



Article 11: Appropriate for High School Expansion Construction

**Presented to Special Town Meeting
October 2, 2017**

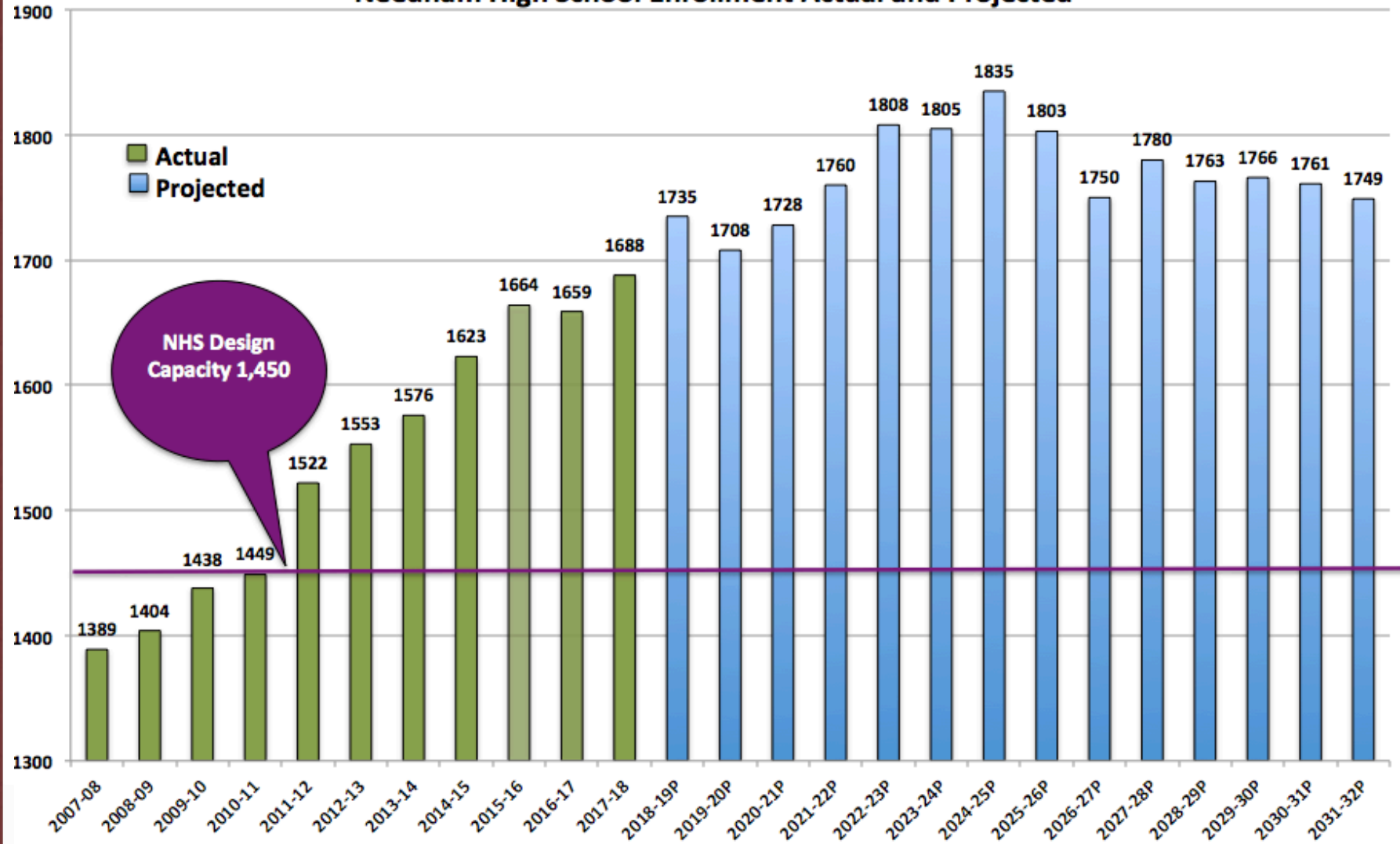
The proposed expansion addresses 3 critical needs:

- **Provides 10 new classrooms and renovates existing spaces to provide for core academic classes, including special education**
- **Renovates the “A” Gym**
- **Repairs the building’s HVAC system**



NHS Enrollment Trends & Building Design Capacity

Needham High School Enrollment Actual and Projected



Proposed Renovation Plans: Campus Overview



Proposed Renovation Plans: Addition at Webster St. Entrance



Proposed Renovation Plans: 2nd Floor Classroom Expansion



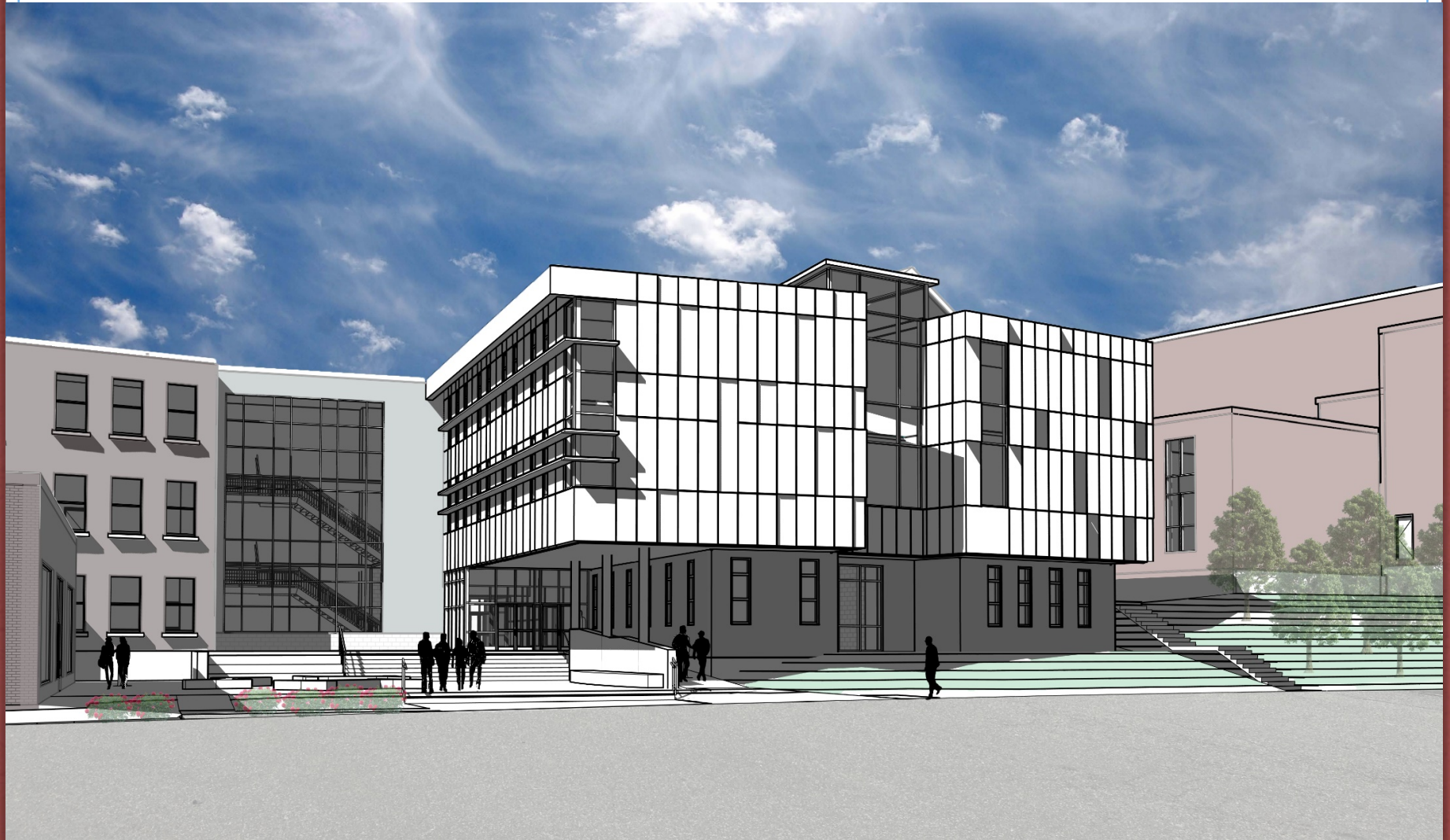
Proposed Renovation Plans: 3rd Floor Classroom Expansion



