.

3. The UPS systems will also be connected to the stand by generator.

H. Lightning Preventer System:

1. Lightning preventer devices will be provided to provide coverage for the entire building.

2. The lightning preventer equipment will include lightning preventers, conductors, conduits, fasteners, connectors, ground rods, etc.

5. TESTING REQUIREMENTS

The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's representative present:

- Lighting and power panels for correct phase balance.
- Emergency generator.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Security system.

Testing reports shall be submitted to the engineer for review and approval before providing to the Owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS:

When the project is completed, the Electrical Contractor shall provide operation and maintenance manuals to the Owner.

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7. RECORD DRAWINGS AND CONTROL DOCUMENTS:

When the project is completed, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

8. COMMISSIONING

The project shall be commissioned per Section 018000 of the specifications.

9. RENEWABLE ENERGY PROVISIONS

Provisions for a renewable energy system will consist of largest capacity (restricted by roof area) grid connected photovoltaic PV system intended to reduce the facilities demand for electricity and reduce carbon emissions. The photovoltaic system will be installed at a future date. The project will be PV ready.

10. SITE UTILITIES

The Electric, Telephone and Cable TV utilities will be underground for each system provided.

11. CCTV

A Closed Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally on exterior building perimeter. The exterior cameras are fixed type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

12. INTRUSION SYSTEM

An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

The system will include a digital communicator to summons the central station in the event of an alarm condition.

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

13. CARD ACCESS

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.

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TECHNOLOGY SYSTEMS

NARRATIVE REPORT

The following is the Technology System narrative, which defines the scope of work and capacities of the Communications system infrastructure and Security system as well as the Basis of Design.

1. CODES

   A. All work installed under Section 270000 shall comply with the Massachusetts Building Code, IBC 2009, and all local, county, and federal codes, laws, statues, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Technology and Security work and all items incidental thereto, including commissioning and testing.

3. TECHNOLOGY

   A. The data system infrastructure will consist of fiber optic backbone cabling. Horizontal wiring will consist of Category 6A UTP Non-Plenum rated cabling for both data and telephone systems for gigabit connectivity. The telephone infrastructure will accommodate VOIP based voice systems. A new IP telephone system will be used.

   B. Each classroom will have 2 data outlets for student computers. Two data with video and audio connections to a wall mounted touch screen monitor will be provided at teacher's station. A wall phone will be provided for communications with administration in each classroom. Wireless access points will be provided in all classrooms and other spaces with (2) CAT6A cables.

   C. A central paging system will be provided and integrated with the telephone system. The speakers shall be IP and manufactured by Valcom.

   D. A wireless GPS/LAN based master clock system will be provided with 120V wireless remote clocks that act as transceivers.

   E. The Main Distribution Frame (MDF) will contain all core network switching and IP voice switch. Intermediate Distribution Frames (IDFs) will serve each floor/wing of the school. A fiber optic backbone will be provided from each IDF to MDF. The backbone will be designed for 10 Gbps Ethernet.

4. TESTING REQUIREMENTS

A. The Technology and Security Contractors shall provide testing of the following systems with the Owner and Owner's representative present:

- Telephone and data cabling
- Fiber optic backbone cabling
- Paging system
- Wireless clock system
- A/V wiring for classrooms

Testing reports shall be submitted to the engineer for review and approval before providing to the Owner.

5. OPERATION MANUALS AND MAINTENANCE MANUALS:

A. When the project is completed, the Technology Contractor shall provide operation and maintenance manuals to the Owner.

6. RECORD DRAWINGS AND CONTROL DOCUMENTS:

A. When the project is completed, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

7. COMMISSIONING

A. The project shall be commissioned per Commissioning Section of the specifications.

1.6 Decision Path

At an early point in the process the design team proposed the development of a comprehensive evaluation matrix to collect, correlate, summarize and compare the diverse evaluation criteria in one document. The evaluation matrix, having been drafted by the design team, was then thoughtfully updated as variety of relevant ideas and concerns came to light from multiple sources from Brookline officials and neighborhood stakeholders.

The following building test fit alternatives, the commentary which they have elicited from the wide range of stakeholders, and the summary tool of the evaluation matrix are provided in Section 3 of this report.

2 Educational Program

School Program

The School Department has carefully considered alternative school size configurations to best serve students in the catchment area around the Baldwin site, as well as the needs of Brookline as a whole. 3 and 4 section alternatives were evaluated, as described in the draft education plan included in Chapter 2.1. Superintendent Bott's memo included in chapter 2.2 recommends a 3 section school with town-wide ELL and SWD programs. This recommendation results in a proposed 645 student school, with spaces described in chapters 2.3 and 2.4.

9th Elementary School Educational Program

Public Schools of Brookline

December 12, 2016 Draft

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9th ELEMENTARY SCHOOL EDUCATIONAL PROGRAM

The Public Schools of Brookline (PSB) provides an education to preschool through twelfth grade students in eight elementary schools, one comprehensive high school, and early childhood programs in rental spaces across town. In addition to school-based programs, the Public Schools of Brookline offers continuing education courses, summer school, enrichment programs, and numerous athletic opportunities.

For more than two decades, the Public Schools of Brookline has been guided by four core values: high achievement for all, excellence in teaching, collaboration, and respect for human differences. More recently, a fifth core value was added – educational equity. The core values, along with a vision, mission, and set of aspirational goals, create the foundation for the work in our schools and across the district. Once finalized, the district-wide strategic plan will provide inspiration and direction, while holding us accountable to fulfilling our vision, which begins with:

Brookline provides an extraordinary education for every child.
Each child's unique path to achievement
is supported in academically exciting and programmatically rich environments.

These two sentences could be part of a school system's vision statement today or 50 years ago; however, the reality of what schools from these two eras would look like is vastly different. Fifty years ago, or in some cases just ten years ago, what was considered extraordinary, exciting, and programmatically rich now borders on being irrelevant for the teaching and learning that is required today. No longer is learning confined to the classroom. Learning is ubiquitous. No longer is there a finite body of knowledge that a teacher imparts to her students. Now, there is a vast amount of information available to students, not just by way of the teacher, but also by virtue of access to technology. Described as the "Four Cs" or "super skills" for the 21st century, communication, collaboration, critical thinking, and creativity are redefining the basics of children's learning experiences. No longer is "smart" defined solely by scores on standardized tests. Instead, intelligence and talent are expressed in a variety of ways: applying knowledge, creating products, solving complex problems, systems thinking, design and testing, and knowing how to learn[1].

[1] M. Neumeier, *Metaskills: Five Talents for the Robotic Age,* New Riders, 2013

STRATEGIC PLAN GOALS

Our teaching and learning aspirations described in the strategic plan visionary goals drive our building plans. The 9th Elementary School building plan was developed with an understanding of how the physical structures can create and sustain an environment that maximizes student learning. It is essential that the school be flexible, with spaces that can be used for multiple purposes, are accessible (both physically and technologically), and create an environment that promises interest, creativity, and multiple learning opportunities.

Goal 1: Every Student Achieving
Ensure that every student meets or exceeds Brookline's high standards and eliminate persistent gaps in student achievement by establishing educational equity across all classrooms, schools, and programs.

Goal 2: Every Student Invested in Learning
Increase every student's ownership of individual learning and achievement by using rigor, relevance, and relationships to foster a spirit of inquiry and the joy of learning.

Goal 3: Every Student Prepared for Change and Challenge
Instill in every student the habits of mind and life strategies critical for success in meeting the intellectual, civic, and social demands of life in a diverse, ever-changing, global environment.

Goal 4: Every Educator Growing Professionally
Foster dynamic professional learning communities that inspire inquiry, reflection, collaboration, and innovation, and use data to improve teaching, advance student learning, and refine the programs and practices of the Public Schools of Brookline.

GRADE AND SCHOOL CONFIGURATION POLICIES

The Public Schools of Brookline provides educational programs for students in preschool through grade 12. Brookline enjoys an international reputation, welcoming students from all over the world. As of October 1, 2016, there were 7,734 pre-K through 12 students enrolled in the Public Schools of Brookline. The eight elementary schools educate students in grades pre-K through grade 8, with an October 1, 2016 enrollment of 5,445 students. Students attend the Brookline elementary school in their geographical neighborhoods. Brookline High School serves students in grades 9 – 12, with an enrollment in October 1, 2016 of 2,001 students. We currently enroll 57 pre-K students in classrooms located in our elementary schools, and another 231 pre-K students in off-campus leased sites in town. The projected K-8 enrollment for the 2020-2021 school year is currently projected to be 6,193; this represents an increase of 748 students from October 1, 2016.

The 9th Elementary School is the next building needed for Brookline's K-8 elementary students. To serve students of this age most effectively, the physical space, at a minimum, needs to feel intimate and small, although not cramped and with plenty of room. Students thrive in a small learning community where teachers know them well; in a community that supports a sense of safety, respect and trust; in a community that is energizing and promotes creativity; and in a community that supports learning *every* way with the appropriate facilities that promote learning inside and outside of the building. Our educational plan, for pedagogical reasons, calls for clustering grade levels. This creates the necessary intimacy and scale to create caring, connected, and collaborative learning communities in the new 9th Elementary School.

CLASS SIZE GUIDELINES

The Brookline School Committee recognizes that class size is an important factor in a quality education. Steadily increasing enrollment in Brookline, coupled with limited space in our school buildings, continues to put upward pressure on class sizes, the average system-wide class size has remained relatively steady during the recent 8-year period of enrollment growth. A goal of the new facility is to create classroom spaces that are small personalized learning environments.

The number of required classrooms based on current enrollment for 550-900 students is outlined below. Acknowledging that Brookline has a history of and commitment to class sizes of 21 or fewer, the design of the new school should consider building classrooms that could hold up to 25 students in order to allow for the ongoing enrollment increases experienced in the district.

4 Section School

Grade Level	# of Classrooms	Anticipated Average Class Size	Enrollment with Avg. Class Size	Maximum Classroom Capacity with Growth	Enrollment with Class Size Growth
Pre-Kindergarten	3	15	45	18	54
Kindergarten	4	21	84	25	100
Grade 1	4	21	84	25	100
Grade 2	4	21	84	25	100
Grade 3	4	21	84	25	100
Grade 4	4	21	84	25	100
Grade 5	4	21	84	25	100
Grade 6	4	21	84	25	100
Grade 7	4	21	84	25	100
Grade 8	4	21	84	25	100
Total	39		801		954

3 Section School

Grade Level	# of Classrooms	Anticipated Average Class Size	Enrollment with Avg. Class Size	Maximum Classroom Capacity with Growth	Enrollment with Class Size Growth
Pre-Kindergarten	3	15	45	18	54
Kindergarten	3	21	63	25	75
Grade 1	3	21	63	25	75
Grade 2	3	21	63	25	75
Grade 3	3	21	63	25	75
Grade 4	3	21	63	25	75
Grade 5	3	21	63	25	75
Grade 6	3	21	63	25	75
Grade 7	3	21	63	25	75
Grade 8	3	21	63	25	75
Total	30		612		729

Historically, all Brookline elementary schools have housed pre-kindergarten classrooms, providing inclusive educational opportunities to the children of Brookline. In 2012, pre-kindergarten classes were moved out of many elementary schools to other leased sites in town due to increasing enrollment and space constraints. We value preK-8 configurations, and believe that pre-kindergarten classes serve students best as part of a contiguous preK-8 school community. Therefore, the 9th Elementary building project creates three inclusive pre-kindergarten classrooms allowing the school's youngest learners to be housed, once again, in an elementary school setting.

Applying the design principle of making a large school feel smaller, grade levels should be clustered to allow teams of teachers to work with their cohort of students. A smaller, more personalized learning environment is created within such clusters, which also promotes a strong sense of teachers "owning" all students and helps to ensure that no student feels anonymous. We suggest a clustering of grades that will support teachers to collaborate within specific grade spans (PK-2, 3-5, and 6-8). Clustering in these three groupings will support a culture of these groups of teachers taking collective responsibility for preparing students in their grade span for the upcoming grade span. In addition to supporting a strong sense of community and allowing teachers to get to know their students well, clustering grade levels promotes collaboration. For this reason, proximity matters. Teachers teaching side-by-side in classrooms with windows to the hallways naturally

promotes a sharing of practice. Internal windows help make student learning more visible and teachers' practice more public while allowing for a clear line of sight into hallways and gathering spaces for informal supervision of students.

Input from teachers, principals, and district administrators makes it clear that classroom spaces need to be adaptable to the many different structures and instructional methods used today and into the future. While the choice of classroom furniture will play a large role in how flexibly a classroom can be used, the model classroom will have some consistent features such as areas for small group instruction and work, seating area at desks or tables for an entire class for full group instruction, counter space that abuts a wall and can be used for individuals to work at either while standing or sitting on stools, magnetic whiteboard space to be used during instruction as well as display space, built in storage, and movable walls within a classroom and between classrooms that will enable the creation of larger or smaller spaces when needed.

Through programming and physical space this school will also take into consideration the separate and distinct needs of 6-8th grade students while still allowing older students to be leaders and role models for the entire school community and interact with and support their younger peers. The middle school program should have a space that is distinctly theirs and that provides a sense of "graduating" to a different and unique part of the school community. At the same time, it should feel "semi-permeable" in that the middle school program should not feel sequestered or entirely separate from the rest of the school.

SCHOOL SCHEDULING METHOD

Every year the district distributes the document, *Time Allocations – Expectations and Guidelines*[2]. This document clearly communicates the minimum teaching and learning minutes by grade level, across the disciplines, per day and in a week, in order to meet state requirements and adhere to collective bargaining agreements. Teachers use this information for planning purposes and administrators create the K-8 master schedule.

The Public Schools of Brookline has a rich program of specials – visual arts, performing arts, physical education, and health -- that allows students to begin to develop mastery in these areas within separate classes and through the integration of these subjects with the other disciplines. A *secondary* benefit of these classes is the use of this time for teachers' planning (individual and

[2] See Appendix B: *K-8 Time Allocations: Expectations* and *Guidelines* and *21st Century Interdisciplinary Themes*

common planning time). Appropriate space for the specialists to provide a high level of instruction is essential.

Within a school week, all students in the school will typically take as many as five specials (two music, one art, and two physical education classes). For music, grades 4-8, students take Conservatory classes. With all grade 6-8 students scheduled *simultaneously* in Conservatory classes, students participating in Conservatory will need to be scheduled in 6 or 7 different spaces that can support music/performing arts instruction. The two visual arts rooms require storage that can accommodate the on-going work of 800 students, stored from week to week as students are working on their projects. The school will also require spaces to display artwork and student work throughout the school. To properly schedule high-quality physical education, two appropriately sized spaces will be required.

K-8 students also take world language within their homeroom classes. The world language program is described in detail later in the document and listed here only for purposes of understanding the complexity of the 9th Elementary School scheduling process. Teachers travel from classroom to classroom for instruction. Typically world language is taught three times per week with the length of each class period lengthening as the grade level increase.

The English Language Learner (ELL) program is another area of attention in the school district's' master schedule. The support system for our ELL students is both push-in and pull-out, as determined by the student's level of English proficiency. Students at the entering and developing stage need a designated ELL learning classroom. We anticipate needing two designated ELL classrooms in the 9th Elementary School.

In addition to the spaces needed for the programming described above, the 9th school must also provide additional types of spaces for the teaching and learning that is aligned to our local standards and our strategic goals. These include:

- Appropriate spaces to schedule math specialists and literacy specialists providing intervention services to students; based on a 4-section school, 8 literacy and math specialist spaces would be needed;
- Special education services stationed and provided throughout the school with proximity to the clustered grade levels;

promotes a sharing of practice. Internal windows help make student learning more visible and teachers' practice more public while allowing for a clear line of sight into hallways and gathering spaces for informal supervision of students.

Input from teachers, principals, and district administrators makes it clear that classroom spaces need to be adaptable to the many different structures and instructional methods used today and into the future. While the choice of classroom furniture will play a large role in how flexibly a classroom can be used, the model classroom will have some consistent features such as areas for small group instruction and work, seating area at desks or tables for an entire class for full group instruction, counter space that abuts a wall and can be used for individuals to work at either while standing or sitting on stools, magnetic whiteboard space to be used during instruction as well as display space, built in storage, and movable walls within a classroom and between classrooms that will enable the creation of larger or smaller spaces when needed.

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[2] See Appendix B: *K-8 Time Allocations: Expectations* and *Guidelines* and *21st Century Interdisciplinary Themes*

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- Appropriate spaces to schedule math specialists and literacy specialists providing intervention services to students; based on a 4-section school, 8 literacy and math specialist spaces would be needed;
- Special education services stationed and provided throughout the school with proximity to the clustered grade levels;

- Open spaces/makerspaces and a Fab Lab that support the work of the *Engineering Design Process*[3] – define the problem, explore, design, create, test, and improve; provided with proximity to clustered grade levels;
- Grade level clusters to allow elementary teachers to collaborate on interdisciplinary and project based learning across all the classes of the grade, integrating the learning of students
- Grade level clusters would also allow elementary world language teachers to move from class to class across a grade level more efficiently;
- Instrumental lessons conducted in the proper space, and not in a classroom, hallway or an alcove where they can disrupt to other classes; We anticipate classes will be provided in strings, chorus, clarinet, guitar, and orchestra with additional small group lessons;
- Music production class requiring on-line access for each student; a four section school would require two classrooms of music production to be scheduled at the same time;
- Fully accessible classrooms allowing students with physical disabilities to be scheduled into any learning space in the building;
- Appropriate professional spaces available for teacher collaboration during common planning time;
- Adequate and secure storage spaces with moveable furniture allowing use by multiple users;
- Availability of appropriate open space for informal gathering; and
- Adequate spaces (walls, glass cabinets, display areas) for extended display of student work so that a space is not deemed "not available" while displaying student work.

[3] See Appendix C: *Engineering Design Process*, a student-friendly version of the engineering design process provided by TheWorks.org. The graphic supports Brookline teachers' understanding of how to build engineering practices into and across the curriculum.

TEACHING METHODOLOGY AND STRUCTURE

"Form follows function" is a fundamental principle in science/engineering. The 9th Elementary School project provides the opportunity to create the school facility in a form that supports the functions of a 21st century education and promotes the collaboration that drives the high-quality and innovative teaching and learning that is called for in our strategic plan goals.

Brookline's K-8 curriculum[4] is created across all disciplines within our local standards, called *Learning Expectations*[5] (LEs). We teach for understanding and mastery[6] of the *Learning Expectations* and pay particular attention to personalization, and attention to 21st Century skills (e.g., critical thinking), Habits of Mind (e.g., reflection), social emotional learning (e.g., respect), and non-cognitive skills (e.g., perseverance)[7].

In addition, the revised strategic plan goals require shifts in our curriculum, instruction, and assessment practices in order for students to acquire the high-priority skills and essential knowledge needed to flourish in high school and succeed in the digital age. Twenty-first century learning requires 21st century teaching in a 21st century school. The 9th Elementary School should be a learning environment that supports the learning necessary for students to prepare for the future.

An overview of Brookline's educational programs follows that includes descriptions of how the new school building will support and promote this pedagogy to enable us to meet our goal of fully preparing students for their futures.

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[4] See Appendix D: *Public Schools of Brookline Grade 3 Curriculum Overview*. Brookline has a comprehensive K-8 curriculum across all subjects defined by the *Learning Expectations*. It is essential that parents and the community are aware of the Brookline curriculum. Each grade level's *Curriculum Overview* introduces the discipline and a summary of important content, skills, and concepts in that discipline and grade.

[5] See Appendix E: *Grade 3 Science/Engineering Learning Expectations*. Every subject has *Learning Expectations* – statements that define what students will know and be able to do, K-8.

[6] See Appendix F: A subset of *Learning Expectations* across the subjects in grades 1-5 are defined as *Essential Learning Expectations* (ELE). Student learning and growth of each ELE is monitored, measured/described, and reported on the grade 1-5 Progress Reports with the use of rubrics. Rubrics describe the continuum of learning for each ELE. On the rubrics, *Established* defines grade level proficiency.

[7] See Appendix G: *Work Habits and Skills*. Beyond the acquisition of discipline- specific content and skills, all students need to know how to learn in a variety of settings and be a good citizen. *Work Habits and Skills* define a set of high-priority skills that Brookline values greatly and, therefore, measures/describes on the *Progress Reports*.

Tiered Instruction

Teachers at the 9th Elementary School will support students through a variety of teaching models: co-teaching, team teaching, flexible grouping, small group instruction, and individualized instruction. PSB recognizes that all students learn in different ways, rates, and timeframes. To that end, the 9th Elementary School needs to be adaptable with its staffing support, instructional methodologies, and assessment practices.

In PSB, tiered levels of instruction provide the general education foundation in all classrooms. With high quality Tier I instruction provided to every student every day, Tier II support provided inside and outside of class, and Tier III interventions typically provided in a pullout or separate classroom. If a student demonstrates academic and/or social/emotional/behavioral concerns despite thorough Response to Intervention (RTI) procedures, the teacher refers the student to the building Child Study Team (CST). The CST supports teachers in implementing additional strategies. CST meetings require a professional space for collaboration.

Grouping Practices

General education teachers, in collaboration with special educators and other instructional specialists, determine a variety of grouping methods to meet the instructional needs of their students. Grouping and regrouping methods take place weekly within classrooms and across a grade level. General education, special education, literacy and math specialists, ELL teachers, and ECS teachers collaborate to provide tiered instruction in the inclusive environment. Pullout instruction is provided for students who require it, based on their identified need for Tier II support or Tier III intervention. Grade level classrooms should be organized within common hallways and adjacent locations. Close proximity of grade level classrooms and the necessary small group learning spaces is critical in order to achieve the requisite communication and collaboration for a variety of grouping methods in grade level teams. Additionally, classrooms should include spaces where small groups of students can work independently, receive instructional support, and participate in interventions within the classroom.

Educational Technology

Technology and digital learning play an ever-increasing and critical role in teaching and learning, both inside and outside of schools. Technology provides an opportunity to transform learning, when used purposefully. Our classrooms need to be flexible and dynamic spaces that allow for all types of learning, have reliable access to the digital resources available to enhance teaching and

learning, and operate with an understanding of the appropriate role of technology in our schools and students' lives.

In Brookline, we envision technology improving our ability to:

- Communicate and collaborate in our schools, our community, and the evolving global society;
- Maximize learning for all students using techniques and materials that take into account varying backgrounds, capabilities, and learning styles;
- Ensure that all students obtain digital literacy skills that are required in the 21st century;
- Create a well-integrated, learner-centered environment focused on inquiry into engaging problems;
- Enrich and extend professional learning for all teachers and instructional leaders; and,
- Enable all school personnel to effectively and comfortably use technology as a teaching and administrative tool so that more resources and time can be focused on teaching students.

Collaboration across town and school departments has produced creative solutions with beneficial outcomes, for example, establishing a wireless network throughout most of the school; properly installing interactive whiteboards with projectors in strategic instructional areas; and creating space for middle school students to have ongoing access to a set of computers near their classrooms.

The new facility will support a variety of improvements in the school's technology including, but not limited to: a more robust and reliable wireless network to support multiple devices per user; multiple and strategically placed electrical outlets and drops for easy access, relocation and setup; sufficient space for technology closets; and well provisioned classrooms that redefine the current standard. We are planning for the standard learning space to include: a wireless access point and appropriate network drops; voice over internet protocol (VOIP) phone; a mounted projection/interactive whiteboard with enhanced audio system; two (2) classroom desktop computers with speakers and headphones; a district-issued teacher laptop; classroom tablet; and a document camera. Teachers should have access to control and utilize much of this technology through a smart teacher control panel with USB ports that allow for easy document camera connections, interactive whiteboard equipment controls, and speakers. With this as the standard, there will be learning spaces that have more technology in the room and others possibly less. The technology in the room should be dependent on the educational goals and functional demands of the space.

The School Building and School Setting as a Classroom

Building a new school in the early 21st century when our community and society are more conscious than ever of the delicate balance between environmental sustainability and ongoing development provides an opportunity to have the physical plant itself play a significant role in the culture, educational approach and daily lives of students and teachers. Whether it's through monitoring waste water, understanding the science behind passive and active solar power, or studying conservation measures built into the new building, the physical plant can be used to help students learn about science, sustainability, and taking care of the environment. For example, signs and working exhibitions created by students could identify design elements that demonstrate architectural, structural, mechanical, and green building strategies. Student tour guides could be trained to introduce visitors to the building's features. Back-of-the-house spaces could be used as instructional spaces for students and staff, and could be used by town building and maintenance staff for hands-on training. Brookline's new elementary school could stand as a physical demonstration of environmental stewardship and innovation, providing a local case study for sustainable school construction.

With the school being adjacent to Soule Recreation it will provide access to a wide range of natural habitats that can be explored by students, play a central role in their education, impact students' attitudes towards school and the broader environment. Thoughtfully connecting the school grounds with the natural resources on the Soule property will allow the school to:

- Create a richer teaching environment and enable pupils to connect the natural world to their daily experience in school;
- Create a sense of responsibility for and an awareness of nature within the school grounds;
- Encourage pupils to explore and understand biodiversity in their locality and to appreciate the need for environmental care on a global level; and
- Encourage pupils to value the school grounds as a place to play, explore and make a connection with the natural world.

Further, we would like to consider leaving some of the school grounds unfinished and allow the students who ultimately attend this school to lend a hand in the final design and even construction of a portion of the school grounds.

English Language Arts/Literacy

The K-8 English Language Arts program emphasizes explicit instruction in strategies of proficient readers and writers as well as meaningful exploration of the content of Language Arts and literature.

Brookline was well positioned for the move to the Common Core State Standards. Through our rigorous Program Review process, an ambitious K-8 literacy initiative began in the 2010-2011 school year. This initiative provided a strong foundation with which to meet the demands of the new Massachusetts Curriculum Frameworks. The literacy initiative, like the Massachusetts Curriculum Frameworks, emphasizes reading and writing in fiction and nonfiction. In addition, just as the Frameworks require students to read texts at ever increasing levels of difficulty, the Brookline initiative has focused on providing students access to a text gradient that supports their reading achievement.

Literacy instruction in Brookline is guided by *The Continuum of Literacy Learning, PreK-8*, a comprehensive and detailed description of student proficiency in literacy in the elementary and middle grades. One of the many strengths of this guide is the broad definition of *Literacy Learning*, including:

- Interactive Read-Aloud and Literature Discussion
- Shared and Performance Reading
- Writing About Reading
- Writing
- Oral, Visual, and Technological Communication
- Phonics, Spelling, and Word Study
- Guided Reading (small-group reading instruction)

Schedules for grades 1 – 5 reflect a daily, uninterrupted literacy block of 90-120 minutes. During this instructional block, students receive small group reading instruction from their classroom teachers and may participate in a variety of language arts learning centers, allowing students to refine reading and writing skills. Students who receive targeted literacy interventions do so outside of this time. Interventions may be provided by one of the 9th Elementary School's literacy specialists, a special educator, or an ELL teacher.

In grades 6-8, at a minimum, students have a daily 50-60 minute block of English Language Arts instruction. Students requiring additional supports and literacy intervention receive targeted

instruction from classroom teachers, special educators and ELL teachers during designated 45-55-minute instructional blocks each day.

Teachers use multiple assessments to measure student progress, including the *Benchmark Assessment System* (BAS), running records and observational notes. In grade level data meetings, teachers examine whole class and small group instructional implications, as well as identify students and develop plans for individual literacy interventions. Tier two intervention includes the *Leveled Literacy Intervention (LLI)* and *Reading Recovery* (grade 1).

Although most of the reading and writing instruction takes place within the classroom environment, smaller work areas are necessary to facilitate individualized instruction, including both 1:1 and small group settings for book discussions and conferring. In addition, small work areas are needed to support individual and small group general education interventions in reading and writing, inside and outside the classroom. The 9th Elementary School's literacy specialists and coaches also need office space in which planning, coaching, direct instruction, and intervention can take place. This space should be a part of one of the grade level hubs for faculty and staff described below in the Professional Learning and Teacher Planning section.

Library/Media Center

The school library/media center remains an integral part of the learning and school community in Brookline schools. The library/media center should be placed in the building so that it is easily accessible by classrooms and be large enough to accommodate multiple classes at once. Having moved well beyond being a repository for books and card catalogs, the media center/library can act as another learning hub that provides access to resources and tools essential to learning in the 21st century. The library/media center needs to provide large group and small group learning spaces that allow for both quiet and collaborative work. Flexible space with moveable and varied furniture will allow numerous configurations for work and learning. Space for computers and easy access to technological devices should be prevalent while at the same time there is a need for spaces where students can use non-technical devices comfortably and without being disturbed. There should be an allowance for integrated office space, workroom, and storage space to be used by the library media center staff and volunteers. In Brookline elementary schools, it is typical to have a book room integrated into the library that is overseen by the librarian where class sets of books are available for teachers to access for their classes and reading groups. A well-provisioned school book room is a vital element of our literacy efforts. Beyond use by students and educators, the library/media

center or an adjoining space that is integrated into the library/media center will be used as community meeting space for the PTO and similar community-based organizations.

Mathematics

The goal of the mathematics program in Brookline is to meet the needs of all learners so that they become critical problem solvers and reflective thinkers about mathematics in our evolving global, technological, and digital world. We also seek to stimulate interest and curiosity in the field of mathematics to develop students' passion and interest in a math career.

The mathematics program is grounded in the 2011 Massachusetts Curriculum Frameworks for Mathematics, in both Standards for Mathematical Content and the Standards for Mathematical Practice. Brookline's transition to the new standards started with focused attention on students' learning through the eight Standards of Mathematical Practice. In addition, for students in K-5, we increased the focus on the critical areas of *place value,* addition, subtraction, multiplication, division, fractions and decimals with an emphasis on understanding and application.

The most effective instruction for in-depth math content and deliberate attention to mathematical practices places different requirements on the physical space. Instruction varies, in that there are opportunities for individual learning, pairs and small groups, and whole-class instruction. Teachers need the space to change as instruction changes – furniture easily reconfigured for different groups, technology easily employed throughout the room, ample space so that students can spread out and use a variety of objects to manipulate and see the math, projection with robust Internet access to show real-life applications and simulations, examples of mathematical models, and sharing student work. Appropriate, safe and secure storage space is also critical to accommodate the various manipulative materials that students use to explain their mathematical thinking and problem solve.

The needs of the physical space in K-5 for math are mirrored in the middle grades. In grades 6-8, students continue this progression to geometry, algebra, probability and statistics, again focused on student learning and application. Brookline teachers use instructional materials from chosen curricula, as well as those developed by the Math Department to align with the content and practice standards. Teachers utilize instructional practices and mathematical experiences that are accessible to all, and provide opportunities for all students to engage in meaningful mathematics. There are opportunities to work with other teachers to integrate the disciplines and highlight STEM project-based opportunities.

Students are supported and challenged in various ways through teacher collaboration with Math Specialists. In addition, we are piloting adaptable universal screening assessments and instructional support programs in different grades across the schools. This will help us target student-learning needs across the units of the math curriculum and across all grades.

Students who show mastery of grade level standards engage in extensions that allow them to investigate math concepts more deeply. Also, with the support of Enrichment and Challenge Support (ECS) teacher, teachers will engage students in challenging authentic projects that require a deep understanding of the topic. As with all other examples, this type of creative investigation requires flexible educational spaces. Students also have opportunities to engage in online coursework, requiring access to devices and robust Internet connections.

The math specialists at the 9th Elementary School, who provide individual and small group support across all grade levels, require adequate office and teaching space. The office and meeting spaces should be located within the grade level clusters and professional workspace described below in the Professional Learning and Teacher Planning section. The space is used for collaborative planning, coaching teachers, and intervention work with students. For interventions and pullout services, math specialists need well-equipped learning spaces with access to the appropriate technology that supports math learning and assessment. The space should be adaptable to accommodate students of various ages as specialists work with students across all grade levels. Teachers and students will benefit from the office size, storage facilities, flexible configurations of space, and location. Proximity to classrooms as well as other specialists (literacy, ECS) is important due to the frequent student transitions to and from the Math Center, and the ongoing collaboration between specialists.

Performing Arts

The Public Schools of Brookline is proud to continue a tradition of a strong performing arts department. Each K-8 school has music instruction for all students across all grades. In grade four, all students begin the study of a string or band instrument, and then choose to participate in band, orchestra, and choral ensembles in grade 5. In grades 6 through 8, students may continue with band, orchestra, or chorus or take classes in music production, guitar, or general music. It is anticipated that the 9th Elementary School will host a variety of music concerts (choral and instrumental) and a musical theater production during the school year. Performances will require a space has a capacity of at least 300 people.

Physical Education

The physical education department provides standards-based instruction to all students across grades, K-8. Students participate in quality instructional physical education programming twice per week, for 40-45 minutes in each class. The curriculum is presented in accordance with the Massachusetts Frameworks and the National Standards for Quality Physical Education. The curriculum follows a developmental sequence from body management competence, to fundamental skills, to specialized skills, while simultaneously addressing physical fitness and social skills.

As described in the School Scheduling Method section we require two gyms where the larger one can be divided so two classes can use it concurrently without disturbing each other. The school requires the capacity to accommodate three classes happening simultaneously. The physical education facilities will require ample and appropriate storage space for large physical education equipment and supplies that can be easily accessed and set up in either of the two gyms. In addition to the two gyms, having a fitness and workout room that can be utilized with exercise machines and/or wellness classes would allow us to modernize our physical fitness and wellness classes.

The physical education department utilizes technology to enhance teaching and learning. Teachers engage students with the use of Polar Heart Rate Monitors, multiple iPad apps for instruction, monitoring student performance, taking pictures and videos, and the web-based Polar GoFit fitness assessment. The anticipated use of similar technology requires a facility with continuous wireless access and safe, secure storage.

Health Education

Students receive instruction in health education, in grades 7-8, two times per week. Health education is aligned in the Massachusetts Curriculum Frameworks and National Standards for Health Education. We strive to provide a "wellness" approach to student learning and well-being. Wellness encompasses a culture of holistic well-being focused on educating, promoting and supporting all dimensions of health (physical, mental/intellectual, emotional, social, ethical) in order to live a longer, healthier, and more productive life. Health education is skills-based, offering students continuous opportunities to practice skills such as analyzing influences on health behaviors, decision-making, goal setting, and communication to enhance health and avoid or reduce risk behaviors. Health classes would require a classroom for instructional delivery. The classroom needs to be large enough to allow for various student groupings and student movement.