Proposed Renovation Plans: 1st Floor Expansion

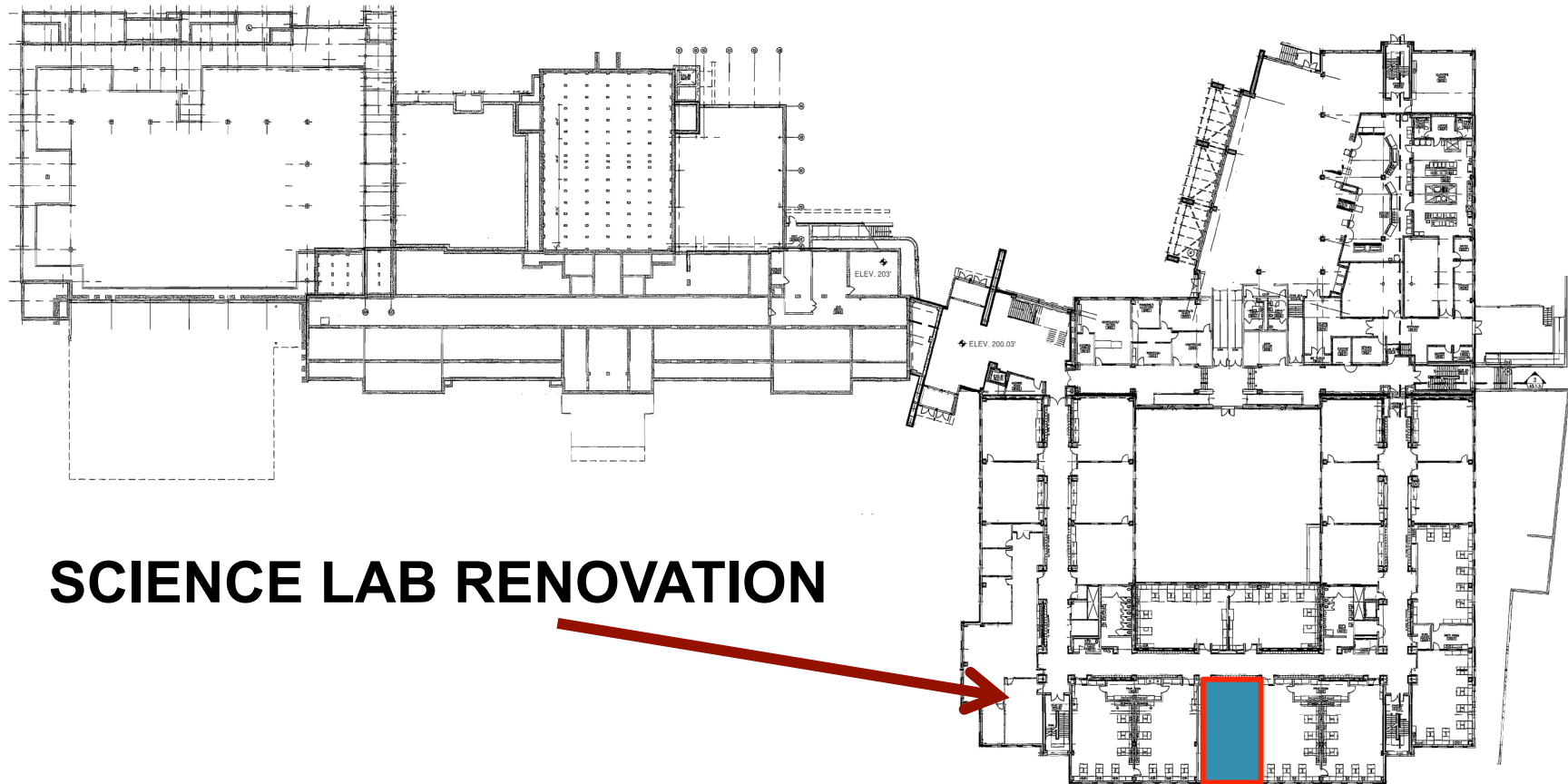


Proposed Renovation Plans: Elevation View from Webster Street



Proposed Renovation Plans

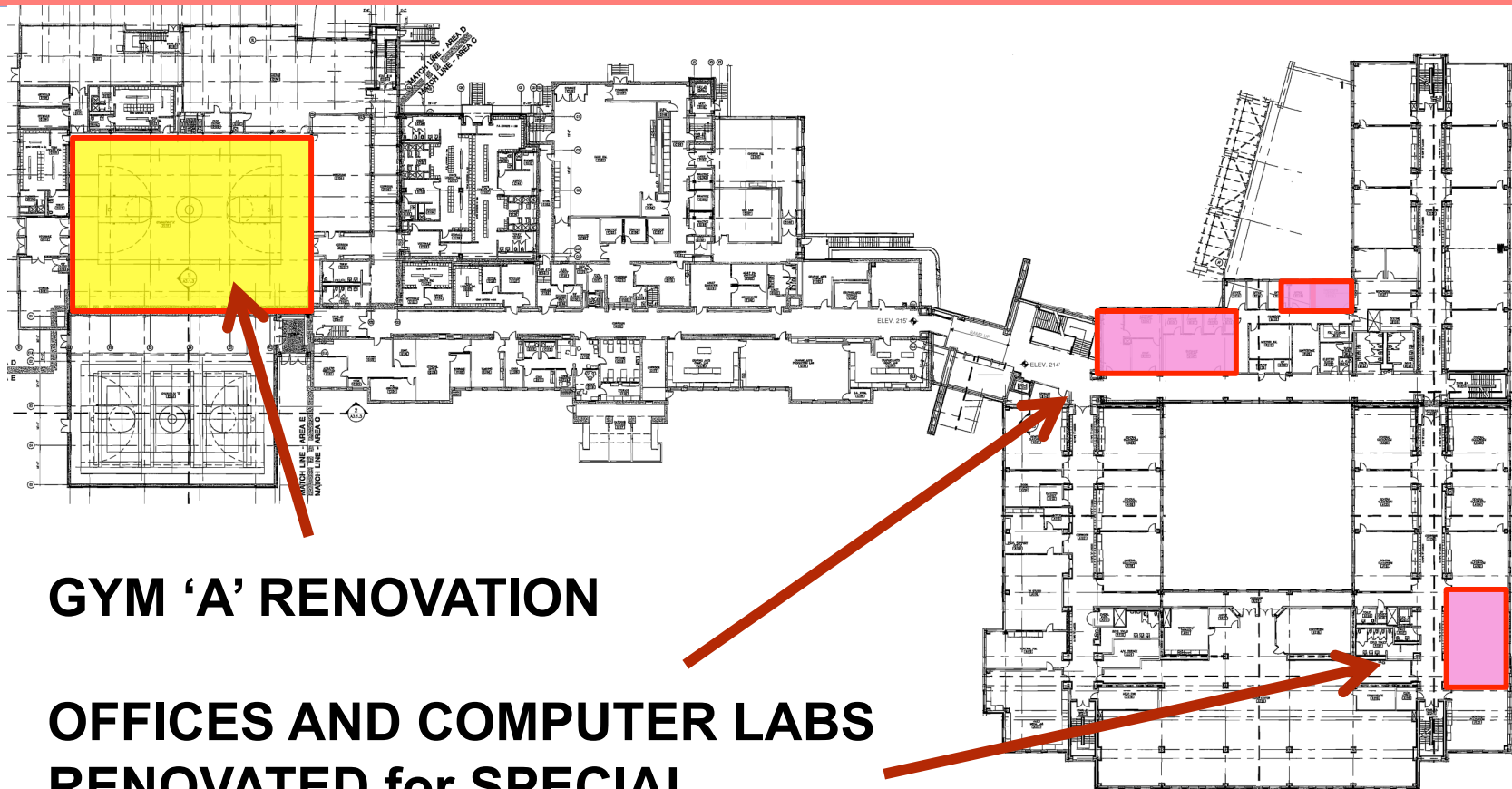
Interior Repairs and Renovations



SCIENCE LAB RENOVATION

LEVEL 1

Proposed Renovation Plans: Interior Repairs and Renovations

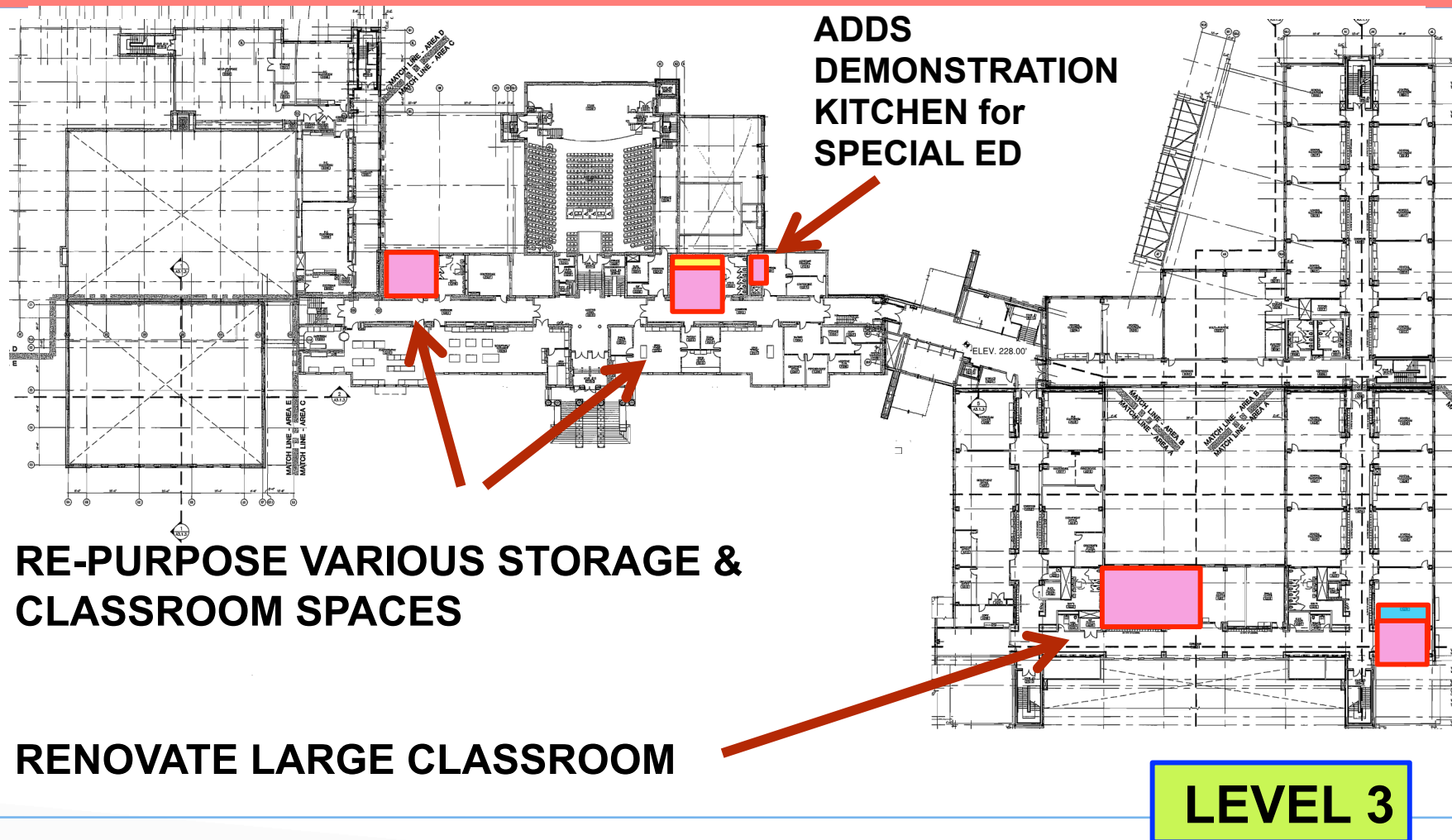


GYM 'A' RENOVATION