Science and Engineering

The Brookline PreK-8 Science & Engineering program is designed to actively engage students in their own learning using hands-on inquiry, outdoor learning, intriguing materials, science

notebooks, scientific tools and high quality media (books, video and online resources) accessible to all learners. The curriculum integrates science/engineering content, science and engineering practices, and crosscutting concepts and is aligned with the new Massachusetts Science Technology and Engineering Curriculum Frameworks that are based on the national Next Generation Science Standards. Also in an effort to inspire students to think of themselves as scientists and engineers and to reflect on how they use science/engineering practices throughout their learning we utilize the Nature of Science curriculum where students address questions such as: What is science? Who are scientists? How and where to they work? How does science change over time based on new evidence and tools?

In order to implement our robust and rigorous hands-on, inquiry-based science and engineering curriculum, teachers require flexible spaces that invite and promote creativity, innovation, and collaboration. These spaces require the use of movable tables so that open spaces can be created to allow for projects-based learning. Every classroom needs to be equipped with wall space for recording questions and ideas, sinks to provide water for investigations and cleanup, space for storing tools and "making" materials (glue guns, cardboard, etc.), and adequate storage space for science materials. Sunny windows are needed to grow plants.

Three middle school science labs need ample, flexible space for students to work and for the safe storage of science materials and supplies. Specific needs of a science lab are in addition to the general design and development of other contemporary teaching spaces – wall space for visuals, projection area(s), technologically versatile, natural light, flexible furniture, etc. Storage space for tools and other "making" materials needs to be provided.

Outdoor learning is built into the PreK-8 science and engineering curriculum. We envision using the outdoor spaces of the school as learning labs (providing field trips right outside the school doors). Students can observe and study the natural world in areas that attract birds and butterflies through the planting of native plants. For example, students will have the opportunity to study rotting logs, birds at birdfeeders, grow vegetables, create a milkweed/wildflower meadow to attract monarchs and other butterflies, and much more. Outdoor seating areas are also needed so that classes can go outside, not only to study science, but also to listen to stories and do other group work.

In addition, we are integrating design thinking and "making" (creating solutions to real world problems) into the curriculum. As such, all classrooms need to be equipped with tool walls and spaces for paper cutters, glue guns, and other making materials. Design walls that students can use to record their questions and ideas also are needed.

Although students will be "making" (solving real world problems by creating solutions) in their classrooms, a stand-alone makerspace (an updated version of an industrial arts shop) is needed to allow students to have a place to extend their projects. This space will provide a common area where students of all ages can meet before, during or after school to collaborate and pursue problems that are of interest to them. This space will need to be equipped with sinks, design thinking walls for recording ideas and questions, tools, tool walls, sewing machines, etc. as well as spaces for laptops.

In addition the inclusion of a Fab Lab that blends STEM (Science, Technology, Engineering and Math) skills into a unique learning opportunity would appeal to all students. Fab Labs, which are embedded in technology, allow for different learning styles to be embraced and create a collaborative environment in which students can make their ideas tangible and engage deeply in their learning. In the Fab Lab, students learn how to be project managers, engineers and designers – all at once. The lab simulates the research and development process and allows students to make everything from furniture to action figures to circuit boards. They learn what it takes to turn an image in their heads into an image on a computer screen and ultimately into a physical prototype. Typically a Fab Lab will contain equipment such as a three-dimensional (3D) printer, vinyl cutter, laser cutters/engravers, a milling machine or a computer-guided router. Such a lab will serve as hub of invention, creation, discovery, inquiry, and sharing for students of a wide range of interests and abilities.

Ideally, the library, makerspace Fab Lab, and art rooms would be a combined or co-located area for innovation.

Social Studies

The K-8 social studies department has been deep in the process of curriculum revision and renewal. Across the grades, the curriculum coordinator, in collaboration with teacher-teams, develop new units of study and common assessments at every grade level. The skills and habits of social scientists are a thread throughout the revised curriculum. Professional development for teachers accompanies each new unit of study. Examples of content include: civics, physical and human geography, economics, and US and world history. Along with content, teachers are developing strategies for explicit literacy instruction, including how to make difficult primary texts accessible to all students and disciplinary literacy instruction. Each unit lesson includes modification and differentiation suggestions, assessment options, and identification of natural connections to other subjects to support the development of interdisciplinary units.

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Teachers continue to incorporate more technology into social studies teaching, enabling them to access real-time data, utilize digital textbooks and atlases, and support the development of digital literacy that includes Internet research, online student learning activities, and diverse instructional strategies to accommodate all learning styles. Students are also taught media literacy skills to prepare them to be discerning media consumers and critical thinkers.

The social studies curriculum and instruction demand physical spaces similar to the other subjects – flexible, accessible, safe and secure storage, and wall space for visuals and student work displays. To make sure 21st Century learners can engage in classroom activities, classrooms require a combination of electrical outlets and power strips that are distributed through the classroom, along with a smart teacher control panel with USB ports that allow for easy document camera connections, interactive whiteboard equipment controls, and speakers. In addition, teachers need to be able to control natural and artificial lighting quickly. Lastly, the physical space available to students needs to go beyond the single classroom, extending into collaborative environments with breakout, presentation, and display space beyond a single room.

Visual Arts

The Public Schools of Brookline has a vibrant visual arts program that provides students repeated opportunities to develop observational skills, decision-making skills, and craftsmanship using art as the visual language to communicate ideas and demonstrate understandings. The visual arts program has a K-12 continuum of key understandings, concepts, and processes as the framework for its curriculum. The department continues to collaborate with other coordinators and teachers to create more interdisciplinary units in the K-8 curriculum.

The 9th elementary school provides an opportunity to update how we think of the physical space for visual arts instruction. The renovation can provide what's needed: three art classrooms, one art room for each grade level cluster, with ample natural light and with enough space for the largest class to sit a maximum of four students per table. Also, the visual art classrooms need a separate storage closet for materials, equipment, and teacher preparation. The visual art classrooms also require ample storage capacity within the classroom for artwork in process. The layout of the classroom should separate the worktables from preparation/sink areas. Multiple sinks at appropriate student height, and furniture and amenities (i.e., sinks), scaled to meet the needs of each grade level clusters, are required. A separate kiln room attached to the classroom is required. A contemporary visual art classroom needs a technology/media station (computers with

photo/video software and Internet access) set-up to serve 4-6 students located away from paints and clay preparation.

There should be ample space for whole-class demonstrations and exhibiting exemplary artwork on the walls. In the corridor outside the visual art classroom, as well as in corridors throughout the school, there should be ample wall space designed for student artwork to be exhibited, including a 3D wall case centrally located in the school. Displaying student work throughout the school is essential for: building a sense of pride and ownership of the space and the school; providing a public audience which serves as a natural motivator for students; and for providing models of high quality work that help to set expectations for students.

World Language

Brookline is fortunate to have a K-8 world language program that immerses students in language and culture beginning in Kindergarten, with the ultimate goal of intermediate level proficiency for students at the end of grade 8. The curriculum is based on the "5 C's" of the World-Readiness Standards for Learning Languages: Communication, Cultures, Comparisons, Connections and Communities, and builds a solid foundation in oracy, the partner of literacy in language learning, in grades K-5. While literacy entails the ability to read and write fluently, oracy is fluency in listening and speaking, or oral/aural language. Lessons are carried out through the use of songs, games, books, and other interactive activities designed to develop real-world communication skills rather than learning vocabulary words in isolation.

K-5 world language instruction takes place in the grade level classroom, and therefore is directly impacted by the distribution of classrooms throughout the building, individual classroom space, as well as individual classroom set-up. World language teachers need ample room to enter and navigate their teaching cart to the "rug area" (particularly in grades K-2) or the projection space/instructional area of the classroom. Space for full access to all sides of the cart is required: drawers on either side hold materials; a laptop and teacher organizational materials as well as large posters/books are in the rear; a magnetic white board, the center of instruction, holds a variety of visuals and other materials to support understanding of target language lessons. Grade-level classrooms clustered together would minimize world language teacher travel time between lessons within a grade level, allowing the world language and classroom teacher to touch base at the end of a lesson, to exchange quick observations about a particular student during a lesson or to debrief an element of a lesson during the 5-minute travel time.

As K-5 world language teachers do not have one classroom in which they teach, a common office space is needed for them with a desk for each teacher, ample storage for K-5 world language materials, and space to meet with other teachers and parents.

With a solid foundation in oracy, students are well prepared to move into literacy-based language instruction in grades 6-8. Students choose the language they wish to study in grades 6-8 from a choice of two languages, and therefore a minimum of two world language classrooms will be needed. The needs of the physical space in K-5 for world language are mirrored in the middle grades. In grades 6-8, students continue to focus on oral proficiency while also developing skills in in the interpretive and presentational modes of communication. Authentic materials in the target language become an essential source of input for students, requiring individual and group access to technology. Flexible space is needed for students to circulate to talk with each other or to work individually, in pairs or in small groups.

Enrichment and Challenge Support Program (ECS)

Many students enter a grade with experiences and/or developmental sophistication that allow them to grasp concepts quickly and easily, with little repetition. These students need opportunities to apply what they know and investigate the curriculum in more depth. Some students show a level of advanced understanding that requires a more specialized response from teachers, providing time and opportunity for self-directed investigations and projects. A very small number of students may require very specialized interventions that extend outside the traditional classroom walls. The PSB Challenge Framework is a system of interconnected supports for addressing the range of needs of students who show advanced understanding of the curriculum and/or innovative and creative problem solving skills beyond their peers. We have recognized the need to shift to a classroom-centered approach that includes, but is not limited to ECS resource teachers who have expertise in designing learning that is connected to the curriculum and addresses the needs of individuals through a project-based learning approach.

ECS Specialists work together with classroom teachers to meet the needs of their students for challenge, enrichment, and extension across all disciplines, within the classroom, throughout the school day. To do this, ECS Resource Teachers spend most of their time collaborating with classroom teachers in conjunction with other specialists. Collaboration among classroom teachers and ECS teachers could include:

- *Co-teaching a differentiated lesson;*
- *Working in the classroom with small groups of students or stations;*
- *Designing and implementing digital, inquiry-based, personalized, and project-based learning;*

- *Assessing students and co-planning appropriate follow-up.*

In support of this collaboration with classroom teachers, ECS Resource Teachers should be located in one of the collaborative workspaces in the grade level clusters so they can easily plan with and debrief lessons together. In addition, ECS Teachers will occasionally pull out students to facilitate small groups of students on Tier II enrichment interventions.

The Enrichment and Challenge Support Program is a vital component of the Public Schools of Brookline Challenge Framework and requires many of the same structural classroom components as other content areas such as: easily reconfigured furniture that lends itself to flexible student groupings and accessible areas where students can engage in the use of technology that provides Tier II interventions in the form of online courses and access to other online resources. Additionally, as mentioned in the Science section of the proposal a stand-alone makerspace and a Fab Lab are needed to allow students to have a space to engage in ongoing projects, and collaborate on and pursue problems that are of interest to them.

English Language Learners (ELL)

The English Language Learners (ELL) program provides services to students whose primary language is not English and who are not yet proficient in English. The program provides support at each school, with services focused on students' English language acquisition, literacy development, social integration, and academic achievement.

The ELL program serves students outside of the classroom and, therefore, needs its own space. Like special education, housing the ELL programs in the general vicinity of the grade level clusters is intentional. Wall space and storage is also important, given the use of visuals and the need for storage of the general education program materials made available to the teachers and students in the ELL classrooms. ELL classrooms will be reflective of other learning spaces – flexible, well provisioned, and accessible, and able to be used to support small group instruction and center-based learning.

10% of the student population in our schools are English Language Learners so in and 800 student school, we would anticipate that the ELL program will support upwards of 80 students or four classrooms in the 9th Elementary school. Small groups of students meet with ELL teachers several times per week both in and out of the classroom for direct English instruction. In addition to these four classrooms, to alleviate crowding in the North Brookline schools, the 9th Elementary School

could become the home to one of the district-wide ELL programs. If this is the case, it will require an additional two classrooms.

Special Education and Student Services

Special education services throughout the district address the needs of identified learners with disabilities between the ages of three and twenty-two, who require specialized instruction to support access to the curriculum. A wide range of services is provided to meet the individual needs of students, from academic intervention to related services in areas such as speech therapy, occupational therapy and physical therapy. Availability of therapeutic services for students requiring special education intervention in the realm of social, emotional and adjustment areas is present at all schools and levels. Staff works closely with families in ensuring that necessary services are identified and provided to students in accordance with applicable mandates.

Inclusion is a core belief and practice in the Public Schools of Brookline. This educational model expects schools to meet the needs of all students by educating learners with disabilities alongside their non-disabled peers. The environment necessary to nurture and foster inclusion is built upon a shared belief system between general and special education, and a willingness to merge the talents and resources of teachers. An inclusive education helps prepare students with disabilities for an integrated adult life and builds understanding and acceptance within the broader community. In 2015-2016, 15.5% of 9th Elementary students in Brookline had disabilities.

Physical environment impacts learning for all students and especially for students with disabilities. The physical structure of the new school building should support our inclusive approach, our commitment to providing all students an appropriate education in the least restrictive environment, and our system-wide special education programs. It is important that every student has an authentic sense of belonging and feels safe in their school. Clustering grade levels, integrating special education classes and spaces throughout the school, and providing services to students in close proximity to their cohort peers are examples of how the design of the school can support the academic and social-emotional learning goals for students with special needs.

The location of the classrooms allows staff to communicate and collaborate fluidly throughout the day on student needs and programming. To support teachers, special educators and families, the school based Education Team Facilitator (ETF) should have office space within one of the grade level cluster teacher work areas described in the Professional Learning and Teacher Planning section, and there should be one conference room that is primarily used for IEP meetings and Child Study Team meetings. This conference room should be able to hold at least 12 people comfortably.

Additionally, the new school should provide equitable access to high quality learning spaces and classrooms that are comparable in every way to general educations classes. Equitable access begins with being fully ADA compliant and includes equity in classroom quality, access to natural light and windows, the size of rooms as well as proper heating and ventilation. Special education classrooms need to be flexible and easily reconfigured, given that different students are served in the same space at different times. In addition, accessibility to a wide variety of technology options is essential. Assistive technology plays a critical role in supporting engagement and learning for students with special needs. Different devices and equipment for different purposes need to be available with supports for quick set-up and secure storage.

Learning Centers

Each Brookline school has Learning Center rooms that support students with special needs. Learning Centers are designed for students with varied disabilities who require a flexible level of services both inside and outside of a general education classroom. The Learning Centers are classroom spaces within which special educators conduct small group instruction, social skills groups, and collaborate with other related service providers to support students. Learning Center classes have a low staff to student ratio allowing for increased individualization. Students may receive higher levels of direct, specially designed instruction in academic areas within the Learning Centers. There should be three Learning Center rooms in the building with one located in each of the K-2, 3-5, and 6-8 areas. Within each Learning Center room there should be adequate space for academic support, social skills instruction, an area for sensory support and quiet academic work.

Specialized Programs

Given the demand for space throughout Brookline and the increasing enrollment demands in district-wide programs, the building of a new school facility gives the school district the opportunity to build a state-of-the-art, flexible and inclusive space that can be used for district-wide special education programs. It is anticipated that the new school would provide a home to one of the district-wide specialized programs such as a Therapeutic Learning Center for students with complex emotional and behavioral challenges or the RISE program for children on the autism spectrum.

Programs like the TLC and RISE are typically organized into smaller rooms that serve between 4 and 10 students who have a higher ratio of adults working with them in that classroom. Each TLC or RISE classroom requires a defined therapeutic space within or adjacent to the classroom that can be used for relaxation. Each classroom also requires a separate room where students and staff work together on de-escalation when needed. Either program would serve a range of ages in their

classrooms and be organized into K-2, 3-5, and 6-8. RISE classrooms require an adjoining bathroom that should not be located near the relaxation space. All told, the 9th Elementary School should include a total of three classrooms for specialized district-wide programs that should be placed within or near the appropriate grade level cluster.

Student Services

In addition to the special education services our educators provide, other essential services and support are provided by a wide range of specialists including school psychologists, social workers, speech/language pathologists, occupational therapists, physical therapists, nurses, and guidance counselors. In many cases, these positions are shared among more than one school, but together they represent a team-based approach to supporting students and families at the elementary level in Brookline. In order to provide coordinated services and promote collaboration among these professionals the 9th Elementary School should be organized into two "suites" – a Guidance and Therapy Suite and a Health Services Suite -- that are easily accessible to all students.

Guidance and Therapy Suite

The Guidance and Therapy Suite should have two separate but connected areas. One of these areas would include individual spaces for an occupational therapist, a physical therapist, and a speech therapist. The speech therapist is likely to support more students than the other therapists. The second area would have offices for two guidance counselors and one school psychologist. All of these spaces should allow for privacy but include doors with windows that can be covered as necessary. The suite should have a small area where students can wait prior to receiving services.

Health Services Suite

The Health Services Suite houses the nurse and allows students to be checked, receive services, or wait comfortably for a parent, guardian or family member to pick them up. The Health Service Suite requires an entry or reception area where students can await services, a treatment area that includes three or four cots/beds, and a space for private meetings and confidential consultations. There should also locked storage, a sink, and a refrigeration unit.

Functional Life Skills

Brookline can use the new school to develop our approach in the area of functional life skills that begin to prepare lower functioning students for life beyond middle school and high school. The curriculum will emphasize daily living skills, community skills, employment skills, and social skills that students will need across a range of settings, including leisure and recreation activities. To support the development of these daily living skills, the 9th Elementary School should include a school store or other retail environment that will serve as a functional academic lab to teach skills which allow each student to succeed in real-life situations at home, school, work and in the

community. The functional academics curriculum that would be implemented in conjunction with the operation includes a range of areas, namely:

- Pre-requisite concepts
- Math, including time and money
- Activities of daily living, including social skills
- Literacy (reading, writing, and speaking)

The store will serve the needs of the special education population, and will provide opportunities for children on the autism spectrum, one to one teaching for speech and occupational therapy services, and opportunities for small group instruction with real-world applications for a range of students. Of note is that both typical and disabled students will use the store, therefore, the store will provide an important social inclusion opportunity for all students.

SCHOOL CULTURE AND SOCIAL EMOTIONAL LEARNING

It is the mission of the Public Schools of Brookline (PSB) to ensure that every student develops the skills and knowledge to pursue a productive and fulfilling life. To truly live this mission, it is essential that our schools are safe, welcoming, respectful and nurturing. Such a culture is created when everyone in the school is aligned to requisite beliefs, values, and behaviors. Children need to learn these beliefs, values and behaviors, and adults need to model, guide, and explicitly teach them to children using intentional strategies in order to establish a culture conducive to learning.

To support a positive, collaborative, and welcoming culture, the physical structure of the school needs to provide gathering spaces to promote social interaction and engagement among students and adults. The new 9th Elementary School needs to facilitate and encourage connections among grade levels and across the disciplines, be welcoming by design, and show evidence of collaboration, respect, and high expectations with student work prominently displayed throughout the school, all of which support the social emotional learning of students

Responsive Classroom (K-5) and *Developmental Design* (6-8) currently represent the core social emotional curriculum in Brookline. Our approach to social emotional curriculum requires classroom meeting areas to conduct "morning meetings" in grades K-5 and advisory groups in grades 6-8. Each classroom should have an area available for these class meetings and other similar functions that is appropriate for the age range.

OUTDOOR SPACE FOR PHYSICAL ACTIVITY

The use of outdoor spaces for physical education, athletics, recess, and curriculum-based learning will be an integral part of the learning at Brookline's new PK-8 elementary school. While playing fields at Soule Recreation Center are expected to be accessible during the school day for physical education classes, dedicated and age appropriate playground space is needed for the all grades. A playground specifically for PK-2 grade cluster is necessary with easy access for these grade levels, as they may have more than one recess per day. Space for grades 3-5 and 6-8 play areas can be integrated as long as they contain a variety of spaces and structures appropriate for the broad developmental and recreational needs of this age span.

A School Garden, maintained by staff and students and integrated across the K-8 science curriculum, should be easily accessible from an exit in close proximity to classroom clusters to ease access during class periods for a variety of grade levels.

PROFESSIONAL LEARNING AND TEACHER PLANNING

The new elementary school's physical spaces will support a culture of professional learning characterized by: shared norms and values; a focus on student learning; making professional practice more visible; collaboration; and, inquiry, reflection, and analysis. We have moved past the mindset of a classroom teacher only being responsible for the general education students in his or her classroom toward a team approach that better balances the essential community of a classroom with the collective responsibility of a team of adults ensuring every student succeeds. The physical spaces where teachers meet and collaborate need to support this shift towards a professional learning culture and teams of adults taking responsibility for all of their students succeeding.

As designers of learning, teachers will spend time planning with colleagues to create the best learning experience for all students. Educators need appropriate and well-provisioned spaces to gather to discuss student learning, share instructional practices, analyze data, determine next steps for instruction, participate in webinars, review student work, vet online resources, and read and discuss the contemporary literature of the profession. Each grade level span (PK-2, 3-5, and 6-8) will require the meeting space necessary for this variety of professional collaboration and learning. The hub of each grade level cluster should be a work area for teachers that replaces individual, isolated desks within a classroom. This work area should have tables for group work, storage for materials and professional resources, and individual workspaces. Adjacent to this work area will be a large conference room that fits the staff of an entire grade span cluster (PK-2, 3-5, or 6-8) and one or two smaller conference rooms for grade-level teacher teams

Professional learning also includes instructional coaching by staff members in a variety of roles including: Math Specialists, Literacy Specialists and Literacy Coaches, Educational Technology Specialists (ETS), Librarians, Enrichment and Challenge Support (ECS) teachers, and Inclusion Facilitators and Inclusion Specialists. Math and Literacy Specialists, Literacy coaches, ETS's and Inclusion Facilitator and Specialists should be embedded in the grade level hubs described above so when they are not in classrooms, they are easily accessible to teachers integrated into the work of teacher teams, and can provide support to colleagues and easily

LUNCH PROGRAMS

The mission of Food Services is to provide healthy, tasty, high-quality, sustainable, affordable meals to the students and staff of the Public Schools of Brookline. Breakfast and lunch are served at all nine schools in the district. As part of the National School Breakfast and Lunch Program, we follow guidelines set by the USDA regulating what qualifies as a healthy breakfast and lunch. Meals are cooked from scratch, using real food, and we are continually looking for ways to improve our school meals.

The 9th Elementary School cafeteria should be large enough so that the entire school is able to eat lunch over the course of three lunch periods. An appropriately sized cafeteria will ensure that the 9th Elementary School can both start and end lunch at appropriate times.

Students typically pay for lunch using online accounts that allow families to pre-pay for student meals and provide easy access for food service workers to children's allergy information and dietary restrictions.

TRANSPORTATION POLICIES

The Public Schools of Brookline provides bus transportation for K-8 students residing more than 2.0 walking miles from their districted school. These students are transported at district expense. All students in Grades K-6, who live less than 2.0 miles from their school, are responsible for their own transportation. The district does make exceptions for students whose needs are "safety" related. K-6 students who live 2.0 miles or more from the school may opt to purchase a bus pass in accordance with the MBTA fee schedule. Special education transportation services are separate from regular bus transportation.

The 9th Elementary School will have multiple busses. In addition to busses for any specialized programs for students with disabilities and one Boston bus for METCO students, we believe several additional buses will be required to transport students to and from school.

FUNCTIONAL AND SPATIAL RELATIONSHIPS AND ADJACENCIES

The 9th Elementary School will serve South Brookline and will have a population of 800 students. Our schools enjoy an international reputation. Academically, we welcome students from all over the world, and socially, we reflect and respect human diversity. The 9th Elementary School will be a relationship-oriented community that practices and values inclusive partnerships and mutual support in all aspects of the school community. This is the overall spirit of the school that will drive the design of the facility.

Functional and spatial relationships and adjacencies are the key to the successful design of the new facility. These relationships between classrooms and programs in the school define the programmatic, functional, spatial, and environmental requirements of the educational facility and become the basis for the design at the next phase. The 9th Elementary School will rely upon adjacencies for communication, collaboration, flexible grouping, and teaming. Providing learning areas both in and outside classrooms for small group work, individual tutorial spaces, and additional instructional break out rooms are critical in a school with a focus on integrated classrooms at grades K-8, requiring specialized instruction and an emphasis on inclusive practices.

Community is a core value among students, staff and parents. The 9th Elementary School will be a warm and inviting place for children, staff and families. A priority for the students, staff and 9th Elementary School community is to bring a “small school” feel to the elementary school design. The 9th Elementary School will require a welcoming main office and community arrival space that can accommodate a large morning influx of students, as well as active dismissal procedures. The students, faculty and parent community in Brookline value spaces where the school community can gather to celebrate learning and to spotlight the arts through assemblies and performances. After school, extended day programming that will be provided until 6:00pm with several hundred students participating in this program daily. While the extended day program will utilize the learning spaces in the building, an administrative office with storage space will be needed.

SECURITY AND VISUAL ACCESS REQUIREMENTS

As with all Brookline schools, safety and security is of the utmost importance. Students, families, and our staff need to feel safe and secure in their school community in order to take full advantage of all educational opportunities. At the same time it is essential to provide the necessary level of security without impacting the building's physical organization or sense as an inviting and open learning environment for students, teachers, parents, and visitors. There needs to be a balance between the type of open, accessible learning spaces that encourage sharing and collaboration with the need to have safe and secure classrooms when needed. It is possible and necessary to prioritize light, glass, and openness and still institute necessary safety measures. Safety and security measures should be designed and integrated in ways that allow for future enhancements. The following features should be considered as part of the school design:

- Access Control to rooms and spaces that utilizes a security access fob device by authorized staff that can also be controlled centrally
- Visual Security of entrances utilizing a video monitoring/recording system that will be monitored at the school secretary's desk
- Safe and well lit staff parking
- Safe and well lit visitor parking
- Safe pathways for pedestrians and bicyclists coming from varied directions to the school
- Safe bus access systems that do not interfere with drop off and pick up traffic
- Safe recess grounds and play fields that can be properly supervised by staff and protected from vehicular traffic
- Open and easily visible front access to the school
- Safe access for kitchen, facility and shipping/receiving separate from school traffic at the main entrance
- Safe and appropriate access to the perimeter of the building and play fields

2.2 Superintendent Recommendation Memo

The Public Schools of Brookline
Brookline Town Hall
333 Washington Street, 5th Floor
Brookline, Massachusetts 02445
617.730.2401

Andrew J. Bott
Superintendent

TO: Brookline School Committee
FROM: Andrew J. Bott, Superintendent
DATE: February 2, 2017
Addendum: February 14, 2017
RE: Recommendation for 9th Elementary School at Baldwin

Addendum

At the February 2, 2017 School Committee Workshop, I presented my Space Recommendation for the 9th Elementary School at Baldwin. During the meeting the School Committee engaged in rich discussion about the numerous factors influencing the decision on whether a three section, a three section plus, or a four section school should be built including current and future enrollment capacity needs, the impact of school size on existing school communities, the impact on the Baldwin neighborhood, traffic impacts on the neighborhood, costs, and allowing for future expansion. Jonathan Levi of Jonathan Levi Architects (JLA) presented information to the Committee about the cost and massing of a four section versus a three section school at the Baldwin site. Mr. Levi explained that a four section school would require nine more classrooms than a three section school, but that the difference in overall massing would not be noticeably different. Mr. Levi also shared with the Committee that the cost of these additional classrooms would be approximately $5 million. To build this capacity, the equivalent of a one section K-8 school, would cost significantly more if built elsewhere.

As the School Committee continues its discussion on the size of the school population and the school building, it is prudent for members to consider additional factors not included in my original recommendation from February 2 including placing an English Language Learner town-wide program at the 9th elementary school thereby opening space in an existing school.

My recommendation is to assign students as outlined in my February 2, 2017 memo to the Committee with the addition of space for a town-wide ELL program. This would allow the 9th Elementary School at Baldwin to have a student assignment zone sized appropriately for three sections with additional capacity used to alleviate stress and district-wide space challenges throughout the system.

Original February 2 Memo

In a joint vote held October 13, 2016, the Brookline Board of Selectmen and the Brookline School Committee selected the current Baldwin School site as the location for Brookline's new 9th Elementary School. I recommend the School Committee request a three section school, with three additional BEEP/early childhood classrooms and three additional classrooms for district-wide special education programming, to be built as Brookline's 9th Elementary School. I did not come to this recommendation easily. This recommendation balances the overall space needs of the Public Schools of Brookline with the project that is the right size for the 9th Elementary School at Baldwin site.

The need for a new elementary school results from the unprecedented enrollment growth experienced in Brookline over the past eleven years. In the SY 2005-2006, 3,904 students were enrolled in our elementary schools. For the current year, 5,437 students are enrolled, an increase of 1,533 students over these eleven years.

These increases in enrollment were absorbed into our existing K-8 schools using a strategy of expanding in place. Working closely with the building department, the Public Schools of Brookline added the equivalent of 55 classrooms into our existing infrastructure. These include:

- Six new classrooms built at Heath School
- Four new classrooms built at Lawrence School
- Two modular classrooms leased for Baker School
- Eleven BEEP classrooms moved out of K-8 buildings into rental space, with those eleven classroom being converted into K-8 classroom use
- Four classrooms leased for Pierce School
- Twelve new classrooms currently being built at the new Devotion School (anticipated opening September 2018)
- Sixteen classrooms built by dividing spaces within our existing K-8 schools

For the upcoming school year, an additional four elementary classrooms are needed to accommodate continued enrollment growth. One classroom each at Driscoll, Pierce, Devotion, and Lawrence will be added to Brookline's existing building infrastructure.

Existing School Space Capacity

The combination of continued enrollment growth and the expand in place strategy has put significant strain on all of Brookline's K-8 schools. In order to understand the extent of this strain, the school department undertook an in-depth space study of each K-8 school (excluding Devotion as it is currently under construction). This study was conducted November 2016 through January 2017. The goals of this assessment were threefold:

1. Physical measurements of all classrooms, instructional spaces, common spaces, offices and conference rooms.
2. A determination of whether these existing spaces are adequate and appropriate for current and future enrollment demands. For the purpose of this analysis, the current MSBA space guidelines were used as the benchmark to determine adequacy.

3. An assessment of existing school grounds and open spaces managed by Parks and Open Space and/or the School Department.

Using the current MSBA guidelines, this analysis shows a significant deficit of net space (classroom and instructional) across all Brookline schools.

School	Net Space Deficit (sq. ft.)
Baker	29,705*
Driscoll	20,632
Heath	25,557
Lawrence	22,061
Lincoln	21,731
Pierce	22,642**
Runkle	19,329
Total	**161,657**

**Includes the square footage of leased modular classrooms*
***Includes square footage of leased classroom space at 62 Harvard St*

Without any additional enrollment growth, the need for a 9th elementary school is clear. The expand in place strategy allowed eleven years of enrollment growth to be absorbed into our existing schools. This strategy, however, resulted in the Public Schools of Brookline having a space deficit larger than the space needed for a five section elementary school. The total net space deficit across the system is 161,657 net square feet while the net square footage of the new Devotion School will be 131,180.

The construction of a new elementary school at the Baldwin School site adds capacity to the Public Schools of Brookline allowing for a portion of this space deficit to be addressed. The capacity of the 9th Elementary School at Baldwin to do this must be considered along with the ongoing Devotion School project and information on the number of students currently living in each of our K-8 districts.

Providing Relief to Schools in North and South Brookline
During SY 2015-2016, the following number of students lived in each of our K-8 districts.

K-8 District	Student Count (PK-8)
Lincoln	605

Pierce	876
Lawrence	572
Devotion	848
Driscoll	504
Runkle	600
Heath	486
Baker	867

These counts of students living in each of our K-8 districts differ from the enrollment in each of our K-8 schools. For example, student enrollment at Lawrence in February 2016 was 688; 116 students greater than the number of students living in the Lawrence District in SY 2015-2016. This difference between students in district and actual enrollment in each school is the result of two factors: each school facility having a specific capacity that is being fully utilized, and the assignment district buffer zones allowing flexibility in student assignment to maintain an average class size of 21 students throughout our school system. The opening of a renovated Devotion School, planned to accommodate 1,050 students including Pre-K, will relieve significant space pressures in North Brookline. A Devotion School that can accommodate all students living in the Devotion district with additional room for buffer assignments and anticipated new housing will provide relief to the Lawrence and Driscoll Schools. By providing relief to Lawrence and Driscoll, we then can address space pressures at Pierce by using buffer assignments in the Pierce/Driscoll and Pierce/Lawrence zones.

The 9th Elementary School at Baldwin will provide similar space relief in South Brookline. In SY 2015-2016, 867 students lived in the Baker District. As a 4+ section school with 762 students enrolled as of February 1, 2017, Baker is operating significantly over its building capacity and still students are being buffered from Baker to other schools. If Baker is operationalized as a four section school, the three classes above the four section total at Baker would be absorbed by the 9th Elementary School at Baldwin. Additionally, all students currently living in the Baker District could be assigned to either Baker or the 9th School at Baldwin. Similar to the Devotion School in North Brookline, the 9th Elementary School at Baldwin would also allow for student buffer zone assignments that could relieve some enrollment and space pressures at Heath, Runkle and Lincoln.

Additional Enrollment Growth Anticipated

In addition to the immediate space need resulting from the Town's expand in place strategy, the enrollment projections for the Public Schools of Brookline show continued enrollment growth in upcoming years. Including known new developments, more than 400 additional K-8 students will enroll by 2020. A significant portion of these students will live in South Brookline, with an anticipated 192 additional students moving into an expanded

Hancock Village. This enrollment growth combined with the number of students currently living in the Baker district, the sections currently at Baker over a four section building capacity of 36 classes, and potential overcrowding relief in neighboring schools/districts provide support for building a three section school at Baldwin.

I recommend a three section 9th Elementary School with a total of 27 K-8 classrooms. In addition to these K-8 classrooms I recommend including three classrooms for BEEP/early childhood education in the 9th school. In a PK-8 district, it is educationally sound to program early childhood in our elementary school buildings. This vision guided Brookline's early childhood program from its inception until the unprecedented space constraints forced the Town to lease early childhood classrooms. The 9th School at Baldwin provides an opportunity for Brookline to reintegrate early childhood classrooms in our K-8 schools. With the space pressure relief provided by the 9th Elementary School at Baldwin, it is also possible that BEEP classes could return to Lincoln and remain at Runkle.

I also recommend including three classrooms for district-wide special education classes in the 9th Elementary School at Baldwin. The entire Reaching for Independence through Structured Education (RISE) program for students with Autism Spectrum Disorder is currently located at Runkle School; it serves 48 students in six classrooms. RISE has outgrown its current space at the Runkle School and current enrollment forecasts from BEEP/early childhood grades indicate continued and substantial growth in this program. Building three classrooms for RISE at the 9th School at Baldwin allows the PSB to continue meeting the needs of the growing number of students served by this specialized program. By building space for RISE at the 9th Elementary School at Baldwin and dividing the large RISE program into two sites, a minimum of two classrooms will open at Runkle providing additional space to address enrollment and capacity challenges in the district. By dividing the program into two sites, the district will be able to more fully support inclusive opportunities as the program continues to grow.