**OFFICES AND COMPUTER LABS
RENOVATED for SPECIAL
EDUCATION**

LEVEL 2

Proposed Renovation Plans: Interior Repairs and Renovations

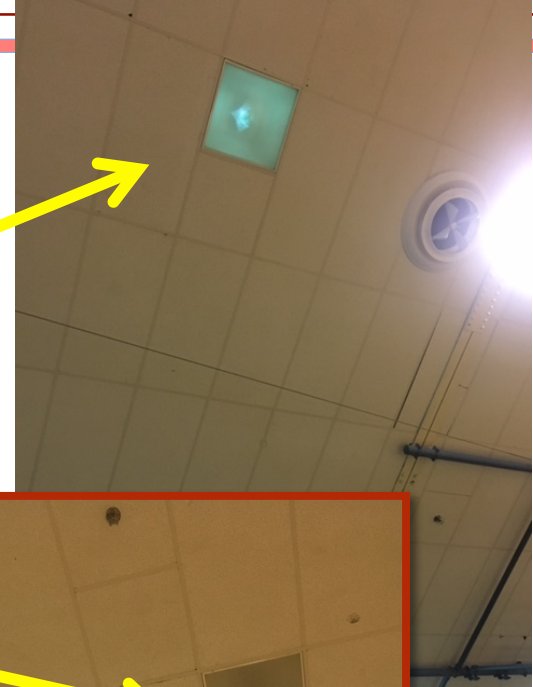


Proposed Renovation Plans: Gym “A” Renovation



**NHS “A” Gym: It’s
a School &
Community
Resource**

Proposed Renovation Plans: Ceiling, Lights, Flooring, Storage, Ventilation



**Lighting inadequate
& non-functioning**



Proposed Renovation Plans: Ceiling, Lights, Flooring, Storage, Ventilation