Based on current enrollment projections, the current Devotion School project, and the student population in each of our K-8 districts, I recommend the School Committee request a three section school, with additional space for both BEEP and RISE, for the 9th Elementary School at Baldwin. A three section school at this location will allow the Public Schools of Brookline to meet its projected enrollment needs and will allow for overcrowding relief for surrounding schools. While there is a need town-wide for four sections, putting all four at the Baldwin location places a portion of the additional capacity in a part of town where it is not needed. The Devotion School project, designed to enroll all the students currently living in the Devotion district with additional buffer capacity, allows the Public Schools of Brookline to address some of the existing overcrowding in North Brookline.

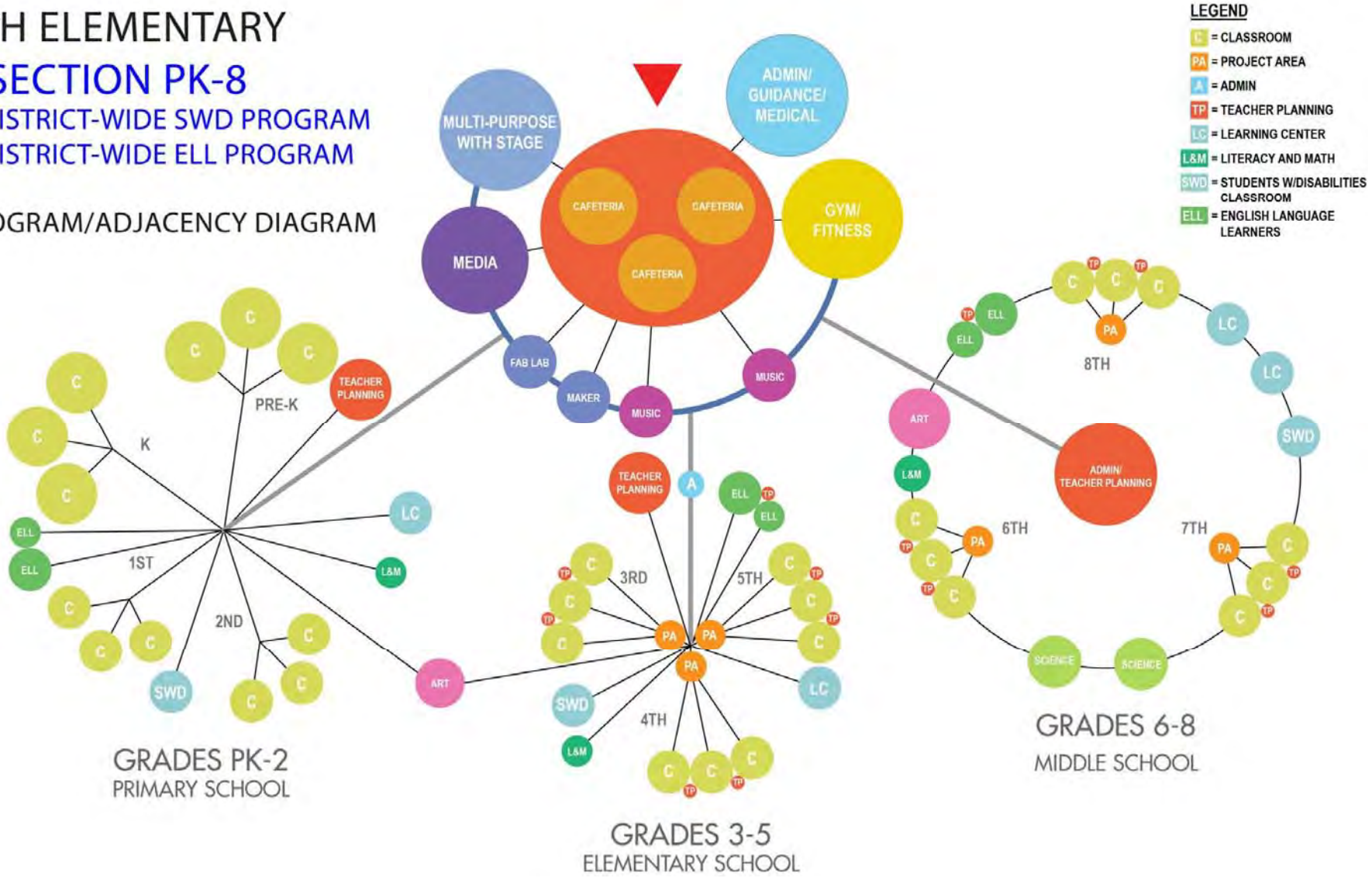
2.3 Draft Program Bubble Diagram

9TH ELEMENTARY

3 SECTION PK-8

+ DISTRICT-WIDE SWD PROGRAM
+ DISTRICT-WIDE ELL PROGRAM

PROGRAM/ADJACENCY DIAGRAM



2.4 Draft Space Summary

Brookline 9th Elementary - Proposed Space Summary

= *Change from MSBA Template*
= *Renovation Space at Devo*

3 Section School + District-Wide SWD Program + District-Wide ELL Program	PROPOSED				DEVOTION (For Reference)			MSBA GUIDELINES (For Reference)		
ROOM TYPE	ROOM NFA	# OF RMS	area totals	Comments	ROOM NFA	# OF RMS	area totals	ROOM NFA	# OF RMS	area totals
CORE ACADEMIC SPACES			**40,020**				**55,710**		**31**	**28,960**
Pre-Kindergarten w/ toilet	1,200	3	3,600		1,225	2	2,450	1,200		-
Kindergarten w/ toilet	1,200	3	3,600	1,100 SF min - 1,300 SF max	1,174	5	5,870	1,200	3	3,600
General Classrooms - Grades 1-5	900	15	13,500	900 SF min - 1,000 SF max	890	25	22,250	950	15	14,250
General Classrooms - Grades 6-8	900	9	8,100		891	15	13,370	950	9	8,550
Teacher Planning Grades 3-8	50	18	900							
Science Classroom / Lab	1,200	2	2,400	1 period / day / student	1,193	3	3,580	1,200	2	2,400
Prep room	120	1	120		133	3	400	80	2	160
World Language Classrooms					850	2	1,700			
Small Group Rooms										
Small Group Rooms - Grades K-2					157	3	470			
Small Group Rooms - Grades 3-5					150	3	450			
Small Group Rooms - Grades 6-8					150	3	450			
Small Group Room / Literacy Specialists	150	8	1,200	Education Plan Page 8						
Literacy and Math Specialist										
Literacy Specialist K-2					170	1	170			
Literacy Specialist 3-5					155	2	310			
Literacy Specialist 6-8					150	2	300			
Small Group/ Math Specialists										
Math Specialist K-2					215	2	430			
Math Specialist 3-5					155	2	310			
Math Specialist 6-8					0	0	0			
Enrichment Challenge Support					230	1	230			
ELL Small Classroom	400	3	1,200	Education Plan Page 24	297	3	890			
ELL Typical Classroom	900	3	2,700							
Teacher Planning ELL	50	6	300							
Project Areas	400	6	2,400	Grade 3-8 Common Project Areas	231	9	2,080			

= *Change from MSBA Template*
= *Renovation Space at Devo*

3 Section School + District-Wide SWD Program + District-Wide ELL Program	PROPOSED				DEVOTION (For Reference)			MSBA GUIDELINES (For Reference)		
ROOM TYPE	ROOM NFA	# OF RMS	area totals	Comments	ROOM NFA	# OF RMS	area totals	ROOM NFA	# OF RMS	area totals
SPECIAL EDUCATION			**8,780**				**10,980**			**7,550**
SWD Classroom PK-8	900	3	2,700	1 per cluster				950	5	4,750
SWD Classroom Teacher Planning	50	3	150							
SWD Classroom PK-8 toilet	60	3	180					60	5	300
De-Escalation Room	50	3	150	De-Escalation Room (page 26)						
Learning Center	900	4	3,600	Education Plan Page 26						
Learning Center Teacher Planning	50	4	200							
Therapeutic Learning Center Large Group K-2					450	1	450			
Therapeutic Learning Center Small Group K-2					190	2	380			
Therapeutic Learning Center Chill Out K-2					90	1	90			
Therapeutic Learning Center Relax K-2					80	1	80			
Comprehensive Learning Center K-2					380	1	380			
Comprehensive Learning Center Chill Out K-2					70	1	70			
Shared CLC/ LC Office K-2					100	1	100			
Therapeutic Learning Center Large Group 3-5					360	1	360			
Therapeutic Learning Center Small Group 3-5					200	2	400			
Therapeutic Learning Center Chill Out 3-5					80	1	80			
Therapeutic Learning Center Relax 3-5					100	1	100			
Comprehensive Learning Center 3-5					410	1	410			
Comprehensive Learning Center Chill Out 3-5					70	1	70			
Shared CLC/ LC Office 3-5					110	1	110			
Self-Contained SWD - Grades 1-5 toilet										
Self-Contained SWD - Grades K-2 toilet					60	1	60			
Self-Contained SWD - Grades 3-5 toilet					60	1	60			
Self-Contained SWD - Grades 6-8										
Therapeutic Learning Center Large Group 6-8					360	1	360			
Therapeutic Learning Center Small Group 6-8					200	2	400			
Therapeutic Learning Center Chill Out 6-8					80	1	80			
Therapeutic Learning Center Relax 6-8					100	1	100			
Comprehensive Learning Center 6-8					400	1	400			
Comprehensive Learning Center Chill Out 6-8					70	1	70			
Shared CLC/ LC Office 6-8					110	1	110			

= *Change from MSBA Template*
= *Renovation Space at Devo*

3 Section School + District-Wide SWD Program + District-Wide ELL Program	PROPOSED				DEVOTION (For Reference)			MSBA GUIDELINES (For Reference)		
ROOM TYPE	ROOM NFA	# OF RMS	area totals	Comments	ROOM NFA	# OF RMS	area totals	ROOM NFA	# OF RMS	area totals
Self-Contained SWD - Grades 6-8 toilet					60	1	60			
Resource Room - Grades 1-5								500	2	1,000
Learning Center K-2					470	2	940			
Learning Center 3-4					400	1	400			
Resource Room - Grades 6-8								500	1	500
Learning Center 5-6					400	1	400			
Learning Center 7-8					450	1	450			
Small Group Room / Reading								500	2	1,000
Speech	150	1	150	Education Plan Page 27	147	3	440			
OT / PT	950	1	950	Education Plan Page 27	1,090	1	1,090			
Special Ed Team Facilitator	150	1	150	Education Plan Page 27	150	1	150			
Special Education Team Clerk					100	1	100			
Special Education Records					60	1	60			
Special Education Waiting					390	1	390			
Special Education Conference	250	1	250	Education Plan Page 25	130	1	130			
Special Education Conference					170	1	170			
BCBA					150	1	150			
TLC Social Worker					150	1	150			
Psychologist				Listed In Admin and Guidance	150	1	150			
Psychologist					170	1	170			
Psychologist / Social Worker Conference					280	1	280			
Psychologist / Social Worker Safe Room					70	1	70			
Psychologist / Social Worker Testing					80	1	80			
Psychologist / Social Worker Waiting					430	1	430			
Life Skills Store	300	1	300							

= *Change from MSBA Template*
= *Renovation Space at Devo*

3 Section School + District-Wide SWD Program + District-Wide ELL Program	PROPOSED				DEVOTION (For Reference)			MSBA GUIDELINES (For Reference)		
ROOM TYPE	ROOM NFA	# OF RMS	area totals	Comments	ROOM NFA	# OF RMS	area totals	ROOM NFA	# OF RMS	area totals
ART & MUSIC			**10,310**				**13,990**			**7,225**
Art Classroom - Grades 1-5	1,000	1	1,000		1,020	2	2,040	1,000	1	1,000
Art Classroom - Grades 6-8	1,200	1	1,200		1,180	1	1,180	1,200	1	1,200
Art Workroom w/ Storage & kiln	150	2	300		160	3	480	150	2	300
Band / Chorus - 100 seats	1,500	1	1,500		1,810	1	1,810	1,500	1	1,500
Music Classroom / Large Group - 25-50 seats	1,200	1	1,200		1,185	2	2,370	1,200	1	1,200
Music Practice / Ensemble - Grades 1-5	75	0	0		80	4	320	75	3	225
Music Practice / Ensemble - Grades 6-8	200	1	200		280	1	280	200	1	200
Multipurpose Room	3,200	1	3,200	Education Plan page 17	3,780	1	3,780			
Stage	1,600	1	1,600		1,600	1	1,600	1,600	1	1,600
Multipurpose Chair Storage	110	1	110		130	1	130			
VOCATIONS & TECHNOLOGY			**2,350**				**2,970**			**3,200**
Tech Clrm. - (E.G. Drafting, Business)	950	1	950	Fab Lab	910	1	910	1,200	1	1,200
Tech Shop - (E.G. Consumer, Wood)	1,400	1	1,400	Maker Space	2,060	1	2,060	2,000	1	2,000
HEALTH & PHYSICAL EDUCATION			**10,400**				**10,680**			**8,310**
Gymnasium	6,000	1	6,000	6000 SF Min. Size	6,120	1	6,120	6,000	1	6,000
Gym Storeroom	210	1	210		210	1	210	150	1	150
Gym Storeroom	80	1	80		80	1	80			
Health Instructor's Office w/ Shower & Toilet	160	1	160		220	2	440	160	1	160
Locker Rooms - Boys / Girls w/ Toilets	400	0	0		420	2	840	1,000	2	2,000
Small Gym	3,000	1	3,000	Education Plan Page 18	2,990	1	2,990			
Fitness Classroom	950	1	950	Education Plan Page 18						

= *Change from MSBA Template*
= *Renovation Space at Devo*

3 Section School + District-Wide SWD Program + District-Wide ELL Program	PROPOSED				DEVOTION (For Reference)			MSBA GUIDELINES (For Reference)		
ROOM TYPE	ROOM NFA	# OF RMS	area totals	Comments	ROOM NFA	# OF RMS	area totals	ROOM NFA	# OF RMS	area totals
MEDIA CENTER			**3,815**				**5,170**			**3,505**
Media Center/Reading Room	3,505	1	3,505		4,860	1	4,860	3,505	1	3,505
Media Center Office	140	1	140		140	1	140			
Media Book Room	170	1	170		170	1	170			
DINING & FOOD SERVICE			**6,780**				**7,850**			**7,867**
Cafeteria / Dining (2 seatings)				2 seatings - 15SF per seat				5,175	1	5,175
Cafeteria / Dining (3 seatings) / Multi-Use	4,000	1	4,000	Education Plan Page 31	5,100	1	5,100			
Kitchen	1,990	1	1,990	1600 SF for first 300 + 1 SF/student Add'l	1,790	1	1,790	1,990	1	1,990
Kitchen Office	70	1	70		70	1	70			
Kitchen Storage	60	1	60		60	2	120			
Kitchen Toilet	200	1	200		200	1	200			
Kitchen Custodial	30	1	30		30	1	30			
Chair / Table / Equipment Storage	430	1	430	200 SF for first 300 + .333 SF/student Add'l	540	1	540	430	1	430
Staff Lunch Room	273	0	0	In Teacher's Work Room		0		273	1	273
MEDICAL			**610**				**720**			**610**
Medical Suite Toilet	60	1	60		100	1	100	60	1	60
Nurses' Office / Waiting Room	250	1	250		290	1	290	250	1	250
Examination Room / Resting	100	3	300		190	1	190	100	3	300
Examination Room / Resting					70	2	140			

= *Change from MSBA Template*
= *Renovation Space at Devo*

3 Section School + District-Wide SWD Program + District-Wide ELL Program	PROPOSED				DEVOTION (For Reference)			MSBA GUIDELINES (For Reference)		
ROOM TYPE	ROOM NFA	# OF RMS	area totals	Comments	ROOM NFA	# OF RMS	area totals	ROOM NFA	# OF RMS	area totals
ADMINISTRATION & GUIDANCE			**5,686**				**4,920**			**3,003**
Principal's Office w/ Conference Area	375	1	375		350	1	350	375	1	375
Principal's Secretary / Waiting	125	0	0	In General Office		0	0	125	1	125
Assistant Principal's Office - AP1	115	1	115		140	2	280	115	1	115
Assistant Principal's Office - AP2	115	0	0		230	1	230	115	0	-
General Office / Waiting Room / Toilet	425	1	425	Includes Principal's Secretary	870	1	870	425	1	425
Conference room	249	1	249		300	1	300	249	1	249
Teachers' Mail and Time Room	100	1	100	Includes Duplicating Room	370	1	370	100	1	100
Duplicating Room	147	0	0	Included in Mail Room		0	0	147	1	147
Records Room	122	1	122		130	1	130	122	1	122
Supervisory / Spare Office	115	1	115		110	1	110	115	1	115
General Waiting Room	100	1	100		120	1	120	100	1	100
Guidance Office	150	4	600	2 Guidance, 1 Psych, 1 Soc. Worker	305	2	610	150	4	600
Guidance Storeroom	35	1	35		40	2	80	35	1	35
Professional Learning and Teacher Planning										
Teachers' Work Room	500	3	1,500	Education Plan Page 29	1,010	1	1,010	495	1	495
Small Conference Room	250	3	750	Education Plan Page 29						
Specialist Collaborative Workspace	250	3	750	Education Plan Page 29						
				Education Plan Page 29						
World Language Office	150	2	300		310	1	310			
METCO Office	150	1	150		150	1	150			
CUSTODIAL & MAINTENANCE			**2,263**				**4,920**			**2,213**
Custodian's Office	120	1	120		120	1	120	150	1	150
Custodian's Toilet / Shower					90	1	90			
Custodian's Workshop	298	1	298		450	1	450	298	1	298
Custodian's Storage	375	1	375		470	1	470	375	1	375
Storeroom	460	1	460		668	4	2,670	460	1	460
Recycling Room / Trash	400	1	400		270	1	270	400	1	400
Receiving and General Supply	330	1	330		380	1	380	330	1	330
Network / Telecom Room	200	1	200		390	1	390	200	1	200
Outdoor Storage	80	1	80		80	1	80			