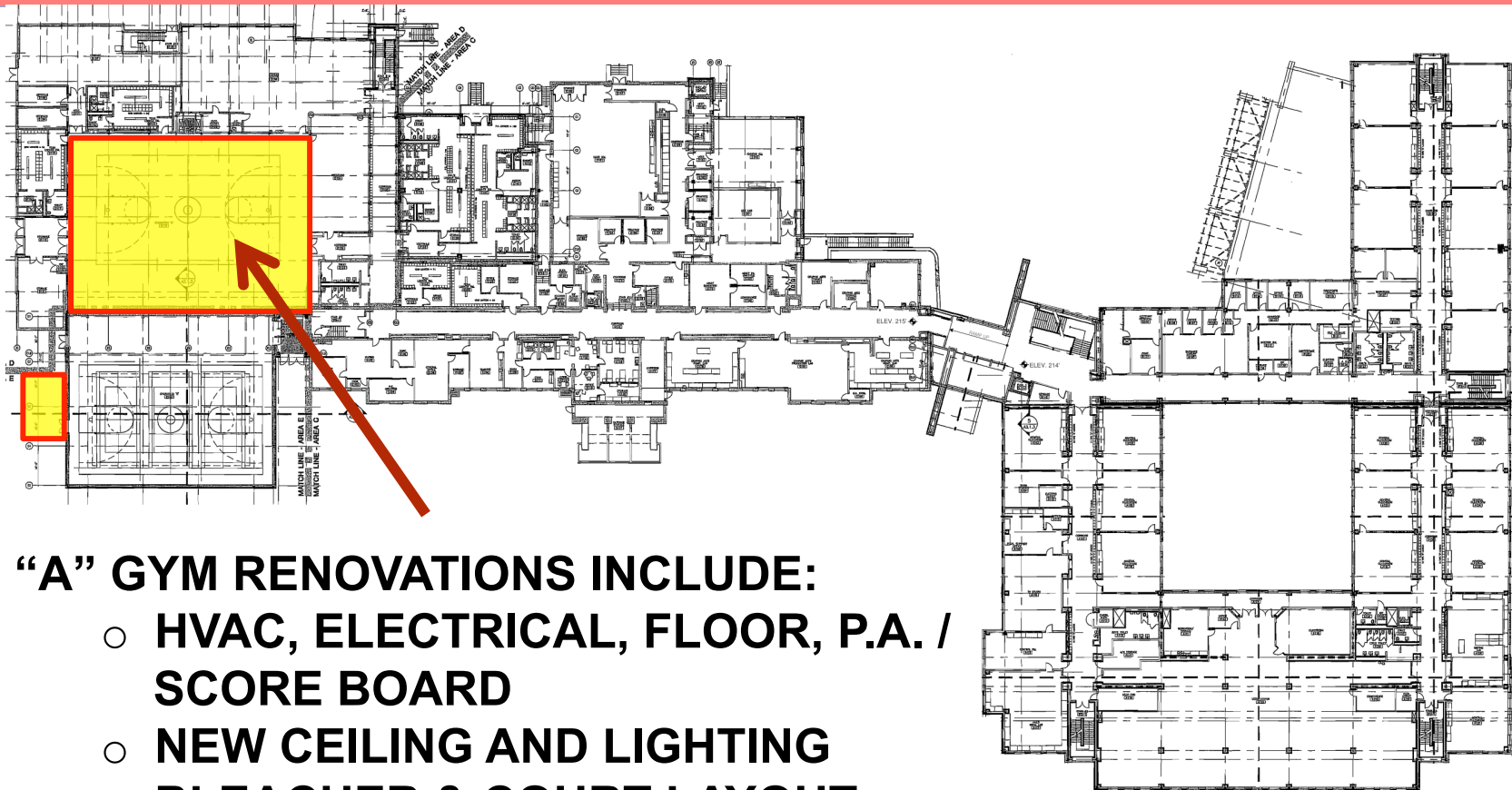
There is insufficient on site storage, causing items to be kept outside or in the way of classes & spectators

Proposed Renovation Plans: **Ceiling, Lights, Flooring, Storage, Ventilation**



**Ventilation units on roof,
some electrical, floor, &
walls need replacement or
refurbishment**

Proposed Renovation Plans: Interior Repairs and Renovations



“A” GYM RENOVATIONS INCLUDE:

- HVAC, ELECTRICAL, FLOOR, P.A. / SCORE BOARD
- NEW CEILING AND LIGHTING
- BLEACHER & COURT LAYOUT
- ADDITIONAL STORAGE

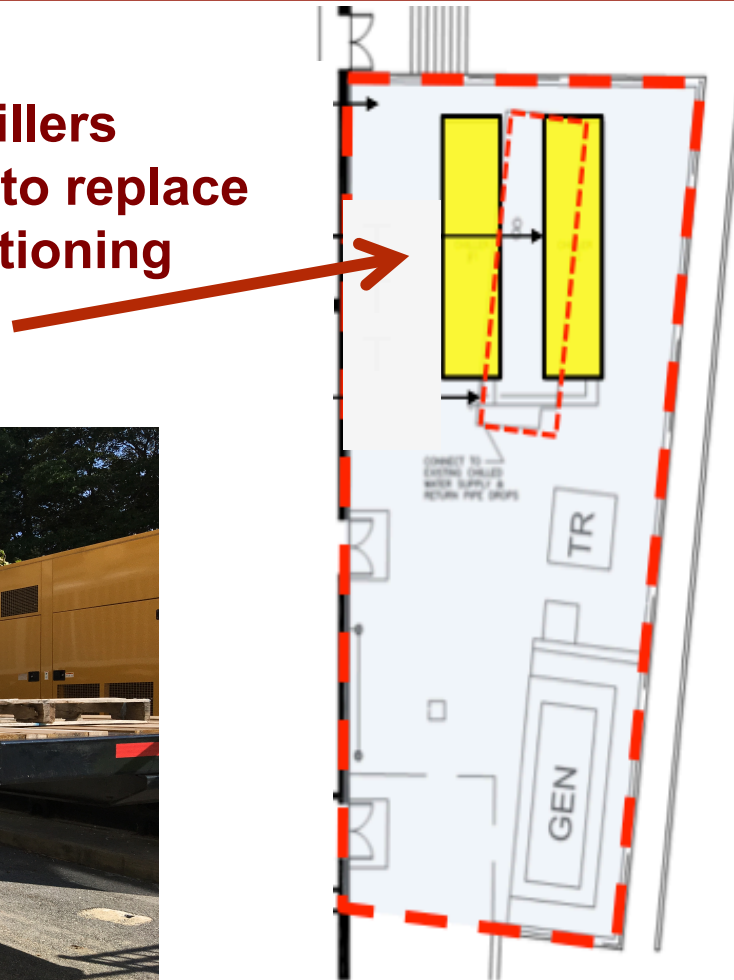
LEVEL 2

Proposed Renovation Plans: Chiller Replacement

**Second season
renting chiller for
high school**



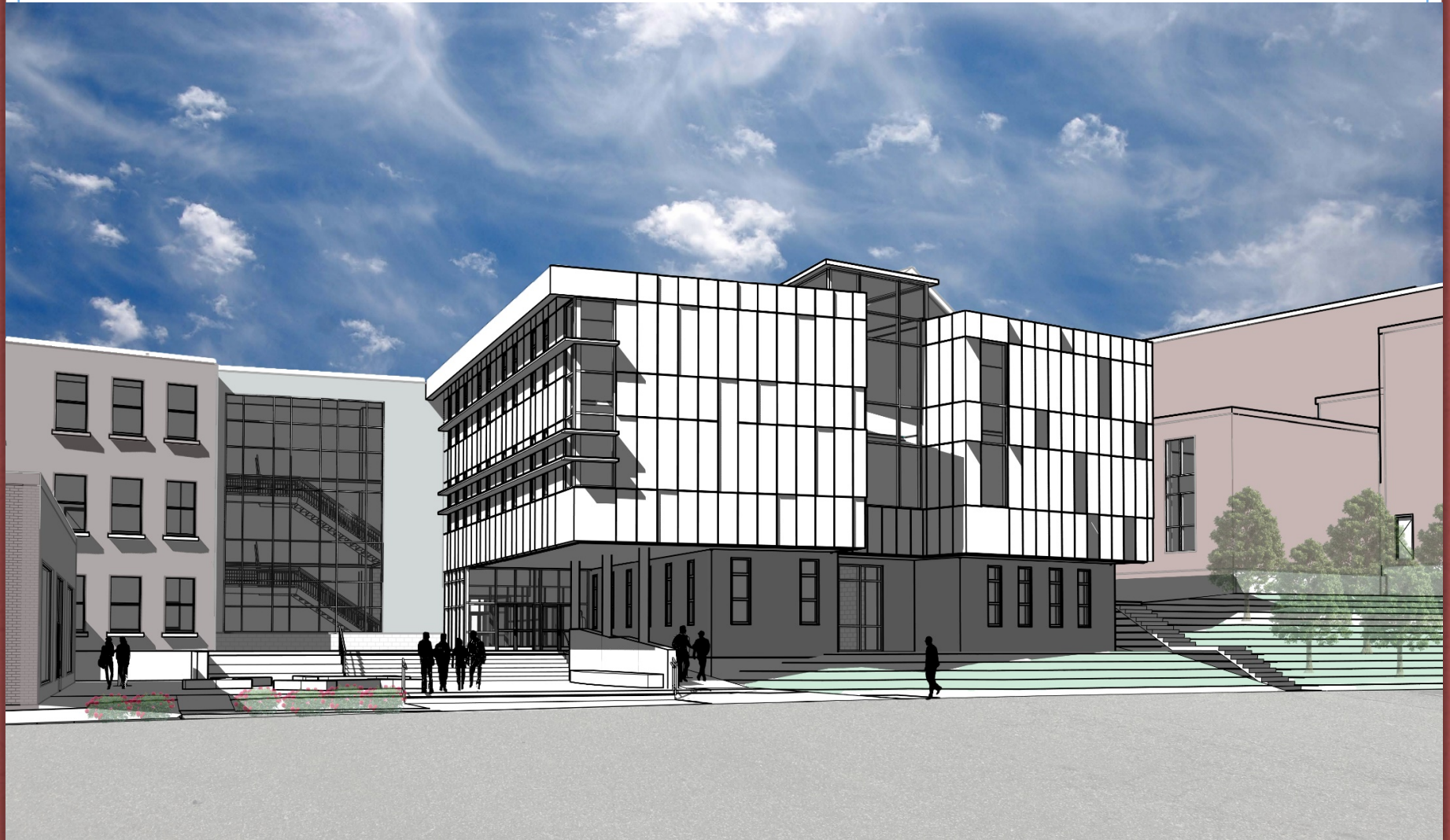
**2 new chillers
installed to replace
non-functioning
chiller**



Proposed Renovation Plans: Total Costs

• Classroom expansion & renovations	\$11,994,000
• Chiller replacement	\$ 801,000
• Gym “A” renovations & storage	\$ 1,468,000
Total:	\$14,263,000

Proposed Renovation Plans: Elevation View from Webster Street





**Town of Needham Special Town Meeting
October 2, 2017**

Article 11: Appropriate for High School Expansion Construction

Frequently Asked Questions

1. What does this article accomplish?

Article 11 appropriates \$13,188,000 for one project to address three critical problems at Needham High School:

- Expands core academic classroom space to address significant overcrowding;
- Renovates the original “A” Gym to repair several infrastructure needs and meet growing program demands; and
- Replaces non-operational HVAC equipment.

The classroom expansion component constructs a new ten classroom wing at the Webster Street entry to the school. The new wing will also include much-needed conference, office, and storage space. Several existing spaces within the high school would also be renovated to meet student and program needs.

The second component of this project would renovate the 1950s era “A” Gym, including the replacement of the floor, ceiling / lights, & ventilation system, the refurbishment of the walls, and relocation of basketball hoops / scoreboards. Additionally, the project adds much needed equipment storage to the gym area, and would reconfigure and increase the number of gym lockers to accommodate the expanded student population.