= *Change from MSBA Template*
= *Renovation Space at Devo*

3 Section School + District-Wide SWD Program + District-Wide ELL Program	PROPOSED				DEVOTION (For Reference)			MSBA GUIDELINES (For Reference)		
ROOM TYPE	ROOM NFA	# OF RMS	area totals	Comments	ROOM NFA	# OF RMS	area totals	ROOM NFA	# OF RMS	area totals
OTHER			**5,510**				**13,120**			**0**
Other *(specify)*										
Extended Day Storage	420	1	420		420	1	420			
Extended Day Office	250	1	250		320	1	320			
PTO	60	1	60		380	1	380			
Staff Showers	90	2	180		90	2	180			
Mechanical / Emer Generator				In Grossing Factor	11,820	1	11,820			
Soule Gym	3,800	1	3,800							
Soule Environmental Ed Center	800	1	800							
Total Building Net Floor Area (NFA)			**96,525**		**(MSBA -**	**104,588)**	**131,030**			**72,444**
Proposed Student Capacity / Enrollment			**690**				**1,010**			**690**
Total Building Gross Floor Area (GFA) ^{2}		GSF new	**142,857**		**(MSBA -**	**156,882)**	**196,979**			**108,666**
Grossing factor (GFA/NFA)			**1.48**				**1.50**			**1.50**

3 Proposed List of Preliminary Alternatives

3.1 Preliminary Alternatives "A-E"

Common Elements

Among the five approaches that were studied all share certain common elements. These include:

1 - The positioning of a new gymnasium structure at the southern boundary shared with the Soule Park in order to facilitate interaction between the schools and the parks athletic activities and also to allow for connection between the school and the proposed Soule Recreation Gymnasium for economy and programmatic flexibility.

2 - The distribution and location of building massing to best prepare for possible preservation of existing mature trees.

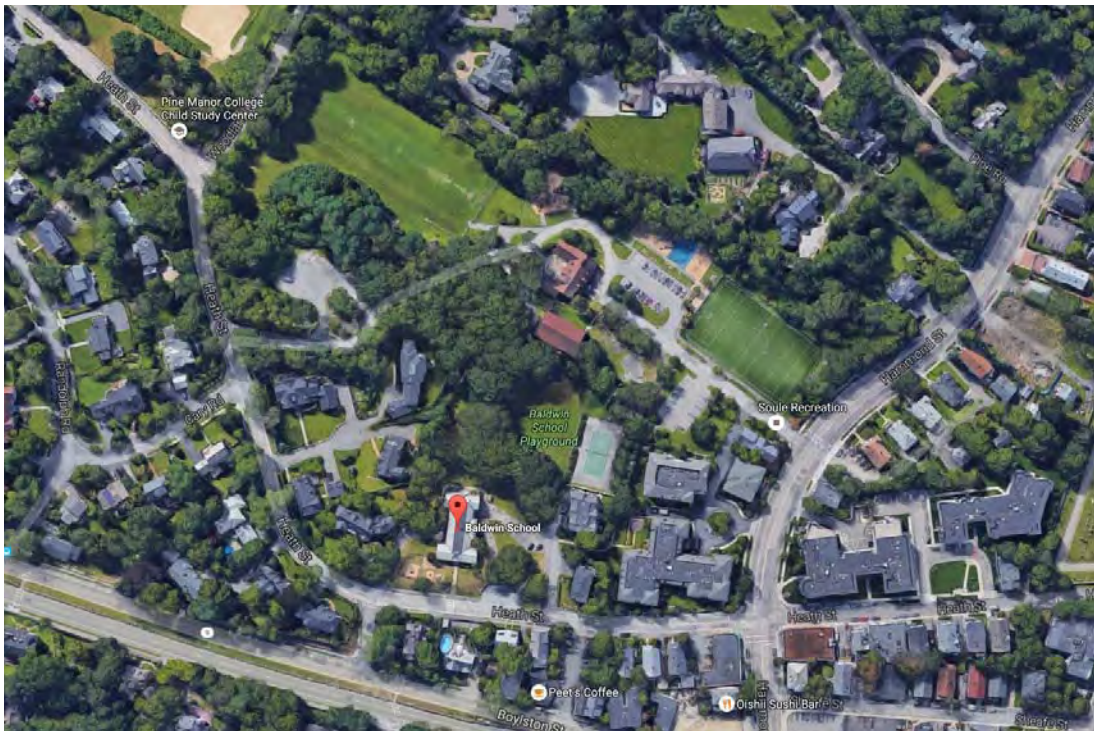
3 - The creation of an at-grade parking area and drop-off to be shared with Soule Recreation activities together with various improvements to the Soule property including an enlarged athletic field. This parking and drop-off location also recommends a consistent location for the school's main entrance at the southeast corner of the Baldwin school property.

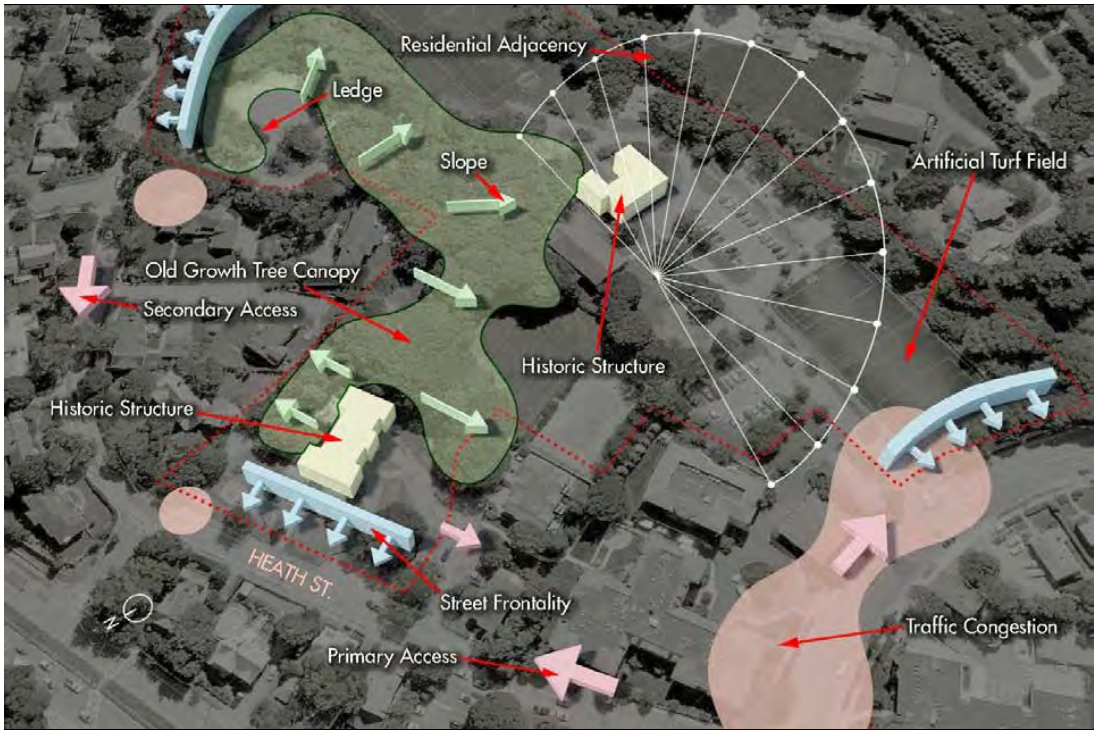
4 - The location of a new continuous connecting drive along the east property boundary.

5 - Except for Option "C", orientation of the majority of classrooms to the south and north to optimize classroom daylighting and mechanical systems.

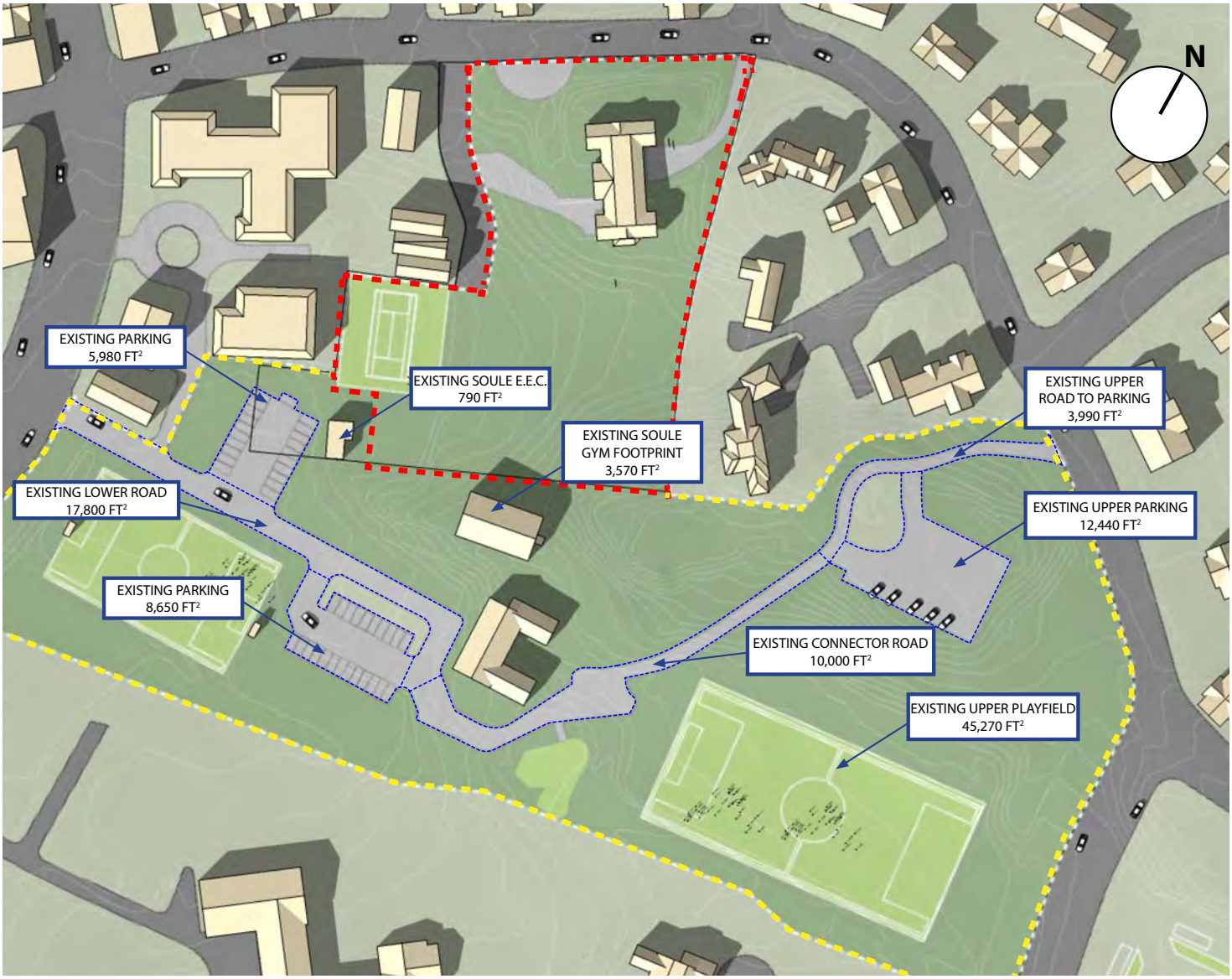
6 - The placement of the school's main cafeteria and learning commons in conjunction with open recess space to be located in the area of the existing tennis courts.

7 - General conformance to the zoning constraints including requirements for FAR, open-space and landscaped space proportions, yard setbacks and, for the most part, height restriction calculations.

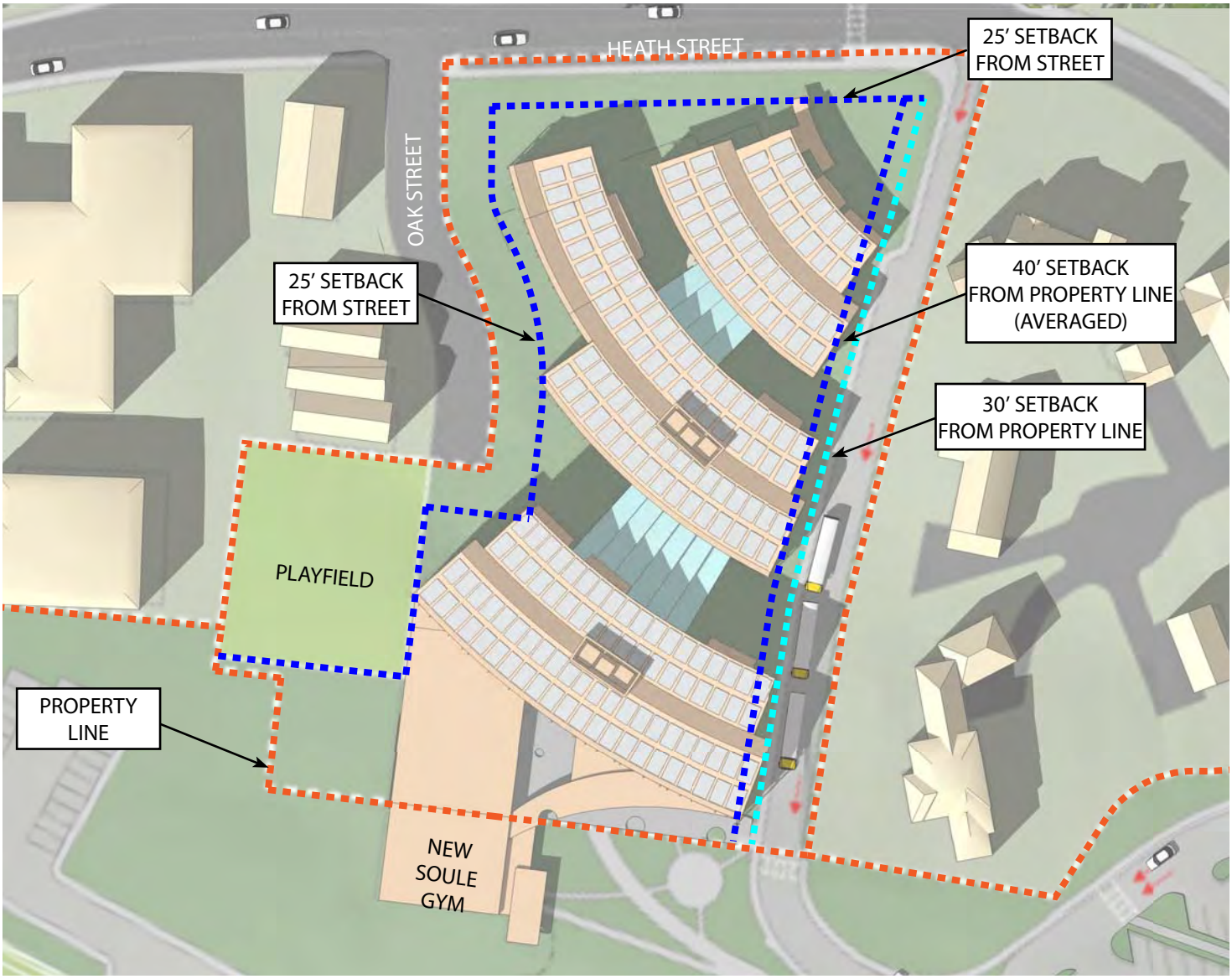




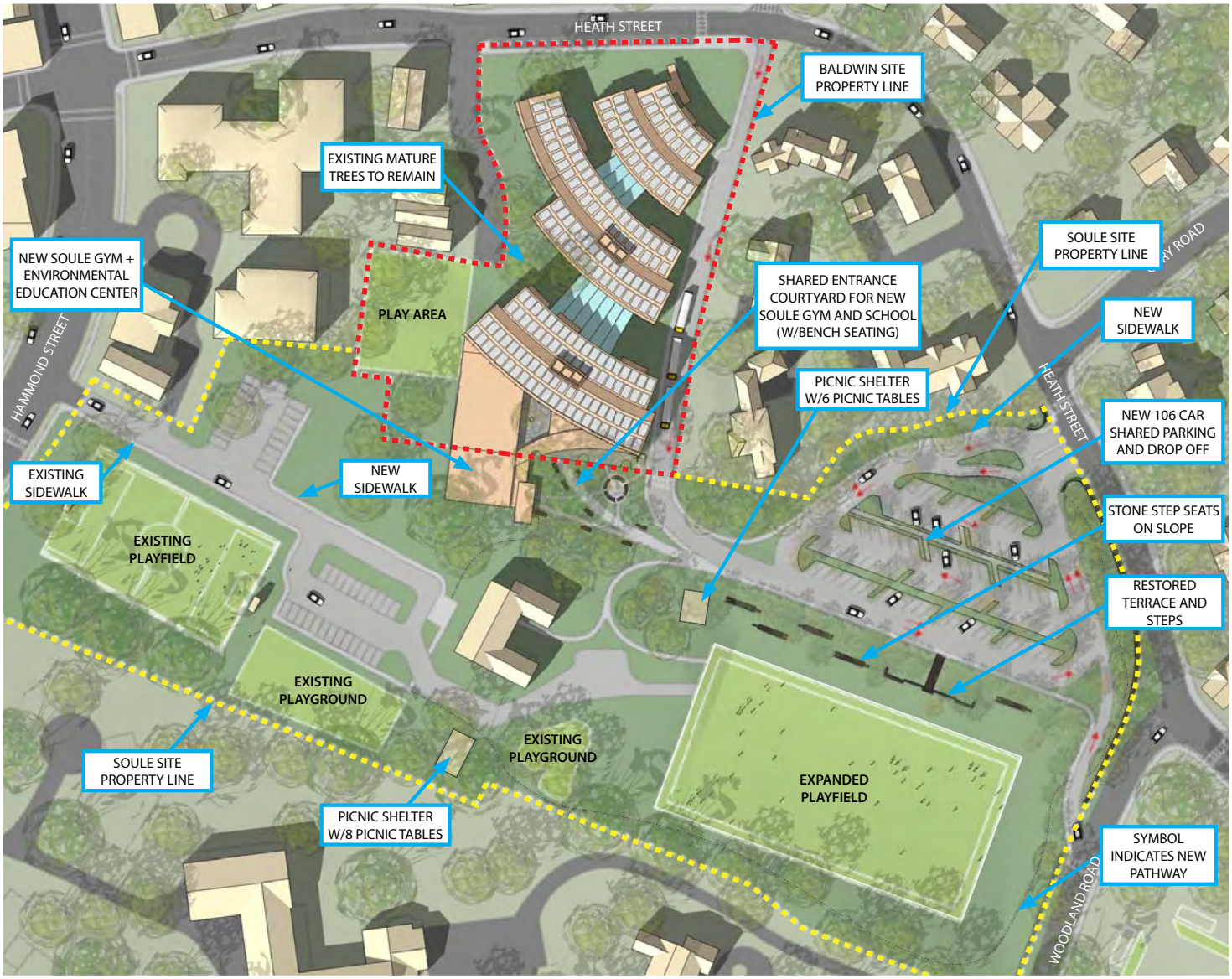
Initial Site Analysis



Soule Site - Existing Conditions



Baldwin Site - Zoning Setbacks
(Option D Example Shown)



Revised Soule Site Improvements

Option A - Perspective

Option "A"- "Double-loaded Bars

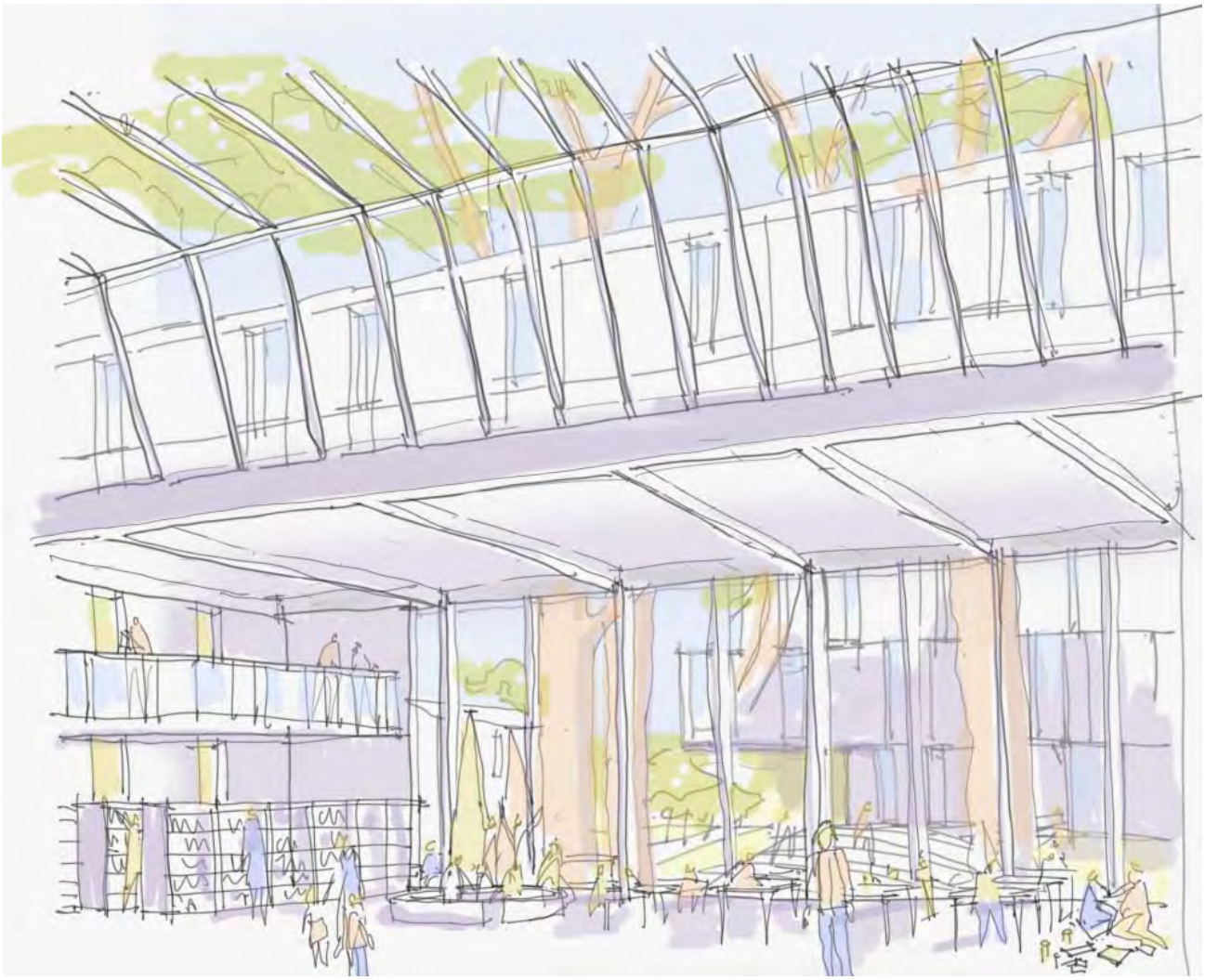
The mass is arranged into three roughly parallel solar-oriented bars. Each double loaded bar represents the majority of one of the school's cohorts - lower school, elementary school and middle school. The three bars are connected by a serpentine path of classroom corridors. In a later version requested by the School Building Committee, these connecting classrooms were aligned into a single row along the east property boundary in order to reduce travel distances and improve wayfinding. At the same time the space between the lower school and elementary school wings was enclosed to become a protected courtyard for the younger children. The large glass-enclosed learning commons fronts onto a public open-space with the intent of preserving several of the existing large Oaks which give the property so much of its character today.

Option A (800 Student) - Aerial View

Option A (800 Student) - Site Plan

Option A (645 Student) - Aerial View

Option A (645 Student) - Site Plan



Option B - Perspective

Option "B"- "Winter and Summer Gardens"

In this bi-nuclear scheme, two different varieties of shared open space serve the younger children on the one hand and the older on the other. The younger children's classrooms surround a garden courtyard. The older children's educational spaces are gathered around a glass roofed wintergarden atrium which also becomes the overall school's shared learning commons. The two groupings are separated by a U-shaped public courtyard surrounding the old oaks. The elementary cohort, grades three through five, connects the two.

After review by the School Building Committee, this alternative was not selected for further development because:

- The classrooms have suboptimally varied orientations to the sun.
- The assignment of cohort to building mass is less clear than it is in several of the other options.
- Classroom wings are predominantly single loaded corridors which suggests four, rather than three, classroom wings to be spread across the site.

Option B (800 Student) - Aerial View

Option B (800 Student) - Site Plan

Option C - Perspective

Option "C"- "Radiating Wings"

Given the various demanding site constraints, the team explored the possibility of moving away from the criteria of solar orientation to the possibilities of greater efficiency and massing distribution along the length of the site. The resulting "X"-shaped building. The scheme has many advantages in terms of program organization, bringing the entrance to the center of the site where it is more equidistant from the various sub communities within the building. Similarly, the learning commons would be at the intersection of the wings in a central location. Two triangular-shaped forecourts frame the approach from both sides of the building to the central entrance and learning commons. Three wings house the cohorts while for the fourth houses administration and shared core spaces.

After review by the School Building Committee, this alternative was not selected for further development because:

- The classrooms have suboptimally varied orientations to the sun.
- The long walls of its massing area less sensitive to residential context

Option C (800 Student) - Aerial View

Option C (800 Student) - Site Plan

Option D - Perspective

Option "D"- "Solar Hemi-cycles"
(Preferred Option)

This arrangement orients three curved classroom wings correctly to the sun while at the same time providing a distinct identity for each of the school's three cohorts. By curving the wings, the broken down massing of the building is able to present the reduced scale of its end elevations to the surrounding residences and residential streetscape. Unlike option "A", the cohorts are connected not by classroom corridors but by two shared common spaces-a major learning commons which joins the middle school to the elementary school, and a minor collaboration space which connects the elementary school to the primary school. The southernmost classroom wing which also houses the central administration swings away from the property line to allow for an outdoor gathering place around the building entry.

Option D (800 Student) - Aerial View

Option D (800 Student) - Site Plan

Option D (645 Student) - Aerial View

Option D (645 Student) - Site Plan

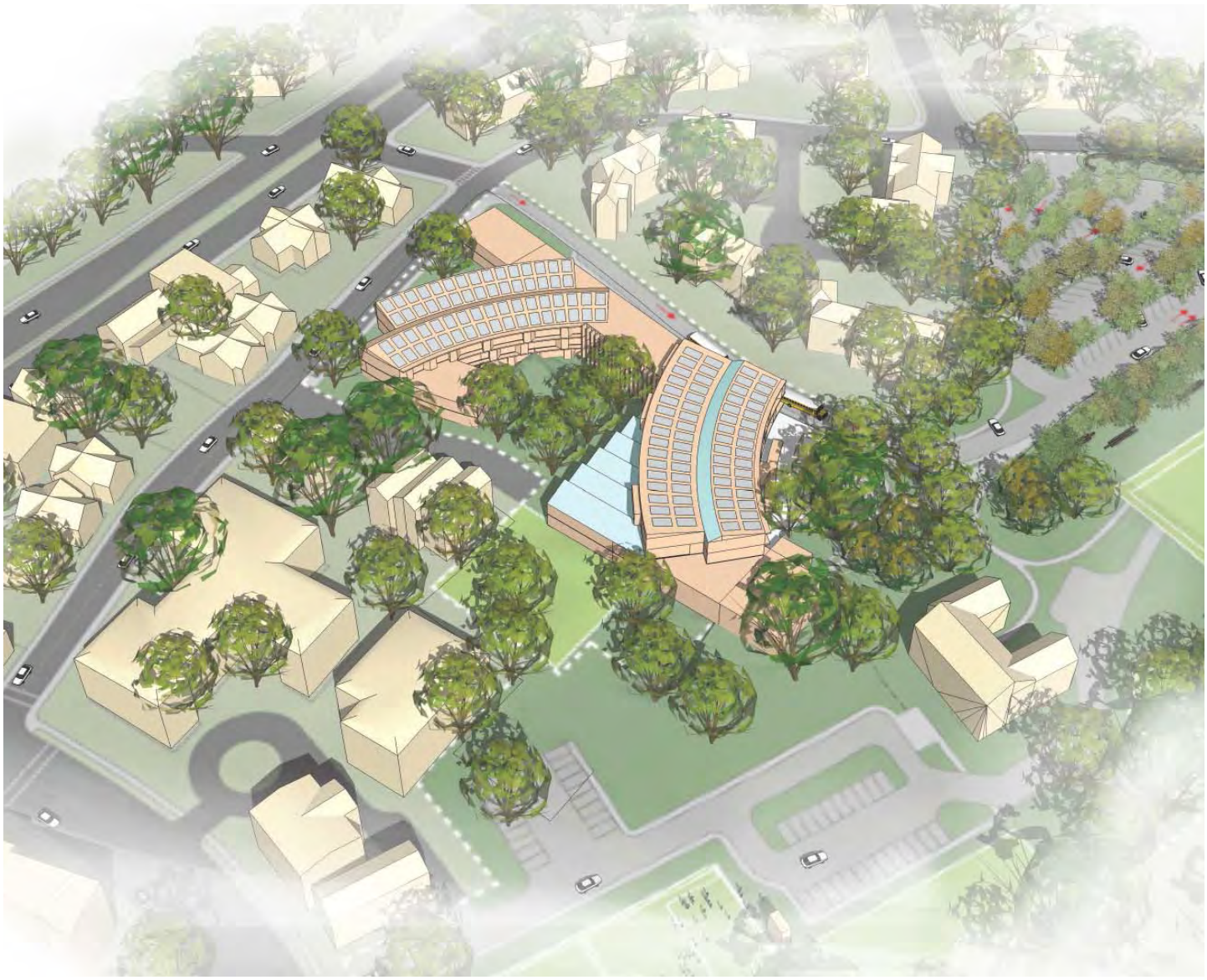
Option E - Perspective

Option "E"- "Shared Courtyard"

Similar to option D, two curved classroom wings are oriented to the sun. However here, the third block of classrooms is oriented East and West stretching to connect the other two. The northernmost wing is also extended to protect a semi-enclosed younger children's playspace which is also contiguous with the primary central outdoor space. A large glass-enclosed learning commons is associated primarily with the main entrance and the middle school classroom aggregation.

Option E (800 Student) - Aerial View

Option E (800 Student) - Site Plan



Option E (645 Student) - Aerial View

Option E (645 Student) - Site Plan

Brookline 9th Elementary School

Evaluation Matrix for Alternative Design Strategies

KEY		
	+	Advantageous
	o	Neutral
	-	Disadvantageous
	- -	Very Disadvantageous

PROJECT EVALUATION CRITERIA	Option A	Option B	Option C	Option D	Option E	Comments
1 Total Project Cost	TBD	TBD	TBD	TBD	TBD	To be Determined
2 Traffic	o	o	o	o	o	All options effectively identical
3 Open Space	o	-	+	+	o	B has least open area, C and D have most
4 Impact to Neighbors	o	o	o	+	+	D and E have smallest apparent massing, residential scale facing neighbors
5 Safety - Outside School Building	o	-	o	o	-	Enclosed courtyards not visible from exterior
6 Security - Inside School Building	o	o	+	+	o	C and D have clearest lines of sight
7 Education Plan Enhancement	o	o	o	+	o	2 group commons facilitate collaboration
8 Classroom Shapes and Adjacencies	+	o	+	+	+	B has single loaded corridors
9 Cohort Configuration	+	o	+	+	o	A, C, and D have most clearly defined cohorts
10 Beneficial Relationship with Soule	+	+	+	+	+	All options enlarge fields, rebuild currently inaccessible gym
11 Community Use	+	+	+	+	+	All options allow community use of gym and auditorium
12 Flexibility of Use - Future Use	o	o	o	o	o	All options effectively identical
13 LEED /Sustainability / Daylighting	+	o	-	+	o	A and D have best solar orientation, C has the least preferable
14 Building Massing/Site Coverage	o	-	-	+	+	B and C look most massive, D and E more human scale
16 MEP Accommodation	+	-	- -	+	o	Solar orientation impacts heating and cooling HVAC requirements
17 Athletic Use	+	+	+	+	+	All options to have new facilities and access to enlarged Soule upper fields
18 Deliveries	o	o	+	o	o	C has most central location for deliveries
19 Schedule Duration / Risk	o	-	o	o	o	B has least site area available for lay-down and staging
20 Site Remediation	o	o	o	o	o	All options effectively identical
21 Hazardous Material Removal	o	o	o	o	o	All options effectively identical
22 Long term Maintenance / Repair Cost	o	-	o	o	-	B and D have most exterior skin
23 Operating Cost	+	-	-	+	o	Solar orientation and exterior skin quantity impact heating and cooling loads

3.3 Preferred Option

While each of the schemes had its positive attributes, the school building committee rapidly narrowed its attention to three schemes, options "A", "D" and "E". The revised option "A" or "A.1" offered the attraction of a protected courtyard for the youngest children but had the disadvantage of utilizing an active classroom corridor as a main passageway from one end of the building to the other. The same row of classrooms along a north-south corridor route also had the disadvantage of positioning a large portion of the building in a sub optimal relationship to the sun.

Option "E" was appreciated for the welcoming aspect of its convex entrance façade but posed the same challenges in terms of allocating a large portion of its classrooms to a poorly oriented wing, both in terms of solar orientation and in terms of its massing relationship to abutting neighbors. Perspective views of both "A" and "E" revealed large uninterrupted façades being presented to the residential context. Whereas, option "D" allows for a more broken up aspect which seemed to many to be more compatible with the neighborhood. The school district also weighed in with a preference for internal connections which utilize shared common space rather than pushing traffic through classroom zones. The proposal of having connected major and minor commons areas was also considered an advantage of this scheme.