The third portion of this project improves boiler efficiency and replaces the 300-ton chiller with two 250-ton chillers to provide adequate HVAC for the entire building.

All three components of this one project will meet the needs of the high school for many, many years to come.

This article requests funds for construction of the proposed expansion and renovation project. The 2017 Annual Town Meeting had previously appropriated \$1.075 million for project design (including \$950,000 for the classroom expansion and gym renovations and \$125,000 for chiller replacement.) The total cost of the project is \$14,263,000. This article requests the balance of the funds, \$13,188,000, needed to complete the project.



Proposed
Expansion
View from
Webster Street

2. Hasn't this cost increased since the May 2017 Town Meeting presentation? Why?

Yes, the final project cost exceeds what was presented to the May Town Meeting by \$991,000. The major factors in the increased costs are:

- The total number of square feet to be constructed increased by about 1,000 square feet and the total number of renovated spaces increased by about 3,500 square feet adding about \$550,000 to the total project.
- The original estimate shared with May Town Meeting did not include painting, fire suppression system, storage, and demolition, for the "A" Gym component, all totaling about \$300,000.
- The ventilation units on the roof of the "A" Gym require additional steel supports and equipment than anticipated, adding approximately another \$120,000 to the total project costs.

3. What is the breakdown of cost components for this project?

A breakout of the cost of the component parts of the project appears below:

Classroom Addition & Renovation	"A" Gym Renovation	"A" Gym Storage	Chiller/Boiler	Total
\$11,994,000	\$1,187,000	\$281,000	\$801,000	\$14,263,000

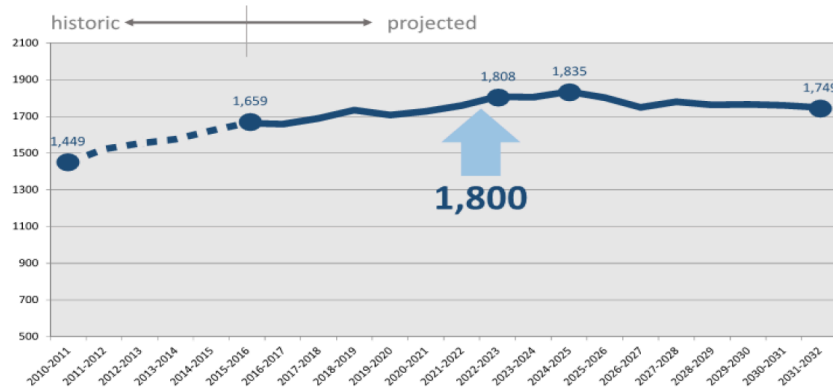
4. Given the need to be prudent about escalating costs and scope, did the designer and contractor consider ways to cut costs or value engineer the design without jeopardizing program needs?

The design team has identified over \$1.0 million in value engineering (also called Value management or VM) project savings during the schematic design process that do not directly affect the educational program. The VM items include a reduction in the cost of several exterior plaza finishes and seating, the deferral of a project to renovate the grade level offices, a reduction in the number of building cantilevers (which reduced the amount of structural steel required), a reduction to a portion of the concrete underpinning, a reuse of existing ductwork in the gymnasium and a simplification of electrical and lighting systems in the classroom addition. In addition, the Fixtures, Furnishings, & Equipment budget has been reduced. The design and construction team will continue to review additional VM opportunities.

5. What is the enrollment/space problem at NHS?

In 2009, the Town completed a significant renovation/addition at Needham High School (NHS.) The resulting facility was designed to serve 1,450 students. The current (preliminary September 1, 2017) student enrollment is 1,684, or 234 students above the design capacity. The forecast is for continued growth, peaking at 1,835 in the 2024-2025 School Year, after which enrollment is expected to decline slowly to 1,749 students by the 2031-2032 School

Year. During the peak year, the projected enrollment will be 385 students more than the 1,450-student design capacity of the school. By the end of the fifteen-year period, the 1,749-projected enrollment still will be 90 students more than the current enrollment and almost 300 students higher than the original design enrollment.



These additional students have stressed the building's resources and have resulted in increased class size, particularly in the core academic spaces serving Math, English, Social Studies and World Languages. In 2016-17, 45% of the academic sections have more than 23 students per section, with some sections having as many as 28 students. An additional 40% of sections have between 16-23 students in classrooms typically sized for 19 students, according to MSBA benchmarks. The average utilization rate in these spaces is 90%, which exceeds the MSBA Guideline of 85% (needed to preserve flexibility in scheduling.) The chart below illustrates the 2016-17 utilization of core academic spaces.

Core Academic, Key Findings

Math, English, Social Studies and World Languages

Average Utilization Rate = **90%**

Average Students Per Section = **20.88**

Total Sections w/ Students ≥ 23 = **147** or **45%**

Total Sections w/ $16 \leq \text{Students} < 23$ = **132** or **40%**

Total Sections w/ Students < 16 = **50** or **15%**

329 Sections @85% = 55 Classrooms, 52 Existing

As enrollment increases, the utilization over capacity is projected to worsen, if no classrooms are added at this time as shown below:

Core Academic, Enrollment Growth Without More Classrooms

Math, English, Social Studies and World Languages

Average Utilization Rate = **90%** → **97%**

Average Students Per Section = **20.88** → **22.67**

Total Sections w/ Students ≥ 23 = **147** or **45%** → **60%**

Total Sections w/ $16 \leq \text{Students} < 23$ = **132** or **40%** → **28%**

Total Sections w/ Students < 16 = **50** or **15%** → **12%**

This could force a reduction in the educational programs and diversity of course offerings.

6. Are large enrollments a temporary or a long-term problem?

Increased enrollment is a long-term problem at Needham High School. Based upon Future School Needs Committee projections, student enrollment at NHS is projected to increase to 1,835 students in FY 2025, and remain above 1,700 students for the next fifteen years.

7. What solution is proposed to address the problem of large enrollment?

The School Department, in partnership with the Board of Selectmen, the Permanent Public Building Committee and the Finance Committee, has sought to address the problem of large enrollment at Needham High School through a series of phased projects to expand the capacity of the school.

In 2014-15, the High School converted a number of non-classroom spaces to classroom use, partially funded by a November 2014 Special Town Meeting appropriation of \$200,000. These included: three computer labs (Rooms 706, 707 and 413), two curriculum rooms (701 and 205F), a social studies storage room (403,) the METCO office (Room 608), and a multipurpose room (728.) All of these conversions were accomplished within the current budget, except for the World Language Computer Lab/Storage Room (707) and the large multipurpose room (728,) for which the additional funds were needed.

In addition, Town Meeting supported the expansion of the Needham High School Cafeteria with an appropriation of \$2,250,000, including \$150,000 for engineering/design (May 2015 ATM) and \$2,100,000 for construction (November 2015 STM.) Before renovation, the occupancy limit of the cafeteria was 488 students. At that time, only 6 lunch periods were within the occupancy limit; the remaining 15 periods were over capacity. The expansion project, which added 2,900 s.f. to the cafeteria space, increased the occupancy limit to 596. The added cafeteria space is also used for special classes during non-lunch periods, faculty meetings, winter sports, evening community meetings and special events.