In the end Option "D" was designated as the preferred path for further design investigation during the upcoming schematic design phase for its neighborhood sensitivity, technical/ sustainability advantages and for its concordance with the aims of the district's educational program.

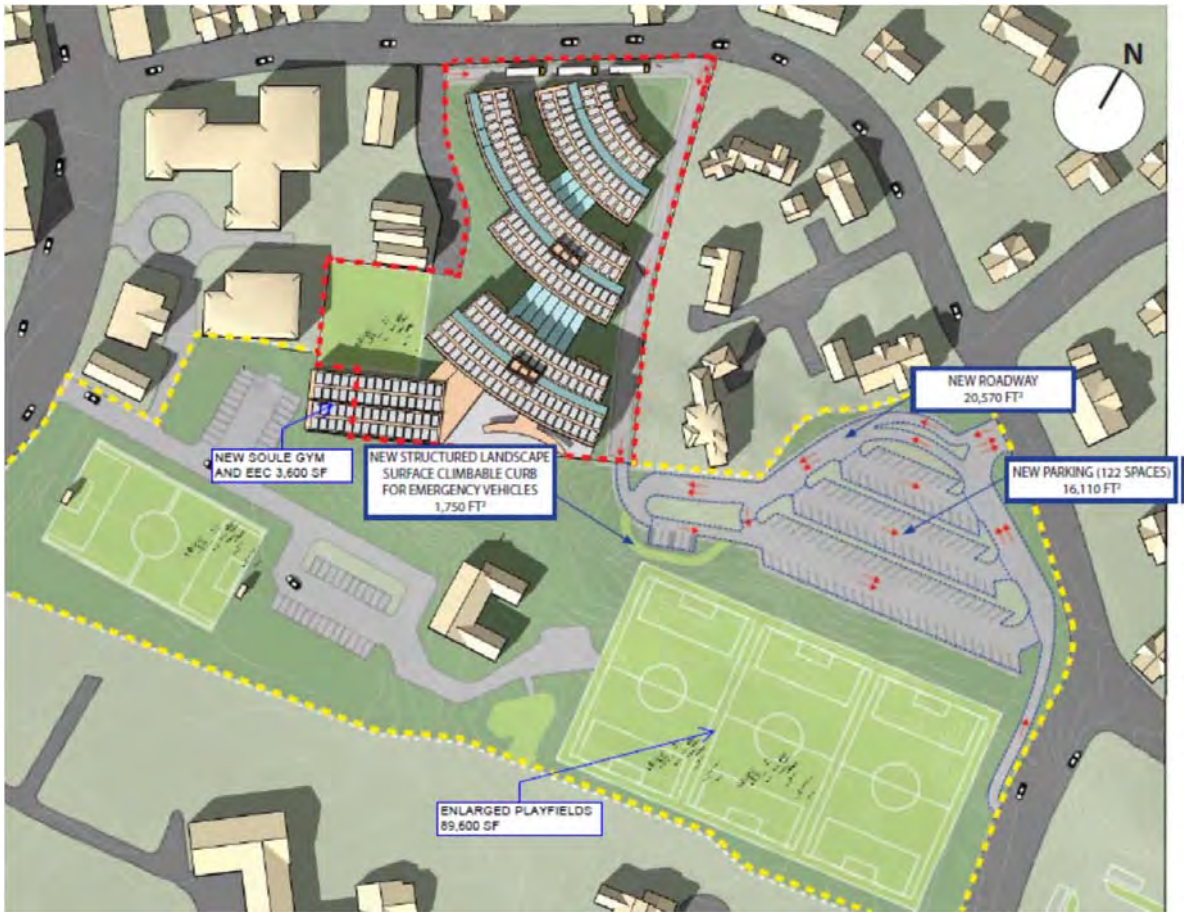
3.4 Feasibility Study Cost Estimates

DAEDALUS

Brookline Schools
Baldwin Site Options
Brookline, MA

March 10, 2017

Feasibility Study Estimate



Architect:
Jonathan Levi Architects
266 Beacon Street
Boston, MA 02116
(617) 437 9458

Cost Estimator:
Daedalus Projects Incorporated
112 South Street
Boston, MA 02111
(617) 451 2717

Project Description:

Analysis and comparison of Pre-Schematic Baldwin Site Feasibility Options
- Option A.1 700 students, 142,000gsf
  - photovoltaics, new bus drop off, new access road, new playfield, 4 story building
  - double-height learning commons with skylight roof
- Option D Phase 1: 700 students, 142,000gsf
  - photovoltaics, new bus drop off, new access road, new playfield, 4 story building in fan shaped mass/formation
  - (2) double-height learning commons with skylight roof
- Option E Phase 1: 700 students, 142,000gsf
  - photovoltaics, new bus drop off, new access road, new playfield, 4 story building in irregular shaped mass/formation
  - double-height learning commons with skylight roof
- Demolition: applies to all Options
  - existing Baldwin School 7,000gsf, Soule Gym 5,000gsf, Environmental Ed Center 800gsf
- Soule Site Work: applies to all Options
  - demolish Gym, drop-off loop and parking lot, expanded artificial turf playfields

Project Particulars:

Design Package prepared by Jonathan Levi Architects
- Revised GSF received March 3, 2017
- Geotechnical Engineering Data Report dated February 15, 2017 prepared by McPhail Associates, LLC
- Brookline Cost Estimate Set received January 17, 2017
- Alternative Soule Site Work Options received January 20, 2017
- Existing Conditions Plan of Land received January 17, 2017 prepared by Hancock Associates
- Existing Conditions Plan Soule Playground received January 17, 2017

Detailed quantity takeoffs where possible from design documents

Daedalus Projects, Inc. site visit to Subject sites

Daedalus Projects, Inc. experience with similar projects of this nature

Acquisition Costs based on Assessed value + 25%

Project Assumptions:

The project will be by a Construction Manager under Chapter 149A CM at Risk Contract

The project will be publicly bid to pre-qualified Trade Contractors

Our costs assume that there will be at least three subcontractors submitting unrestricted bids in each sub-trade

Unit rates are based on current dollars escalated to mid-point of construction and utilizing prevailing wage labor rates

Subcontractor's markups are included in each unit rate. These markups cover field and home office overhead and subcontractor's profit

No occupancy during construction

Operation during normal working hours

Noise and vibration disturbances are anticipated and will be minimized

Anticipated start of construction Spring 2018

Escalation allowance has been carried in the Main Summary at a rate of 3½% per year to start of construction

Estimate Exclusions:

Work beyond the boundary of this Project
Police details and street/sidewalk permits

STUDY MAIN SUMMARY

OPTION	BASE	SIDEWALK	TOTAL
Option A.1 700 students, 142,000gsf	$83,105,000	$1,257,000	**$84,362,000**
Option D Phase 1: 700 students, 142,000gsf	$83,454,000	$1,257,000	**$84,711,000**
Option E Phase 1: 700 students, 142,000gsf	$82,276,000	$1,257,000	**$83,533,000**

BALDWIN SITE STUDY COST DETAILS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
8	**Option A.1 700 students, 142,000gsf**				
9					
10	Property line limit of disturbance, site prep, selective demo	**115,300**	GSF	$5.00	$576,500
11	Abatement	**1**	AL	$500,000.00	$500,000
12	Demolish existing building; Baldwin School	**84,000**	CFT	$0.85	$71,400
13	Bulk earthwork, disposal	**9,400**	CY	$40.00	$376,000
14	rock excavation	**4,100**	CY	$75.00	$307,500
15	New access road, signage	**771**	SY	$135.00	$104,099
16	street curb crossing	**1**	LOC	$10,000.00	$10,000
17	new drop off lane	**606**	SY	$200.00	$121,244
18	site pavement light pole	**2**	FIX	$7,500.00	$15,000
19	Stormwater management - allowance provided	**1**	AL	$400,000.00	$400,000
20	water main service	**250**	LF	$75.00	$18,750
21	sanitary drain system	**250**	LF	$50.00	$12,500
22	electrical service	**250**	LF	$200.00	$50,000
23	New school construction, 4 story	***142,000***	*GSF*		
24	perimeter foundations	**2,930**	LF	$550.00	$1,611,610
25	slab on grade, spread footings	**67,770**	SF	$20.00	$1,355,396
26	structure	**142,000**	GSF	$37.50	$5,325,000
27	exterior closure, shades; 70% brick, 30% glazed	**94,645**	SF	$92.00	$8,707,340
28	roofing	**61,640**	SF	$30.00	$1,849,191
29	skylight at Learning Commons	**6,130**	SF	$125.00	$766,263
30	interior construction, finishes	**142,000**	GSF	$92.50	$13,135,000
31	stairs	**10**	FLT	$30,000.00	$300,000
32	monumental stair	**4**	FLT	$53,000.00	$212,000
33	elevators	**8**	STOP	$50,000.00	$400,000
34	plumbing	**240**	FIX	$9,500.00	$2,280,000
35	fire protection, HVAC, electrical	**142,000**	GSF	$104.00	$14,768,000
36	photovoltaic energy source	**40,000**	SF	$125.00	$5,000,000
37	equipment; audio/visual, food service, gym, kiln	**1**	LS	$500,000.00	$500,000
38	New playfield	**11,935**	GSF	$10.00	$119,350
39	Restore site improvements and plantings	**23,200**	GSF	$8.00	$185,602
40	site lighting	**1**	LS	$50,000.00	$50,000
41	Escalation allowance from now to proposed start of construction	**4%**		$59,127,745	$2,273,334
42	Project Soft Costs	**21%**		$61,401,079	$12,894,227
43	Add Soule Sitework	**1**	LS	$8,809,000	$8,809,000
44	**Option A.1 700 students, 142,000gsf Total**				**$83,105,000**
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BALDWIN SITE STUDY COST DETAILS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
50	**Option D Phase 1: 700 students, 142,000gsf**				
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52	Property line limit of disturbance, site prep, selective demo	**115,300**	GSF	$5.00	$576,500
53	Abatement	**1**	AL	$500,000.00	$500,000
54	Demolish existing building; Baldwin School	**84,000**	CFT	$0.85	$71,400
55	Bulk earthwork, disposal	**13,400**	CY	$40.00	$536,000
56	rock excavation	**6,800**	CY	$75.00	$510,000
57	New access road, signage	**771**	SY	$135.00	$104,099
58	street curb crossing	**1**	LOC	$10,000.00	$10,000
59	new drop off lane	**606**	SY	$200.00	$121,244
60	site pavement light pole	**2**	FIX	$7,500.00	$15,000
61	Stormwater management - allowance provided	**1**	SF	$400,000.00	$400,000
62	water main service	**250**	LF	$75.00	$18,750
63	sanitary drain system	**250**	LF	$50.00	$12,500
64	electrical service	**250**	LF	$200.00	$50,000
65	New school construction, 4 story	***142,000***	*GSF*		
66	perimeter foundations	**2,770**	LF	$550.00	$1,523,445
67	slab on grade, spread footings	**65,435**	SF	$20.00	$1,308,690
68	structure	**142,000**	GSF	$37.50	$5,325,000
69	exterior closure, shades; 70% brick, 30% glazed	**94,645**	SF	$92.00	$8,707,340
70	roofing	**58,235**	SF	$30.00	$1,747,041
71	skylight at Learning Commons	**7,200**	SF	$125.00	$899,975
72	interior construction, finishes	**142,000**	GSF	$92.50	$13,135,000
73	stairs	**10**	FLT	$30,000.00	$300,000
74	monumental stair	**4**	FLT	$53,000.00	$212,000
75	elevators	**8**	STOP	$50,000.00	$400,000
76	plumbing	**240**	FIX	$9,500.00	$2,280,000
77	fire protection, HVAC, electrical	**142,000**	GSF	$104.00	$14,768,000
78	photovoltaic energy source	**40,000**	SF	$125.00	$5,000,000
79	equipment; audio/visual, food service, gym, kiln	**1**	LS	$500,000.00	$500,000
80	New playfield	**11,935**	GSF	$10.00	$119,350
81	Restore site improvements and plantings	**25,536**	GSF	$8.00	$204,285
82	site lighting	**1**	LS	$50,000.00	$50,000
83	Escalation allowance from now to proposed start of construction	**4%**		$59,405,619	$2,284,018
84	Project Soft Costs	**21%**		$61,689,637	$12,954,824
85	Add Soule Sitework	**1**	LS	$8,809,000	$8,809,000
86	**Option D Phase 1: 700 students, 142,000gsf Total**				**$83,454,000**
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BALDWIN SITE STUDY COST DETAILS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
92	**Option E Phase 1: 700 students, 142,000gsf**				
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94	Property line limit of disturbance, site prep, selective demo	**115,300**	GSF	$5.00	$576,500
95	Abatement	**1**	AL	$500,000.00	$500,000
96	Demolish existing building; Baldwin School	**84,000**	CFT	$0.85	$71,400
97	Bulk earthwork, disposal	**13,400**	CY	$40.00	$536,000
98	rock excavation	**6,800**	CY	$75.00	$510,000
99	New access road, signage	**771**	SY	$135.00	$104,099
100	street curb crossing	**1**	LOC	$10,000.00	$10,000
101	new drop off lane	**606**	SY	$200.00	$121,244
102	site pavement light pole	**2**	FIX	$7,500.00	$15,000
103	entrance courtyard on grade at Level Two	**7,930**	SF	$20.00	$158,594
104	Stormwater management - allowance provided	**1**	SF	$400,000.00	$400,000
105	water main service	**250**	LF	$75.00	$18,750
106	sanitary drain system	**250**	LF	$50.00	$12,500
107	electrical service	**250**	LF	$200.00	$50,000
108	New school construction, 4 story	***142,000***	*GSF*		
109	perimeter foundations	**2,340**	LF	$550.00	$1,286,835
110	slab on grade, spread footings	**58,815**	SF	$20.00	$1,176,290
111	structure	**142,000**	GSF	$37.50	$5,325,000
112	exterior closure, shades; 70% brick, 30% glazed	**91,450**	SF	$92.00	$8,413,363
113	roofing	**53,975**	SF	$30.00	$1,619,238
114	skylight at Learning Commons	**4,840**	SF	$125.00	$604,988
115	interior construction, finishes	**142,000**	GSF	$92.50	$13,135,000
116	stairs	**10**	FLT	$30,000.00	$300,000
117	monumental stair	**4**	FLT	$53,000.00	$212,000
118	elevators	**8**	STOP	$50,000.00	$400,000
119	plumbing	**240**	FIX	$9,500.00	$2,280,000
120	fire protection, HVAC, electrical	**142,000**	GSF	$104.00	$14,768,000
121	photovoltaic energy source	**40,000**	SF	$125.00	$5,000,000
122	equipment; audio/visual, food service, gym, kiln	**1**	LS	$500,000.00	$500,000
123	New playfield	**11,935**	GSF	$10.00	$119,350
124	Restore site improvements and plantings	**24,225**	GSF	$8.00	$193,799
125	site lighting	**1**	LS	$50,000.00	$50,000
126	Escalation allowance from now to proposed start of construction	**4%**		$58,467,950	$2,247,966
127	Project Soft Costs	**21%**		$60,715,916	$12,750,342
128	Add Soule Sitework	**1**	LS	$8,809,000	$8,809,000
129	**Option E Phase 1: 700 students, 142,000gsf Total**				**$82,276,000**
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BALDWIN SITE STUDY COST DETAILS

	ELEMENT	QUANTITY	UNIT	UNIT RATE	COST
134	**Soule Site Work: applies to all Options**				
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136	*Carried in Base Estimate Options details above*				
137	Property line limit of disturbance, site prep, selective demo	**405,000**	GSF	$4.00	$1,620,000
138	Demolish existing building; Soule Gym, Environmental Ed Center	**5,800**	CFT	$0.85	$4,930
139	Bulk earthwork, disposal	**8,000**	CY	$40.00	$320,000
140	rock excavation	**15,000**	CY	$75.00	$1,125,000
141	New drop-off and parking, permeable, signage	**7,121**	SY	$145.00	$1,032,577
142	street curb crossing	**1**	LOC	$10,000.00	$10,000
143	site pavement light pole	**7**	FIX	$7,500.00	$52,500
144	Concrete sidewalk	**3,040**	SF	$5.00	$15,200
145	4' rolled aggregate asphalt pathway	**1,067**	SY	$100.00	$106,667
146	New artificial turf playfield	**92,180**	SF	$7.50	$691,350
147	New tree buffer	**425**	LF	$500.00	$212,500
148	Stone step seats on slope	**5**	SET	$15,000.00	$75,000
149	750sf picnic shelter w/6 picnic tables	**1**	SET	$95,250.00	$95,250
150	Restore site improvements and plantings	**236,089**	GSF	$6.25	$1,475,556
151	site lighting	**1**	LS	$180,000.00	$180,000
152	Escalation allowance from now to proposed start of construction	**4%**		$6,836,530	$262,850
153	Project Soft Costs	**21%**		$7,279,380	$1,528,670
154	**Soule Site Work: applies to all Options Total**				**$8,809,000**
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157	**Sidewalk Remediation**				
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159	Sidewalk remediation	**1**	AL	$1,000,000.00	$1,000,000
160	Escalation allowance from now to proposed start of construction	**4%**		$1,000,000	$38,448
161	Project Soft Costs	**21%**		$1,038,448	$218,074
162	**Sidewalk Remediation Total**				**$1,257,000**
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Jonathan Levi Architects JLA

266 beacon street
boston ma 02116
tel 617 437 9458
fax 617 437 1965
www.leviarc.com