In March 2016, the Needham High Space Needs Task Force released its recommendation to address space needs at the school. The Task Force found that classroom space is currently, and will continue to be, at a premium due to enrollment, and that the school is unable to schedule programs in an efficient and effective way. The Task Force recommended that additional science, general and special education space be added to support the school's existing and anticipated programs, and advocated for a feasibility study to be conducted of the need for additional space.

The May 2016 ATM approved \$65,000 for the feasibility study, which was undertaken by Dore & Whittier Architects and completed in April 2017. The study concluded that, to serve a population of 1,800 students, 60 general classrooms and 15 science labs are needed, which is eight more classrooms and one more science lab than exist today. The proposed additional spaces would allow the utilization rate in Core Academic areas to reach 85%, and then remain at 85% even when enrollment increases, and would relieve overcrowding by allowing a maximum of 24 students per section. Additionally, the study recommended that additional special education spaces are required and that the proposed design include student collaboration spaces that allow students to congregate and work together.

The feasibility study examined a variety of options for achieving the needed additional space, including an option to build a new classroom wing at the Webster Street Entry. The

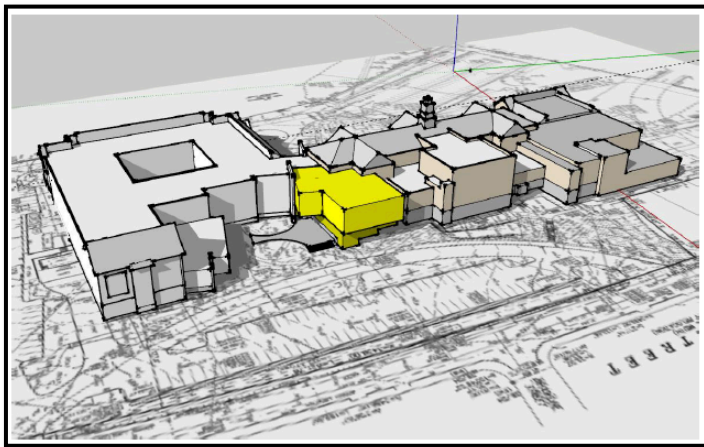
School Committee and Permanent Public Building Committee unanimously voted to support this option (Option F summarized below) in March 2017, as that option which came closest to achieving the program goals and addresses the key needs at Needham High School.

If funded by the October 2017 Special Town Meeting, this one project will meet the remaining three critical needs at Needham High School for many years to come.

8. What is the design plan for classroom expansion at Needham High School?

Based on the feasibility design work of Dore & Whittier, the School Committee endorsed a project to construct an addition to Needham High School facing Webster Street. The proposed new addition is adjacent to and above the existing Webster Street building entrance. It would provide space for administration and storage on the ground/entrance level and new classrooms on two floors above. There would also be some renovation of space within the existing building. The project includes construction of ten new classrooms and the renovation of interior spaces for one science lab and the special education program. The new classrooms are generally larger than existing classrooms and will provide greater flexibility for scheduling and student programming needs. The new wing also accommodates student collaboration space within the design and locates general classrooms close to the academic center of the building, placed on the connection corridor between the old and new areas of the school. The total cost of this component of the project is \$11,994,000.

As a benefit, the proposed project minimizes the impact of construction on the existing building compared to the other options, and the contractor, Consigli Construction, plans to complete the project within a seven-month construction timeline minimizing disruption to the school, its students, and the neighborhood.



Conceptual Massing Model of Option F as viewed from above the Webster St. entrance.

9. What alternative design options were considered for Needham High School?

Dore & Whittier developed five design options, described in the chart below. Each option had pros and cons, with the Webster Street addition offering to meet the largest portion of the design goals for the project at a reasonable value with the least impact during construction. In March 2017, the School Committee and Permanent Public Building Committee voted unanimously to support the Webster Street Addition option.

Design Option	Total Cost	Design Goals Met	Pros/ Cons
("B") Internal Renovations	\$8.6 M	50% Classrooms (4) 100% Science Lab (1) 27% SpEd Spaces	Pro – Renovations only; lowest cost. Con – Achieves lowest amount of design goals; Extensive construction within the building; reduces Media Center and department offices.
("C") SW Corner Addition	\$9.8 M	75% Classrooms (6) 100% Science Lab (1) 50% SpEd Spaces	Pro – Single phase construction Con – Temporary classrooms needed; Impact to adjacent classrooms and site area.
("D") Move Media Center to Courtyard Renovate existing Media Center with a new mezzanine into classroom spaces	\$22.3 M	100% Classrooms (8) 100% Science Lab (1) 41% SpEd Spaces	Pro – Centralized Media Center Con – High cost; Multi-phased construction; Extensive construction within building; Reduced Media Center size; Reduced Department offices.
("E") New Media Center on Webster Street Entry, Renovate existing Media Center with a new mezzanine into classroom spaces	\$17.5 M	100% Classrooms (8) 100% Science Lab (1) 75% SpEd Spaces	Pro – New Media Center; Centralized classrooms; Improved Administrative spaces. Con –Extensive construction within building; Multi-phased project; Construction impact to bus loop, parking and Webster building entrance.
("F") New Classroom Wing on Webster Street Side with some internal renovation	\$11.4 M	100% Classrooms (8) 100% Science Lab (1) 80% SpEd Spaces	Pro – Achieves highest amount of design goals; Moderate cost; Minimizes construction impact on existing building; improved administrative space. Con –Construction impact to bus loop, parking and Webster building entrance.

10. The High School was renovated from 2005 to 2009. Why are additional improvements needed now?

The significant increase in student enrollment was unanticipated at the time of the original NHS renovation and expansion. Further, School Building Authority funding guidelines in effect at the time would not have reimbursed the Town for the additional growth, even if the growth had been fully anticipated during the renovation planning stages.

The design enrollment agreed to with the School Building Authority over 10 years ago, was 1,450 students. During the course of design, as enrollment projections began to show increases, the architects considered the building's ability to accommodate up to 1,600 students on an interim basis. Today's enrollment projections are indicating a sustained enrollment of over 1700, with peaks reaching 1,835 students. Over 85% of core academic classroom teachers share multiple classrooms. Current class sizes exceed district standards, impact student learning, and constrain school programs.

11. What alternatives to adding additional classrooms have been considered?

- a. **Adjusting the student schedule to utilize existing space more efficiently, or increasing the number of periods.** The current core academic instructional space is scheduled at 90% utilization. While increasing the number of periods would alleviate some of the challenges facing NHS, it would more than likely exacerbate the space problem, because students would need to be scheduled into additional class periods with no additional space available. In addition, this would reduce the required 'time on learning' standard in individual classes.
- b. **Increasing class size.** The Needham High School already has increased class size. Currently, there are an unprecedented number of individual course sections with 23 or more students enrolled across all academic departments at NHS. As noted by Dore and Whittier, over 45% of sections have 23 or more students in classrooms of 725 s.f. that are appropriate for 19 students, according to MSBA guidelines, with some sections reaching 28 students. The increase in class size has had a deleterious effect on the academic social emotional learning program, as teachers are trained and expected to foster strong individual academic relationships with students.
- c. **Using non-traditional spaces as classrooms.** Since FY 2011, several non-traditional spaces already have been converted to address enrollment. For example, curriculum planning rooms 701 and 205F have been converted to fully-scheduled classrooms. Conference Room 702A has been converted to the District METCO Office as the original METCO Office in Room 608 is converted to a general education classroom. Storage Room 403 has been converted to an Art Therapy room, and the Guidance Student College Counseling area and has been repurposed into two school counselor offices. Computer Writing Lab 706 has been replaced by mobile technology and converted into a shared classroom. Each of these conversions has had a significant impact on student and professional life at Needham High School.
- d. **On-line and off campus learning.** The school has assessed the options for Off-campus internships, community college classwork and on-line learning options. These offerings are available but only affect a small proportion of the senior class and, therefore, have a very limited impact on reducing the overcrowding.

12. What other improvements are planned as part of the NHS expansion and renovation project?

The School Committee hopes to make other improvements to the school, including renovating the A Gym, replacing the building's chillers, and optimizing the school's boilers.

Gymnasium A was added to the High School in the 1950's, and remains essentially in its original configuration. Little or no refurbishment of the "A" gym occurred in the 2005-09 renovation project. The project would replace the gym floor, relocate the ceiling mounted basketball hoops, replace the rooftop-mounted ventilation units, replace the lighting and floor systems, remove the wood paneling, repaint the entire space, and install acoustic panels to the underside of the exposed roof deck. Additionally, the project would add much needed equipment storage to the gym area, and would reconfigure and increase the number of gym lockers, to accommodate the expanded student population. Finally, new bleachers, which have previously been purchased, will be installed.

The school is heated by four cast iron boilers and cooled by an air-cooled chiller. Only three of the boilers are operational; one has stopped working possibly due to debris and sludge within the system. The air-cooled chiller, located outside the school, is damaged and has not been in operation since last year. During the cooling season, the Town's Department of Public Facilities has rented temporary chillers, at an annual cost of about \$63,000, to operate the chilled water system. An independent evaluation of both systems has recommended that the boilers be retained, but that they be cleaned and inspected for interior damage and that minor upgrades be undertaken. However, the evaluation concluded that repairing the existing chiller is neither viable nor feasible. This project would replace the 300-ton chiller at the High School with two 250-ton chillers. The new chillers will accommodate the current building needs, as well as the additional square footage from the expansion project.

13. What is the project timeline?

If Special Town Meeting authorizes the \$13.188 million to construct this project, the contractor will begin work in February 2018 and complete it in time for the opening of school next September 2018.

14. Why does the 1950s era gymnasium require renovation?

The "A" Gym no longer meets the contemporary and future needs of the high school or the community.

Needham High School has one of the largest interscholastic, intramural, and club sports programs in the state. In the 2016-17 school year over 1,850 spots on teams were filled by student athletes who participated in over 46 interscholastic and club programs, many of which require practice and/or game space in the "A" and "B" Gyms throughout the year, including in the summer.

The "A" Gym is also heavily used by many Town teams and programs throughout the year. Needham Park and Recreation, Community Education, Metrowest Basketball, St. Joe's CYO, YMCA, Boston Hurricanes, and many other local youth and adult leagues and programs

participate in basketball, volleyball, badminton, tennis, and fitness programs in the “A” Gym. Also, craft, antique, school music, and other community groups, including the Needham Education Foundation, utilize the “A” Gym for numerous fairs, concerts, and events.

Additionally, all Needham High School students use the “A” Gym as part of their wellness/physical education program. Due to a lack of appropriate storage space, the “B” Gym is used for partial storage, which inhibits school programming.

The reality is the “A” Gym is a highly visible and over-scheduled facility, and it is the only venue in Town that can accommodate over 1,270 people for a school or community event.

It is accurate to say that thousands and thousands of students, athletes, fans, children, and community members access and use the Needham High School “A” Gym annually, and it is both timely and cost efficient to tackle this component of the high school project now.

If approved, this component of the project will:

- Replace and reconfigure the “A” Gym floor to provide for a high school regulation-sized basketball and volleyball space that meets standards and addresses safety concerns for athletes and fans.
- Ensure that the refurbished floor system can accommodate the new bleachers (previously authorized by Town Meeting and purchased by the Town) and offer additional seating in the end zones for players, officials, and fans.
- Replace missing/broken ceiling tiles in the “A” Gym and replace the lighting system to ensure functional and contemporary lighting standards are met.
- Replace the rooftop ventilation units with a modern HVAC system. (Air conditioning will not be installed.)
- Refurbish and replace basketball hoops, clocks, and scoreboards.
- Add 440 square feet of storage space to the north side of the “A” and “B” Gyms to accommodate the existing PE and athletic program storage needs.
- Provide for acoustical and wall panels that will assist with noise levels and offer additional safety; refurbish certain electrical components and provide for painting.
- Include new scoreboards and refurbished basketball backboards.

The renovated and refurbished “A” Gym will meet the needs of high school and Town programs for many years to come, and it will be a source of pride for the entire community.

15. Will the proposed project present a disruption to students at the school?

The contractor, Consigli Construction, has an excellent track record with providing for the safety, security, health, and wellbeing of its clients and workforce; this is particularly true when a project involves students. Consigli was also the contractor the Town hired and who successfully and safely renovated the Newman Elementary School while students remained on campus.

The project will impact traffic patterns in and around the high school but will minimally disrupt the school’s program. Construction on the classroom expansion, for example, will take place outside the existing building’s envelope and will be fenced off from all students and staff. Renovations to the interior of the building, including the “A” Gym, will take place

over the summer. Over the summer months, additional shifts are proposed to speed construction along and ensure the school can be ready for classes in September 2018.

We anticipate that up to 75 parking spaces will not be available to students in the spring of 2018 so that the contractor can have room for construction lay down to store equipment and materials. In addition, the school will have to adjust its morning and afternoon student drop-off and pick-up routines to accommodate construction. For example, the emergency exit from one of the high school's parking lots to Rosemary Street may be opened to accommodate smooth and safe traffic activity.

16. How will the Town fund this project?

Funding sources are noted in the Town Meeting Warrant Article #11.

17. Is this expansion and renovation project going to meet the needs of Needham High School or will the School Committee request additional renovations at NHS?

If Town Meeting authorizes the funds for this critical expansion and renovation project at Needham High School, the School Committee recognizes that three important needs will be addressed and will serve the student population for many years to come.